A CASE STUDY OF THE COGNITIVE APPRENTICESHIP MODEL IN LEADERSHIP EDUCATION

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled:

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And hereby certify that, in their opinion, it is worthy of acceptance.

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Dedication

This work is dedicated to my loving parents, Roger D. Larsen and Carolyn A. Larsen. Thank you for telling me I could, and then demonstrating that conviction as role models.

Acknowledgements

I wish to express my deepest appreciation to the late Professor David H. Jonassen and to Professor Gail Fitzgerald, my two academic advisors in the doctorate program at the University of Missouri in the School of Information Science & Learning Technologies. Also, I recognize the members of my research committee – Professors Julie Caplow, Joi Moore, Allan Ensor, and Rick McGuire. I have the most profound admiration for each of these consummate scholars. Their meticulous mentorship has been a blessing, and any ascension of my own comes only because I have stood on the shoulders of these fine men and women.

I entered the program with an agenda, or at least a floundering inclination of a research area. Dave's wonderful patience and insightful wisdom helped me reify and refine those ideas over the first two years of my studies, until Dave's sad passing. At that tender time Gail stepped in gracefully and put me back to work with remarkably prescriptive detail – which is precisely what I needed at that moment. Gail has been my steadfast champion ever since. And it is enormously gratifying that having begun my master program some fifteen years ago with Gail, that she is now again at my side for the completion of my doctorate program. I am so grateful.

Finally, this acknowledgement would not be complete without offering a sincere note of thanks to my dear wife and friend, Hae-jung. These last four years I appear to be moving in slow-motion as she labors to balance our budget, rushes our two beautiful daughters to school, doctor appointments, and birthday parties – all while instructing them in mathematics and piano lessons (at least I think those are my girls playing the piano upstairs, it could be the radio). Whereas in that same time I have only been vaguely aware when I look up from my studies that I have been parading around the house in my pajamas and bathrobe for the past four years. Sweetheart, thank you. And I promise to start shaving and showering again as soon as I get a job.

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Abstract

The cognitive apprenticeship model (CAM) has been examined for more than a quarter century as an instructional model from the perspectives of instructors. However, CAM is also a learning model. Remarkably little has been offered regarding the manner by which learners experience this model, and yet such perspectives are relevant to the successful design of CAM for instruction and learning. Accordingly, this research sought to describe learner perspectives, motivations, and coping strategies through the lived experiences of students as they used CAM within an education program to develop leadership competencies.

Collins, Brown, and Newman's (1987) seminal work in CAM followed the theoretical traditions of Piaget, Bandura, and Vygotsky in cognitive and social learning models. Collins et al., elaborated beyond the physical task mastery of traditional apprenticeships to discover tacit knowledge within cognitive apprenticeships by asking, "How do masters think?" That past work begs new questions: How do learners describe their experiences using CAM in education? And are learner and instructor perspectives of mastery congruent?

This research developed a case study using a grounded theory technique. Four students nearing the end of a three-year leadership program participated over the duration of a weeklong leadership session. Findings discovered that (1) learners preferred to explore through non-evaluated play; (2) failure elicited greater effort only if the learner initially expected to succeed; (3) humor was a preferred learner coping strategy; and (4) the learner's emotional state influenced adherence to the cognitive model. These findings suggest four key assumptions of learner participation in CAM require further study and refinement.

CHAPTER 1 - INTRODUCTION

This research sought to achieve an understanding of how learners experience the cognitive apprenticeship model (CAM) within leadership education in order to better inform educators, instructional designers, and educational institutions leveraging CAM. The findings presented through this study may have wide applicability for education using CAM, particularly where it applies to instruction on leadership competencies.

Statement of the Problem

Traditional apprenticeship represents the oldest means of learning from experience (Lester & Johnson, 1981; Jonassen & Hernandez-Serrano, 2002), with mention of apprenticeship dating as far back as 2100 B.C. in Hammurabi's Code (Cash, Behrmann, Stadt, & Daniels, 1997). CAM as pioneered by Collins, Brown, and Newman (1987) is a modern embodiment of the historically proven apprenticeship method, and CAM expands experiential learning into tacit thinking processes by making such processes explicit through modeling (Jonassen, 2011). Yet collaboration between master instructor and apprentice learner inherent within CAM has been explored chiefly from the master instructor perspective. Where the apprentice learner has been considered, the focus of such investigations emphasized measuring learner performances rather than interpretation of learner perspectives, motivations, efficacy, or metacognitive awareness of learning (Jarvela, 1998; Lajoie, 2009; Alfieri, Brooks, Aldrich, & Tenenbaum, 2011).

If research intends to inform scholarly institutions on the instructional design of the pedagogical implementation of CAM, it is prudent to include perspectives of all stakeholders, including the apprentice learners (Dennen & Burner, 2007). With that goal in mind, this study investigated CAM through a qualitative method and analysis as CAM was leveraged within a leadership education program in the Midwest of the United States.

Overview of Leadership Education

Although there is little consensus on a definition of leadership, a working description includes both the positional status of the leader and the act of being a leader, and involves the artful process of influencing others to achieve a common objective or goal (Chemers, 1997). Instruction of leadership focuses on identified attributes including roles, relationships, behaviors, dispositions, and values of successful leaders (Richards & Engle, 1989; Kirkpatrick & Locke, 1991). Yet Kirkpatrick and Locke note controversy in this emphasis because, as they claim, there exists no conclusive evidence that awareness or even possession of such attributes consistently guarantee leadership success.

In his review of leadership research, Brungardt (1997) differentiates between leadership education as an abstract theoretical approach to leadership, and leadership development obtained through practical experience in service as a leader. Brundgardt's distinction between theoretical approaches to leadership education juxtaposed with leadership development through practical experience appears to advocate experiential education as a viable alternative for the development of leadership competencies.

Experiential education involves both instruction and practical experience that seeks to transform the learner's identity (Colley, James, Diment, & Tedder, 2003). The emphasis here is on *being* a leader. Fittingly, Kirkpatrick and Locke (1991) conclude that character traits and the personality of the learner evolve as the learner actively participates as a leader. The value of experiential leadership education is the learner's opportunity to actively be a leader – leading, inspiring, and making decisions to solve problems. Moreover, learners gain membership in a community of expertise, an umbrella group formed around the interests and expertise of its members across the breadth of a specific competency.

Theoretical Framework

Collins, Brown, and Newman (1987) pioneered a theory of cognitive apprenticeship as a model for both instruction and learning. The problem-solving nature of CAM renders it suitable for development of leadership (Jonassen, 2011). Since Collins, Brown and Newman's earlier work, significant strides in research have been made within various disciplines of study regarding how and to what effect educators leverage cognitive apprenticeship as an instructional model, although much less has been said of cognitive apprenticeship as a learning model.

Recent research in CAM has pushed beyond nuanced definitions to explanations that link CAM to other existing theoretical models of pedagogy. Brown, Collins and Duguid (1989) link CAM to the theory of situated learning, meaning pedagogy situated in real-world activity as opposed to classroom lecture. Hmelo-Silver (2004) has also linked CAM to problem-based learning (PBL) with the rationale that both CAM and PBL benefit from situated learning in authentic problems and environments explicitly because a masterful instructor interacting with an apprentice learner is "critical to making problem-based learning function well" (p.201).

Inroads and progress on the cognitive apprenticeship model are too numerous to annotate here. Still, Dennen and Burner (2007) write that further progress in the cognitive apprenticeship model will require research on "the development of guiding principles to support instructional design, teaching, and learning based on this model" (p. 437). This study proposes to advance our understanding of the last theme on their list, *learning* through CAM.

To date, research focusing on the learner within CAM appears to seek validity of the model through learner performance (Lajoie, 2009; Alfieri, Brooks, Aldrich, & Tenenbaum, 2011). In contrast to that trend, Jonassen (1991) explains that cognitive theory is not merely

concerned with what leaners do or how they perform, but more so "cognitive psychologists are interested in what learners know and how they come to acquire" such knowledge (p. 6).

Preliminary studies indicate that learners believe CAM helps stimulate learning when the learning is situated in authentic context and when the learners are meaningfully engaged within a community of expertise (Rogers, 2000; Stalmeijer, Dolmans, Wolfhagen, & Scherpbier, 2009). Further, it has been established that the nature of collaborative learning inherent in cognitive apprenticeships benefits learners in their achievement, self-efficacy, and relationships with peers (Johnson & Johnson, 2007). Yet again there has been little examination to date of how the learners experience, perceive or leverage CAM as a learning strategy (Dennen & Burner, 2007). Jarvela (1998) argues that learner activities and interpretations in cognitive apprenticeship environments have not been adequately analyzed, and that this calls for a discussion on "the complex interactional bases for individual students' motivation" (p. 293).

Rationale for the Study

The gap in our understanding of how CAM is leveraged as pedagogy is that we have yet to identify a descriptive narrative of how learners experience this model, what learning strategies they might employ, and how learners perceive benefits or consequences of CAM. This research sought to investigate learner experiences of CAM within the scope of leadership development.

The value of obtaining learner perspectives on CAM within leadership education affords informed decisions for institutions, instructional designers, and educators (Dennen & Burner, 2007). Traditional apprenticeships are recognized as some of the oldest forms of instruction known to humankind (Lester & Johnson, 1981; Jonassen & Hernandez-Serrano, 2002). CAM is a contemporary innovation of this successful method of instruction. CAM is linked to social learning theory, situated learning models, and problem-based learning that presently informs

educators and instructional designers (Brown, Collins, & Duguid, 1989; Bandura, 1997; Hmelo-Silver, 2004). Further research holds the promise of developing the guiding principles for CAM as a learning model as addressed by Dennen and Burner. Learner perspectives of CAM within leadership education sheds light on learner motivations, strategies for growth, and awareness of their learning preferences toward leadership competency for future instructional design.

Rationale for Qualitative Methods

Using qualitative research methods, this study sought to establish an understanding from which to direct future research and ultimately inform the design of CAM. The intent was to gain insight into the learning model, to understand learner motivations, and to discover emergent trends in learner perspectives and behavior as they actively participated in a learning program as leaders of small teams in decision-making exercises. This research conducted interviews and field observations of learners using CAM in leadership education.

Qualitative research afforded examination of the "how and why" of decision-making (Silverman, 2010) and this was deemed appropriate to investigate leadership education because so much of the learning activity focused on decision-making. This study did not seek to quantify "how many" or "how often." Instead, this study sought to understand how learners thought and behaved, and what they valued about CAM as they developed leadership competencies.

Research Questions

The central purpose of this study was to explore the lived experiences of learners using CAM to develop leadership competency. The intent of this study was to identify a descriptive narrative of learner experiences of CAM during instruction on leadership, and then to explore that narrative in order to discover learner perceptions of CAM as learner perceptions pertained to the development of leadership competencies. This study addressed two research questions:

1. In what ways do learners describe their experiences using a cognitive apprenticeship model in leadership education?
    a. How do learners describe motive for studying through this model?
    b. How do learners articulate metacognitive awareness of their development?
    c. How do learners express connection to the community through this model?
2. To what extent is learner self-assessment congruent with instructor assessment of the learner's leadership competency development?

Key Terminology

Authentic scenario: A socio-historical context of a learning activity in which meaningful real-world tasks are convincingly replicated for the learner to practice (Godden & Baddeley, 1975; Jonassen, 1999; Ormrod, 2012).

Community of expertise: An umbrella group that draws on member expertise across the breadth of a specified topic for a professional, technical, or interest-based community (Expert Groups: Communities of Practice, 2014).

Ill-defined domain: A problem for which there exists no systematic means to verify if a proposed solution will be acceptable (Lynch, Ashley, Aleven, & Pinkwart, 2006).

Ill-scripted domain: A problem that (1) requires multiple conceptual models to solve, and (2) the interactions of conceptual models vary with great irregularity across problems that are otherwise similar in classification (Spiro, Feltovich, Jacobson, & Coulson, 1995).

Leadership competency: The artful process of (1) Creating and communicating a vision of success for the organization; (2) Building trust through candid relationships; (3) Using influence to align goals of the individual and organization; and (4) Cultivating the success of others while leading the organization to success (Wade, 2014).

Learner autonomy: A situation or learning environment in which the learner assumes the authority to make decisions, and the learner is then responsible for implementing those decisions (Holec, 1981; Dickinson, 1994).

Learner coping strategies: A conscious effort to solve problems through the mastery of learning tasks, or the mitigation of stress in the learning environment (Weiten & Lloyd, 2008).

Self-determination: A theory that posits learner benefits based upon the degree to which a learner's behavior is self-motivated and self-directed (Deci & Ryan, 1985).

Self-efficacy: An individual's belief in their own ability to achieve established goals (Bandura, 1997; Ormrod, 2012).

Tacit knowledge: A collection of thoughts, intuition, skills and competencies that are the result of cultural, situational, environmental experiences and are discovered through a metacognitive reflection on processes (Wilson, Jonassen, & Cole, 1993).

Zone of Proximal Development: The identified skill gap between what a learner can achieve alone and what a learner can achieve with the help of a skilled expert. This concept is attributed to Lev Vygotsky's work on social learning theory (Ormrod, 2012).

CHAPTER 2 – LITERATURE REVIEW

The cognitive apprenticeship model (CAM) affords mediated application of skills, plus synthesis for those learners who connect meaningfully with the community of expertise and then begin to define their own problems to solve (Lave & Wenger, 1991). CAM facilitates advanced cognitive learning objectives of application, analysis, and synthesis within Bloom's (1956) taxonomy due in part to its inherent problem-based nature that offers the critical opportunity to take risks and make decisions. Furthermore, instruction through CAM seeks to achieve affective domains of valuing, organizing, and characterizing within Bloom's taxonomy.

The most powerful advantage of leadership education through CAM instruction is the apprentice learner's opportunity to explore the situated problem by taking risks while making decisions as a leader. "Leaders work from high-risk positions, indeed often are temperamentally disposed to seek out risk and danger, especially where opportunity and reward appear high" (Zaleznik, 1977). In her research of the implications of risk-taking decisions for pedagogical theory, Clifford (1991) concluded that learners were more often engaged in their studies when risk-taking was involved, and that such decision-making autonomy elicited an increase in learners' academic efforts. In turn, learner autonomy results in learners with a stronger sense of self-efficacy and self-determination in their own scholarly development (Dickinson, 1994).

Pertinently, through his decades-long research on decision-making situated in naturalistic settings, Klein (1999) contends that within organizational meritocracy, leadership is assigned to the members who are most experienced in decision-making. Experienced leaders make decisions quicker than inexperienced leaders, and the decisions of experienced leaders are more often and more consistently effective (p. 21). Klein maintains that leaders "need a certain amount of experience to use analogical reasoning reliably…novices run the risk of missing

important causal factors" which too often results in an incorrect decision (p. 210). The implication being that leadership education must create for learners a rich series of applied decision-making experiences, which they may reference for future decisions.

To that effect, Jonassen (2011) suggests that decision-making within "problem-solving learning environments are perhaps the most appropriate medium for engaging students in cognitive apprenticeships" (p. 160). Situated learning in CAM, when coupled with a master instructor, immerses the apprentice learner in an engaging cognitive apprenticeship from which they are motivated to behave, think, and make decisions like masterful leaders.

Motivational Theory and Self-Efficacy in Leadership Education

A interdependent relationship exists between learner motivation and learner self-efficacy within leadership education (Deci & Ryan, 1985; Chan & Drasgow, 2001). Deci and Ryan delineated *approach motivations* as originating from the desire to gain positive reward; and *avoidance motivations* from the desire to avert negative outcomes. Chan and Drasgow then linked leadership behavior to motivation theory. Chan and Drasgow measured five personality traits as antecedents to determine that leader self-efficacy and leadership experience predict learner motivation to lead. Their study involved large-scale multivariate hierarchical linear regression with 1,594 Singaporean military recruits, plus 274 Singaporean college students, and 293 US college students, all between 16 and 25 years of age. As self-efficacy lends to higher levels of motivation, this results in internalized values that regulate cognitive processes and conceptual understanding of cognitive processes (Deci, Vallerand, Pelletier, & Ryan, 2011).

Hughes (1993) explored leadership competency through the development of cognitive and behavioral processes. He proposed that leadership is developed through experience, but that more often than not insights to underlying principles of leadership are gained through academic

study. Hughes suggested that processes of leadership are therefore learned more effectively when supported by deliberate scholarly scaffolds, lending to greater learner self-efficacy.

Self-efficacy has an identified positive correlation to learner motivation and leader success (Bandura, 1997; Tschannen-Moran & Gareis, 2004). Bandura noted that learners who have a strong sense of their own ability to master a task will redouble their efforts in the face of obstacles, whereas learners with a weak sense of self-efficacy will often decrease their efforts. Tschannen-Moran and Gareis' study of 157 high school and middle school principles further establishes the positive impact of self-efficacy as a factor correlated to successful leadership experiences. The implications are that a strong sense of self-efficacy directly impacts the learner's willingness to accept leadership experiences, resulting more frequently in successful leadership experiences that in turn predict higher levels of motivation to lead (Schunk, 1991; Zimmerman, Bandura, & Martinez-Pons, 1992; Chan & Drasgow, 2001).

Cognitive Apprenticeship Theory

Cognitive apprenticeship is a theory of the manner by which a master instructor teaches an apprentice learner how to think about solving a complex problem (Collins, Brown, & Newman, 1987). This theory is rooted in the constructivist paradigm (Brown, Collins, & Duguid, 1989). Furthermore, CAM branches from the theory of situated cognition (Godden & Baddeley, 1975; Brown, Collins, & Duguid, 1989) that conceives all knowledge as being learned through human activity in authentic contexts (Jonassen, 2011); and from modeling theory that insists learners must be engaged, motivated, have access to necessary information, and have the opportunity to accurately mimic the task or skill (Bandura, 1997).

CAM seeks to make explicit for the apprentice tacit knowledge that is otherwise exclusive to successful leaders (Collins, Brown, & Newman, 1987). Tacit knowledge is

competency of any process that was learned without formal instruction and which only comes to our conscious awareness through a metacognitive reflection on that particular process (Wilson, Jonassen, & Cole, 1993). To mimic tacit knowledge, it is important that the apprentice learner first understand the master's cognitive process and rationale (Ormrod, 2012). Under the observation of the master instructor, the apprentice learner then mimics that cognitive process in an authentic situation for an ill-structured problem (Hmelo-Silver & Barrows, 2006).

Table 1

A Contrast of the Apprenticeship Models (Cash, Behrmann, Stadt, & Daniels, 1997)

Traditional Apprenticeship	Cognitive Apprenticeship Model
Psychomotor Tasks and Processes	Affective and Cognitive Processes
Master observes apprentice's performed work with well-structured outcome.	Master listens to apprentice's reasoning and diagnosis of ill-structured problem.
Learning is achieved by doing physical tasks.	Learning is achieved by externalizing cognitive processes.
Teaching requires modeling, coaching, and fading of the master's presence.	Teaching requires modeling, coaching, and fading plus learner exploration, reflection, and articulation of cognitive processes.
Measurement of task-based performance. e.g. "How well did you do?"	Assessment of goal-based competency. e.g. "What have you learned?"

Table 1 offers a point-by-point comparison and contrast of traditional apprenticeships with that of cognitive apprenticeships. In a traditional apprenticeship the master models the process of a psychomotor task with a well-structured outcome, and then coaches the apprentice

through accomplishment of the same task while eventually fading the master's presence from the apprentice's work over time (Brandt, Farmer, & Buckmaster, 1993; Hansman, 2001). Likewise, modeling, coaching, and fading of the master's presence are also conducted in the cognitive apprenticeship model, however the task involves cognitive and affective processing of an ill-structured problem that may have an unknown outcome (Lajoie, 2009; Jonassen & Land, 2012). Moreover, in CAM the apprentice learner is responsible for activities of exploration, reflection, and articulation of the targeted competency while in the presence of the master instructor in order to affirm and refine the inherent cognitive processes, hypothesize causality, and elaborate solutions (Collins, Brown, & Newman, 1987).

CAM as an Instructional Model

Through this process Collins, Brown and Newman (1987) posit cognitive apprenticeship as a model for both instruction and learning. Instructional methods used by the master instructor in CAM include *modeling*, *coaching*, and *fading*.

Modeling. Given a complex problem situated within an authentic scenario, the master instructor expertly demonstrates in the presence of the learner apprentice the cognitive processes (Brown, Collins, & Duguid, 1989). This includes weighing the value of multiple diagnosis, potential influencing factors, and possible courses of action (Jonassen, 1999). The master instructor achieves this through think-aloud exercises while immersed in the authentic scenario because tacit knowledge of the problem may be lost if the master is not situated in an authentic scenario (Godden & Baddeley, 1975). Furthermore, learning activities in authentic scenario increases the likeliness that the apprentice learner will transfer knowledge, skills, and problem-solving strategies to real-world contexts (Ormrod, 2012).

Coaching. When it is the apprentice learner's turn to solve the situated problem, the master observes while scaffolding the learning activity by offering clues to critical considerations or steps in the process, and provides feedback regarding the apprentice's competency development (Brown, Collins, & Duguid, 1989). There are various techniques employed in coaching, including a master-led question-and-answer routine in the Socratic tradition (Padesky, 1993). Yet Savery and Duffy (1995) caution that this technique does not necessarily involve the popular misconception of the Socratic method in which the master is the sole possessor of all correct answers. Instead, coaching should present a collaboration of master instructor and apprentice learner toward an explorative discovery of expert competence.

Fading. Initially the master instructor must scaffold those tasks for which the apprentice is not yet competent enough to achieve for him/herself (Dennen & Burner, 2007). Over time the master's instructional scaffolds of modeling and coaching are gradually removed from the apprentice's work within the situated problem, allowing the apprentice greater autonomy to explore and elaborate various possible solutions (Brown, Collins, & Duguid, 1989).

CAM as a Learning Model

Cognitive apprenticeship is also a model of learning. Cognitive apprenticeships immerse the apprentice learner in authentic scenarios from which they solve complex problems while under the observation of the master instructor (Bandura, 1997; Dennen & Burner, 2007). Learning methods of the apprentice include *exploration*, *reflection*, and *articulation*.

Exploration. This learning method is employed in two manners. Initially exploration affords the apprentice learner an opportunity to practice solving the problem in the presence of the master instructor, permitting not only a solution to the problem at hand, but also a metacognitive awareness of how to explore, develop hypothesis, and research an identified

problem within that specific situation (Brown, Collins, & Duguid, 1989). In time, as the master fades scaffolding, the apprentice develops autonomous competency, and through conceptual elaboration seeks to establish new problems within the authentic scenario for him/herself (Ormrod, 2012).

Reflection. The apprentice learner must compare and contrast his/her own processes with that of the master's expert processes or with an established model of expertise (Collins, Brown, & Newman, 1987). The objective of reflection is to move the apprentice's cognitive process towards the cognitive behavior of the expert master, and for the apprentice to assume responsibility for his or her own sense making (Hmelo-Silver & Barrows, 2006).

Articulation. It is critical to note that the master instructor cannot observe the reflective process or conclusions of the apprentice learner unless reflection is articulated in some manner. Articulation requires the apprentice to separate domain knowledge of the situated problem from his/her own reasoning processes (McLellan, 1994). The apprentice then verbally expresses reflection of that knowledge and reasoning process in front of the master to affirm and refine both through collaborative discussion (Brown, Collins, & Duguid, 1989).

Instructional Methods of Leadership

Within the epistemological framework of the constructivist paradigm, leadership competency can be conceptually development through problem solving while situated in an ill-defined or ill-structured domain (Jonassen, 1999). That is to say the critical element of learning leadership competency is the presence of an authentically situated problem. Presented here are four methods of situated, problem-based instruction for leadership. This includes one-on-one mentorship, project-based learning, expeditionary learning, and simulation-based learning. Advantages and disadvantages of each are discussed.

One-on-One Mentorship

This method of informal instruction is based on the relationship between a more experienced mentor and a less experienced protégé, by which the mentor assists the protégé in the development of social capital through experience relevant to professional or personal development (Bozeman & Feeney, 2007). The advantages of this method include the protégé gaining experience under careful observation of the mentor, which further mitigates financial or destructive risk. This is arguably the most cost-effective method of vocational leadership education. However Jekielek, Moore, Hair and Scarupa (2002) note the disadvantages of mentorship include a lack of scalability for large numbers of apprentices due to the limited number of willing mentors and the enormous commitment of time. Plus, formal mentorship in the workplace may be less effective in the goal of promoting career growth than developing spontaneous relationships between mentor and protégé (Chao, Walz, & Gardner, 1992; Eby, Rhodes, & Allen, 2007).

Project-Based Learning

This method of formal and/or informal instruction organizes learning around a real-world project, often with an established client and product delivery date. The advantages of this method include meaningful experience and depth of learning (Thomas, 2000). Scalability for greater learner participation is a concern and depends on the specifics of the class size, tasks, and industry (Edelson, Gordin, & Pea, 1999). The disadvantage of project-based learning is that so few instructors are formerly trained or qualified to leverage such instruction, and this method demands an appreciable level of expertise in the area of learning (Thomas, 2000). Concerns of risk and scalability not withstanding, project-based learning is suitable for careers in education, research, and virtually any industry if financial backing is available for projects.

Expeditionary Learning

This method combines formal and informal instruction organized around adventure expeditions to support intellectual inquiry, character development, and community building (Campbell, Cousins, Farrell, Kamii, Lam, Rugen, & Udall, 1996). Outward Bound® international camping adventures pioneered this instructional method that admittedly has much in common with project-based learning, yet expeditionary learning differs in that it invariably involves wilderness fieldwork, teamwork, and reflection with the specified intent to connect learners to the world outside of the classroom (Thomas, 2000). One of the numerous advantages of expeditionary learning is the trend toward retaining learners under the same set of instructors for multiple years, and although the learning sessions are normally dispersed over that timeframe, instructors and learners tend to form strong personal bonds (Rugen & Hartl, 1994). The disadvantage of expeditionary learning is that some learners struggle with self-directed inquiry, and this results in the demand for an even greater array of institutional supports that increase the already considerable cost to the learner and/or institution (Thomas).

Simulation-Based Learning

This method also combines formal and informal instruction to target specific competencies through the simulation of an interesting, authentic, and engaging problem that encourages the learner to reach beyond their current zone of proximal development (Jonassen, 1999). Simulations are appropriate when the risk to humans or property is too great, or when access to equipment or the working environment is simply not feasible. The advantages of simulation-based learning include meaningful depth of experience and mitigated risk. Also simulation is inherently more scalable than real-world enterprises. The disadvantage is that this method can be incredibly expensive and may require significant periods of time to develop.

Alternatively, some forms of simulation offer low-cost solutions as they involve only scenario-game scripting; also commercial game products may offer affordable alternatives for simulation-based learning (Frank, Helms, & Voor, 2000). Simulation is commonly employed in high-risk vocations such as medical, fire and police professions, airline and ship crews, and the aerospace and military industries.

Each of the four methods discussed offer problem solving in an authentically situated and ill-defined or ill-structured domain to target the development of leadership competencies. And regardless of which problem-based method of vocational instruction is employed, each method may suitably be operationalized through a cognitive apprenticeship (Jonassen, 2011).

Germane Research in Cognitive Apprenticeship

A critical aspect of the CAM is that it offers collaborative instruction and learning within the situated context of an authentic scenario. Chi, Bassok, Lewis, Reimann and Glaser (1989) asserted collaborative and contextually situated learning as remarkably powerful in part because such activity produces the greatest recall and retention of memory. Their work illustrates that retention and recall for learning through reading is 10% whereas learning through seeing offers 20% recall. When sight and hearing were combined, retention and recall of memory increased to 50%. What's more, when learners collaborated with one another during the learning exercise, memory retention and recall increased to 70%. Yet most impressive, when learners participated in learning through the conduct of a task, the act of doing and the nuanced understanding that is obtained in-situ results in memory retention and recall of 80%. The work of Chi et al., is consistent with earlier findings on memory recall by Godden and Baddeley (1975) who worked with scuba divers in both land and underwater environments to test for memory.

In the years since the seminal work of Collins, Brown, and Newman (1987) that established the theory of cognitive apprenticeship there has been considerable research on this instruction and learning model. Sampling of research studies shows that much of the investigation to date has focused on cognitive apprenticeship as a model of instruction (Dennen & Burner, 2007). Where investigations have focused on cognitive apprenticeship as a model of learning, all too often the apprentice learners are only measured for established performance outcomes (Jarvela, 1998; Lajoie, 2009; Alfieri, Brooks, Aldrich, & Tenenbaum, 2011).

Yet Jonassen (2011) appears to question the suitability of measuring learner performance, insisting that such measurements are better suited to traditional instruction and apprenticeships. He suggests that cognitive apprenticeships might better be assessed on goal-based competencies of in-situ decision-making, "Rather than learning to think like students, students serving cognitive apprenticeships learn to think like masters. Cognitive apprenticeships make explicit the decision-making required to perform like a master" (p. 160).

Jonassen's cautionary note of appropriate measurements for situated learning not withstanding, Lave and Wenger (1991) assert that in addition to decision-making and masterful behavior, cognitive apprenticeships inform learners on measurable domain content such as language unique to the industry and situation. There are numerous ways to compare and contrast the language behaviors of expert masters with apprentice learners. Clariana (2007) has developed the Analysis of Lexical Aggregate Reader that measures specific language of any two expert masters against each individual apprentice learner to determine congruence and convergence of language over the course of their collaboration.

However, effective collaboration between master and apprentice is often dependent on apprentice perceptions of the master's competency. Schoenfeld's (1998) research suggests that

the comfort level of apprentice learners corresponds positively to the facilitation proficiency of the master instructors. His case study research analyzed one novice and three experienced teachers leveraging situated instruction. Schoenfeld noted the new teacher appeared more comfortable working within the parameters of well-structured problems, but when the students were confronted with ill-structured problems this required deeper insight from the teacher and the new teacher often failed to adequately explain the worked system in-situ. The experienced teachers were often able to leverage the learners' questions of ill-structured problems in order to explain the worked system in better detail. When learners articulated incorrect concepts, the experienced teachers would use such "teachable moments" to facilitate discussion and work toward a better understanding.

Similarly, Hmelo-Silver and Barrow (2006) studied two experienced medical professors using CAM in a situated problem-based learning environment in order to identify a repertoire of masterful facilitation strategies in modeling, coaching and fading. Through this research they determined that effective master facilitation resulted in apprentice learners who were likely to ask both casual and metacognitive questions. Additional findings were that apprentice learners assumed responsibility for their own sense making.

When master instructors are aware of and seek to increase the apprentice learner's zone of proximal development, instructional strategies of chunking, sequencing, and a detailed review of tasks or components show significant benefit to the apprentice learner (Sugar & Bonk, 1998). More precisely, the apprentice learner appears to benefit the most when the master instructor develops regular, structured practice opportunities that focus on the learner's zone of proximal development rather than the master's expectations (Jekielek, Moore, Hair, & Scarupa, 2002).

While acknowledging successful instructional strategies in CAM, it is also important to recognize that the master instructor is often unable to control the direction in which situated learning will move. Jarvela (1998) conducted research with a 7th grade online science class using a Lego environment in a cognitive apprenticeship model to explore learner motivation and emotional interpretation. Her findings concluded that while some of the apprentice learners understood task activities and moved in a direction anticipated by the master instructor, other apprentice learners clearly did not move in the anticipated direction of the instruction. While the apprentice learners received prompts from the master instructor for the learning activity, the apprentice learners interpreted these prompts differently, and therefore created their own motivational and coping strategies.

Jarvela is certainly not the only voice championing self-determined learning. Simply put, the master cannot do for the apprentice learner what the apprentice must do for herself. Ormrod (2012) insists that control of learning is not the responsibility of the master instructor, but instead control of learning is the obligation of each apprentice learner engaged in the cognitive processes of the situation. Ultimately it is the apprentice learner, not the master instructor, who is required to collaboratively and eventually over time independently explore, reflect, and articulate their cognitive processes (Collins, Brown, & Newman, 1987; Dennen & Burner, 2007).

Therein lies the gap of our understanding. To use a Bly (1990) analogy, how exactly or even generally do apprentice learners "steal the key" of autonomy from under their master's pillow? At what point along the path of learning does the apprentice rebuff the guidance of the master and seek autonomy in learning? How does the apprentice know she is ready? How does the master know – or does the master know?

We have yet to identify how learners develop motivational and coping strategies within CAM; or to identify the manner in which learners articulate metacognition of their competency development and signal their readiness for autonomy in exploration. Are these considerations based on the learner's connection to the master and community surrounding the situated learning, or is it more a function of self-efficacy within the domain knowledge? There is some evidence that it is a combination of both. Researching nursing students through situated learning, Cope, Cuthbertson, and Stoddart (2000) found that while these students were readily accepted as members of the professional community, they were still valued as members of the community based upon perceptions of the students' nursing competency. Unfortunately, their study did not elucidate answers to the more perplexing questions of when and how an apprentice learner becomes part of that community of expertise, or how the apprentice and/or master come to realize that an apprentice is ready for autonomous exploration and discovery.

This study sought to address the identified gap in our understanding of learner perspectives of CAM within leadership education for the sake of educators, instructional designers, and institutions. Through an explorative analysis of participant narratives, the objective was to discover emergent perceptions of CAM within leadership education with the intent to better inform and direct future research in this stratum.

To that end, a suitable and accessible program of leadership education that applied CAM through a combination of expeditionary learning and simulation-based learning methods was identified for this study. The three-year leadership program included sequenced coursework and progressively challenging opportunities of applied practice. Apprentice learners were situated in multiple-day simulations of ill-defined and ill-structured domains to solve complex problems in

which master instructors conducted modeling of essential cognitive processes to explicitly detail the tacit knowledge of leaders. This program offered an appropriate context for this study.

CHAPTER 3 – METHODOLOGY

The purpose of this study was to gain an understanding of how learners experience the cognitive apprenticeship model (CAM) within leadership education – defined as sequenced coursework and practical experience in procedural knowledge for the preparation of individuals toward the professional art of influencing others toward a common objective (Wade, 2014). The value of gaining learner perspectives of CAM for leadership education was to address Dennen and Burner's (2007) call to investigate learning through CAM to better inform educators and educational institutions toward effective instructional design of the model.

In pursuit of that purpose, this study addressed the following research questions:

1. In what ways do learners describe their experiences using a cognitive apprenticeship model in leadership education?
    a. How do learners describe motive for studying through this model?
    b. How do learners articulate metacognitive awareness of their development?
    c. How do learners express connection to the community through this model?
2. To what extent is learner self-assessment congruent with instructor assessment of the learner's leadership competency development?

Through qualitative research this study sought to establish an initial understanding from which to direct future research and inform the design and instruction of leadership education. The intent was to gain insight into the learning model, understand learner motivations, and to discover emergent trends in learner perspectives and behavior as they actively participated in an education program on leadership.

To achieve the stated purpose, the investigator established the rigor and trustworthiness of this study through data triangulation and data checking. Triangulation helps to establish data

that reliably reflects the situation described in the study, as well as to establish that conclusions are supported by evidence; member checking, peer checking, and purposive sampling helped establish data that validly represents the participant population (Creswell, 2012). Triangulation provided reliable and consistent data through cross verification of data sources. Analysis focused on three primary sources of data – (1) audio recorded and transcribed semi-structured interviews with participants, (2) audio recorded and transcribed semi-structured interviews with program staff personnel, and (3) observation videos and field notes of learner and instructor interactions during classroom activities and simulations. Radio call logs and participant-created mission orders were also collected from the three-day simulation at the end of the training week to ensure the accuracy of participant reflections during post simulation interviews and video.

Member and peer checking provided further validation of data interpretation, ensuring that explanations offered were those of the participants and not the researcher; while peer checking lended theoretical validity that constructs align with the investigator's conclusions (Lincoln & Guba, 1985; Thomson, 2011). Member and peer checking included (1) the investigator, (2) peer checking with a colleague for content validity, and (3) member checking with the participants of this study for interpretive accuracy. Furthermore, purposive sampling aided in the transparency of the research through an explanation of the investigator's process, interpretation, and conclusions (Thomson, 2011). The process of data collection and analyses are discussed in further detail later in this chapter.

Research Setting

As the investigator of this study, I am also one of the founding members of a private non-profit expeditionary learner school (ELS) that has offered leadership development for 33 years. This program was suitable and relevant to the proposed research because it remains one of the

very few organizations outside of the federal government that leverages CAM for leadership education. It also had the distinct advantage of being accessible.

However, my long-established and close relationship to the ELS leadership program and to the community of expertise created a situation in which potential bias might have arose. To alleviate the potential of bias and/or the potential for conflict of interest I implemented the quality measures of rigor and trustworthiness discussed at the end of this chapter.

Furthermore, this study did not seek promotional claims to quantify or qualify this particular leadership program as having favorable standing over any other similar program. There were no direct comparisons explored in the instrumentation. Instead, participants were asked to reflect on their experiences within this specific program. Where past experience were explored, such interrogation intended to investigate motivation and attitude of the participants toward learning in general, and not to specific educational programs or schools. Furthermore, participants were not asked to rate the instructors, the staff, or the program during this study.

The Leadership Program

The ELS leadership program offered non-traditional education through an experiential learning model. The program recruited students who pursued adventurous challenges to learn while testing their mettle in a manner that has not commonly been offered through other educational institutes outside military service, law enforcement agencies, or emergency fire and medical careers. While the program also appealed to professionals from these government agencies, it more commonly recruited individuals who were either weighing the prospects of enlisting in such careers, or who had continued down another career path but still wanted the advantage of leadership education through simulation of high-stake decision-making.

The program was designed to facilitate the development of leadership competencies over six weeklong courses, each seven days in duration, spanning a three-year period. The program situated the learner in military wargame simulation. Participants were immersed in military models of training and simulation, however the program was a private not-for-profit entity that was *not* affiliated with any military or government organization.

For each individual, the first year was dedicated to training on fundamental military skills unique to battlefield tactics of patrolling operations. The first year involved experiential learning situated in authentic scenario from which to solve complex problems; however training in the first year did not utilize CAM. Instead, the focus of the first year of training was to ensure that learners developed a proficiency of military skills sufficient to participate in the leadership education track of the successive two years in the program.

The last two years of the program included CAM for the development of leadership competency. Each learner was offered multiple, progressively demanding assignments as the leader of small teams immersed in authentic scenario from which they were required to make decisions in order to solve complex problems in ill-defined, ill-structured domains. Missions within the wargame simulation offered the apprentice learner an opportunity to *explore* solutions to the problem. Afterwards, apprentice learners were asked to *reflect* on their initial plan, their actual performance in comparison to that plan, and to identify any obstacles that created a chasm between their plan and performance. Finally, the apprentice learners were asked to *articulate* their reflections in the presence of the master instructors and peers to affirm their cognitive processes and refine solutions to leadership within the situated problem.

The program offered no graded evaluation of the learners, not even so much as a binary "pass or fail" system. The leadership program was designed in the experiential tradition that

involved learning through participation. Learners assessed their own growth through reflection on their various performances, through feedback from the master instructors, and through interactions with members of the community of expertise. Each learner's accomplishment of the recommended series of coursework, leadership experiences in simulation, and reflective sessions over the three-year experience has been ceremoniously recognized in front of the community.

Learning Environment

All learning through this ELS leadership program took place outdoors on a private campground in the Midwest of the United States and ran for a duration of seven consecutive days in early autumn. The program promoted the adventure of experiential learning of leadership through military-type wargame simulation in the wilderness. Membership to the community of expertise focused on warrior and leadership competencies.

Each week of education was broken into three discrete training events. The first two days, Sunday and Monday, involved individual task training. For those students in the first year of the program, individual tasks included weapon-handling, use of targeting optics, land navigation, radio communication and protocol. For those students in the leadership track of the second and third year of the program, individual tasks included planning processes, inspection processes, reflection processes, decision-making models, mission order development, leadership ethics, and reflection on leadership roles, responsibilities, and influence within the organization.

The second two days, Tuesday and Wednesday, involved collective task training. All students in the program were brought together and formed into small teams with the leadership students assigned as team leaders. Collective task training involved tactical operations of offense, defense, and enabling missions. These two days included four brief simulations, each approximately two-hours in duration from which the small student teams plan, lead, and assessed

their mission performance under the observation of the master instructors who were available to coach students "think through" cognitive processes, multiple influencing variables, and potential courses of action.

The last three days, Thursday through Saturday, involved a non-stop 50-hour simulation with teams led by the assigned student leaders. Missions in the simulation took place in steep hilly terrain with dense mature forests, hot humid weather, and daytime/nighttime visibility conditions for a continuous period of three days and two nights. The simulation involved participants collaboratively interacting while situated in authentic scenarios of ill-defined and ill-structured domains. The master instructors observe only to control the information flow of the simulation scenario, and to resolve potential safety issues during the simulation. The master instructors did not prompt or coach the student leaders during the three-day simulation.

Students have defined the program as physically and emotionally challenging. The staff reported a two-thirds retention rate and one-third "washout" rate of members. It should be made clear that the program desired a zero washout rate, and actively worked to retain all students.

Master Instructors

Program instructors were not the subject participants of this study. Nevertheless they served as the expert masters in the master-apprentice relationship. Master instructors were either graduates of the program, or had been vetted as veteran officers and non-commissioned officers hailing from one of the four branches of the US Armed Forces, or both. Roughly half of the master instructors were military veterans having served in at least one combat theater, and many have served in multiple wars.

Regardless of their status as military veteran or graduates of the leadership program, all instructors underwent an additional year of teaching certification provided by the institution.

Certification includes an exploration of various pedagogical methods, including Kolb's Experiential Learning Model (ELM) and CAM.

Table 2 illustrates how master instructors implemented CAM via modeling, coaching, and fading scaffolds over the seven-day course and throughout the three-year program. The first two days of each course involved lecture and group discussions of six ill-defined domains – leadership concepts in which the master instructors offered modeling of cognitive procedures. Modeling tacit cognitive processes included assessing variables relative to decision-making in a specified situation. The apprentice learners were then encouraged to practice the process while under the close observation of the master instructor. A two-hour well-scripted simulation was offered for each of the first two days in which the master instructor coached the apprentice learners through prompting with Socratic questions or offering partial solutions to the problem at the discretion of the master instructor.

The middle two days were very similar in construct, yet the significant difference was three-fold. First, class lecture and discussions focused on a single ill-structured domain that was approached from three unique perspectives. Second, apprentice learners were situated in a more complex simulation that added another level of complexity to the previously demonstrated cognitive models. Third, the master instructor began to fade the scaffolds by allowing the apprentice to prompt coaching by the master instructor when the apprentices could not come up with a solution themselves or through collaboration with other apprentices.

Master instructors delegated responsibility for training to the apprentice learners for the last three days of each course. There was no instruction during the simulation. Instead, the apprentice learners were assigned leadership positions in one of two opposing teams, blue forces (BLUFOR) team and opposing forces (OPFOR) team.

Table 2

Master and Apprentice Tasks Aligned to Learning Activities Over the Week

Day	Activity	Master	Apprentice
Sun.	Lecture & Discussion x4	Modeling	
	2-Hr Simulation x1	Coaching	Explore
		-Master Cued-	Reflect & Articulate
Mon.	Lecture & Discussion x2	Modeling	
	2-Hr Simulation x1	Coaching	Explore
		-Master Cued-	Reflect & Articulate
Tue.	Lecture & Discussion x2	Modeling	
	2-Hr Simulation x2	Coaching	Explore
		-Apprentice Cued-	Reflect & Articulate
Wed.	Lecture & Discussion x1	Modeling	
	2-Hr Simulation x1	Coaching	Explore
		-Apprentice Cued-	Reflect & Articulate
Thu.	Simulation, Apprentice-Led	Observe	Explore
Fri.	Simulation, Apprentice-Led	Observe	Explore
Sat.	Simulation, Apprentice-Led	Observe	Explore
	Reflection Session	Observe	Reflect & Articulate
	Feedback Session	Feedback	Reflect & Articulate

Teams consisted of all learners, including those still developing military skills in their first year of the program. Teams were immersed in a three-day, nonstop wargame simulation to

solve ill-defined, ill-structured problems. Stressful conditions were induced in the simulation including time constraints, rugged terrain, and direct competition with an opponent team. The master instructors observed, but did not interfere except to administratively control the flow of the simulation, and for safety issues or concerns. At the end of the week apprentice learners participated in a reflection and articulation exercise in front of the community that was observed and coached by the master instructors. Afterwards master instructors privately offered individual feedback to each apprentice learner.

Example: Sunday Lecture and Discussion. The master instructor engaged the leadership students in a learning activity related to the concept of the U.S. Army's Troop Leading Procedure (TLP, see Appendix D) – an eight-step process of how to prioritize the leader's responsibility upon receipt of a mission from higher command. The master instructor then situated TLP in a case from which he modeled the process through a think-aloud exercise. Discussion followed with student prompted questions to further refine and elucidate TLP. Then another learning activity was conducted in which each apprentice learner had the opportunity to work an authentic problem involving TLP in front of the master instructor. Apprentices were then asked to reflect and articulate their experiences, and master instructors offered apprentices feedback. This single learning experience was allocated two hours during day one of training.

Example: Monday Lecture and Discussion. The master instructor engaged leadership students in a learning activity related to the concept of the U.S. Armed Forces' Battle Drill Matrix (BDM, see Appendix C) – a four-step process of selecting the most effective battle drill to conduct when a patrol comes into contact with an enemy opponent. The master instructor then situated BDM in a case from which he modeled the process through a think-aloud exercise. Discussion followed with student prompted questions to further refine and elucidate BDM. Then

a two-hour force-on-force engagement simulation was introduced to allow all apprentice learners the opportunity to lead teams while practicing the BDM in front of the master instructor. Apprentices were then asked to reflect and articulate their experiences, and the master instructor offers each apprentice feedback on performance. This single learning experience was allocated four hours during the second day of training.

Example: Tuesday Lecture and Discussion. The master instructor engaged all students in a learning activity related to the tactical concept of the U.S. Armed Forces doctrine on ambush – a tactic of attacking a moving or temporarily halted enemy opponent from a hidden or protected position to achieve the element of surprise. The master instructor then situated the ambush in a case from which he modeled the process of planning, conducting, and assessing an ambush through a think-aloud exercise. Discussion followed with student prompted questions to further refine and elucidate the doctrine of ambush. Then a two-hour force-on-force engagement simulation was introduced to allow all students – with student leaders assigned to leadership positions – the opportunity to practice planning, conducting, and assessing the ambush in front of the master instructor. All students were then asked to reflect and articulate their experiences, and the master instructor offered feedback on performance with attention to the student leaders (apprentice learners). This single learning experience was allocated six hours during the third day of training, plus four more hours for an identical learning process of route reconnaissance.

Example: Wednesday Lecture and Discussion. The master instructor engaged all students in a learning activity related to the tactical concept of the U.S. Armed Forces doctrine of Objective Rally Point (ORP) – a tactic of defending a patrol's last temporary halted position prior to arriving at the patrol's objective. The master instructor situated the ORP in a case from which he modeled the process of planning, conducting, and assessing an ORP through a think-

aloud exercise. Discussion followed with student prompted questions to further refine and elucidate the doctrine of the ORP. Then a two-hour simulation was introduced to allow all students – with student leaders assigned to leadership positions – the opportunity to practice planning, conducting, and assessing the ORP in front of the master instructor. Students were asked to reflect and articulate their experiences, and the master instructor offers feedback on performance, giving special attention to the student leaders (apprentice learners). This earning experience will be allocated four hours during the fourth day of training.

Example: Thursday ~ Saturday Simulation. On the fifth through seventh days of training, the students assumed full responsibility for their learning. Two opposing teams were organized with apprentice learners being assigned leadership roles by the program staff. Both teams were issued a scenario storyline for the three-day simulation with embedded missions to complete. In the simulation learners applied all the individual and collective task skills they had learned and practice over the past four days and evenings. At this point the master instructors served only as observers to control the flow of scenario information into the simulation, and to resolve any potential safety issue. Two master instructors directly observe student teams throughout the three-day simulation. This arrangement afforded four perspectives of each engagement in the simulation during the reflective session on the seventh day – two opposing leadership teams, plus two observing master instructors. It also afforded both observing master instructors an advantageous opportunity from which to offer perspectives to each student leader (apprentice learner) during the individual feedback session at the end of the week of training.

Simulation and Learning Technologies

The program used the Multiple Integrated Laser Engagement System (MILES) simulation tool in its fourth generation of the series, known as Individual Weapon Systems

(MILES IWS). MILES simulation was developed for the US Armed Forces in the 1970s and is still in use by American and allied foreign militaries as the dominant form of live simulation for force-on-force battle training, generally called Tactical Engagement Simulation Systems (TESS). MILES attaches to land-borne, airborne, and water-borne vehicles, plus an array of weapons using hardware bolts and straps. Sensors are similarly strapped to individuals and vehicles.

MILES is referred to in military colloquialism as a force-on-force combat simulation platform. That is, MILES physically attaches an eye-safe laser device to each weapon, which allows participants to shoot at each other with real firearms. However, other than a blank rifle cartridge that emits a loud bang and muzzle flash, the only projectile coming from the weapon is the eye-safe Class I laser, literally an invisible beam of light. Lasers carry digital information regarding the participants ID number, the type of weapon being fired, weapon lethality relative to the target, and the effective range of the weapon. If a laser beam strikes any of the sensors worn on the head and torso of each participant, that participant is rendered a "casualty." Their MILES system signals a loud beep and shuts off. In this case the participant cannot engage opponents until a master instructor "respawns" the participant back to "alive" status with a controller device in accordance with the governing rules of the Master Scenario Event List.

In this manner, there was accurate representation of combat casualties for the simulated battle with detailed feedback that identified which participants shot whom. Added pyrotechnic simulation created loud noises, smoke, and confusion to the battlefield in challenging terrain and dense vegetation. Simulation continued through hours of darkness. Such limitations of the environment and physical fatigue complicated the leader's situational awareness and decision-making as each team attempted to maneuver to an advantageous position and engage the enemy.

The wargame simulation was further augmented by an array of sophisticated equipment. These included holographic targeting optics; passive-light night vision scopes and goggles; encrypted two-way radio communication systems; topographical maps and magnetic lensatic compass, plus Global Positioning Satellite navigational systems.

Participant Population

This study recruited four apprentice learners who were selected by the program staff for primary leadership roles during the course. The identified learners met established criteria set by the program. Each apprentice learner assigned to a primary leadership position has completed all required coursework and served at least once in a subordinate leadership experience prior to serving in a primary leadership position.

The research took place in the fall course of the year. The participants of this study have already completed two weeks spent learning fundamental military skills, plus at least one more week in the leadership education track. Master instructors delegated decision-making authority to the selected participants in leadership roles for their respective teams during simulations. Over the span of the weeklong course these four apprentice learners planned, lead, and assessed performances while immersed in wargame simulation.

During the week each participant leader was afforded the opportunity to (1) explore leadership through the conduct of combat patrols; (2) reflect on their plan, their performance, and the underlying themes of leadership; and (3) to articulate their cognitive processes as well as their lessons learned from the experience. The apprentice learners did so in the presence of master instructors to affirm and refine tacit cognitive process toward the development of leadership competencies.

The leadership program has a history stretching back more than 30 years and was openly inclusive, accepting males and females from all races, religions, sexual orientations, and political beliefs as members to the program. Although the institute did not collect demographic data of members, an informal sampling of recent attendance records indicated that roughly 85% of the program participants are males of Anglo-Germanic ancestry, with females making up just 3% of the population. Ages of the learners ranged from high school students in their mid-teens to professional adults in their mid-50s. An informal sampling of recent attendance records showed a mean age of 20 at the start of the program. However, members were required to be a minimum of 14-years-old to join the program. This study did not involve minor-aged participants.

Risk Mitigation

This study did not present any additional risk to participants beyond that already encountered in the learning environment. Participants received no graded evaluation from instructors or program staff. Furthermore the investigator offered no compensation for participants. Participant confidentiality was sustained through the use of pseudonyms.

Pilot Study Findings

A pilot study of the program was conducted two months prior to this research effort. Objectives of the pilot sought to (1) bolster the self-efficacy of the investigator to competently conduct such research, (2) test the adequacy of the interview instrument and recording devices, (3) test the research protocol for data collection and ongoing analysis, and (4) confirm the recruitment techniques and process.

Piloting a qualitative study allowed the researcher to refine focus for future research (Frankland & Bloor, 1999). A pilot was desirable because the researcher was a novice to qualitative studies, and the researcher was conducting a new technique of data collection

(Holloway, 1997). To this purpose, the pilot was successful in bolstering the investigator's self-efficacy to conduct further qualitative research.

Based on pilot study results, the interview instrument was determined appropriate in that it led to reflective responses by the participants and allowed refinement of interview questions over the progression of the week of data collection. The interview instrument required refining. A section of four additional questions (Appendix B, #17–20) have been added to further address learner motivations. Question #13 was revised to explore participant awareness of how other's perceive the participant's development of leadership competencies; and question #24 was revised to ask the participant how the program has inspired him/her to change. Finally, question set #13–16 are now designated solely for mid-simulation individual interviews when participants appear most aware of the relevant information.

The iPod audio and Go-Pro video recording devices performed without failure in the field environments. The research protocol for data collection and ongoing analysis was thusly confirmed with the very notable exception of the data collection schedule (Appendix C).

The pilot study corrected assumptions of the original data collection schedule that was planned to include of four interviews per day, over the first four days of training. The last three days of training involve a simulation that results in stress on the decision-making efforts of the leader teams. It was believed that there would be no opportunity to interview the participants during those three days, but a focus group interview was planned for the last day of the week.

However, the pilot study proved most of these assumptions wrong. The participants were so engaged in training, planning, decision-making, and reflective exercises that individual interviews are obtainable only during scheduled "personal time" during the week. Those time slots fall on the evening of the second day of training (Monday) and the evening of the fourth

day of training (Wednesday). However, there was an administrative lull in the simulation exercise on day six of training (Friday) that permitted participant interviews to be conducted at the midway point of the simulation. This spacing allowed interviews to be undertaken at critical moments in the weeklong training of the participants, although it also limits the individual interviews to just three per participant, instead of four as originally planned.

In addition, there was a focus group interview on the evening of the last day (Saturday) after all training has completed. Conducting a focus group interview last prevented participants from influencing each other's interview responses during the week. Another advantage of the focus group interview was the relaxed and casual atmosphere at the end of the week. The casual atmosphere allowed for a focus group interview in which the participants were forthcoming with their assessments of their own performance and development over the week. Participants of the pilot study offered their assessment of the program as a whole during this last interview. The relaxed mood of the focus group interview seemed to encourage discussion that may further evidence the existence or value of CAM as an instructional technique and learning strategy.

Lastly, the pilot study confirmed the suitability of the recruitment technique. All four students assigned to leadership positions for the week successfully recruited to the pilot study, and the method used was appropriate for gaining voluntary participation and confidentiality.

Data Collection

This research conducted a single case study with multiple participants and pursued a rich description of learner perspectives and behaviors to reveal underlying principles of CAM for leadership education. According to Creswell (2012), data collection in a case study occurs over a sustained period of time and relies on multiple sources of evidence. Accordingly, this study collected data over a seven-day period of an ELS program that was situated in an authentic

scenario simulation of an ill-defined, ill-structured domain. This study recruited four participants near the end of their three-year program of study in leadership.

This case study investigated CAM within leadership education. A leadership program offered through a experiential learning model was identified as meeting the established criteria for the use of CAM for instructional within situated learning. Table 3 aligns instrumentation and the data capture method with each research question and sub-questions.

Data was collected through semi-structured interviews with program staff on Sunday regarding the four individuals selected to develop a rich description of each participant. At the end of the week another semi-structured interview was conducted with the master instructors to determine if there was congruence between master and apprentice perspectives. During the week three half-hour semi-structured interviews were conducted privately with each of the four learner participants – on Monday, Wednesday, and Friday. Additionally, a focus group interview was conducted on Saturday at the end of the week.

Data collection also included three videos. The first two videos captured interactions between master instructors and participant leaders as they worked in leadership teams during the mission planning session on Thursday morning prior to the three-day simulation. The intent of these two videos was to capture master-apprentice collaboration during active use of CAM. The third video captured the 2.5-hour reflective session of the four participants at the end of the week as further evidence of active use of CAM.

Lastly, participant documentation of both teams' mission plans and the radio traffic logs were collected at the end of the week. Mission plans and radio traffic logs offered veracity of participant statements captured in the reflection session. Yet these documents yielded little insight because they provided no descriptions of experiences or direct observations of CAM.

Table 3

Instrumentation Matched to Research Questions

Research Question	Instrument	Capture
1. In what ways do learners describe their experiences using a cognitive apprenticeship model in vocational leadership education?	Individual Interviews x12	Audio File
	Focus Group Interview x1	Audio File
1a. How do learners describe motive for studying through this model?	Interview Set A, E	Audio File
1b. How do learners articulate metacognitive awareness of their development?	Interview Set C, D, F	Audio File
	Observe Planning Session x2	Video File
		Field Notes
	Observe Reflection Session	Video File
		Field Notes
1c. How do learners express connection to the community through this model?	Interview Set B	Audio File
	Observe Mentor Session	Field Notes
2. To what extent is learner assessment congruent with instructor assessment of the learner's leadership competency development?	Interview Pre & Post-Set	Audio File
	Observe Instructor Feedback	Field Notes
	Mission Plan x2	Text Artifact
	Radio Traffic Log	Text Artifact

Instrumentation

Staff Interview: Pre-Set. An interview of staff officers responsible for selecting participants of this study was conducted to establish a rich description of each participant. The interview explored participant qualifications, qualities, and expectation of the staff that lead to the selection of the participant for a primary leadership role.

Individual Interviews 1: Set A and B. The first interview of the four participants explored issues of self-efficacy and learner motivation to participate in the leadership education program, plus participant relationship with the program's leadership community as well as other leaders outside the program. Data collected from this interview set sought to discover attitudes toward CAM, and to offer insight of metacognition as compared to other participant interviews over the duration of the week.

Individual Interviews 2: Set C. The second interview of the four participants explored participant expectations of self, peers, and of the master instructors. This interview sought further insight into the participants' connectivity to the community, metacognition of their learning progress, and evidence of learner coping strategies in CAM.

Individual Interviews 3: Set D. The third interview of the four participants explored metacognitive awareness of the learning progress. This interview sought additional insight as to participant motivations toward CAM as a learning tool.

Focus Group Interview: Set E and F. The focus group interview with all four participants explored motivations to use CAM as well as metacognitive awareness of their development of leadership competency. This last interview with the participants asked the "big picture" questions of how the program has impacted or changed their perspectives of leadership, and what that meant to them personally.

Instructor Interview: Post-Set. An interview of master instructors explored congruence between each participant's assessment of their own leadership development and that of the master instructors' assessment. The pivotal issue here was whether the participant's assessment of self is consistent with the assessment of the master instructors.

Video 1 and 2: Mission Planning Session. The mission planning session involved two participants working together as a "command team" for either of the two opposing student teams. Each video captured the verbal interactions of the command teams as they develop their mission plan and leverage the expertise of two master instructors through student-prompted questions in which the master instructors are only permitted to respond with Socratic questions to redirect the command team back to relevant cognitive processes. Each video captured two participants interacting with one master instructor.

Video 3: Reflection Session. This video captured the 2.5-hour reflection session that took place immediately after the end of the simulation. The reflection session included all four participants (two command teams) and both master instructors. This meant for each significant decision in the simulation, the reflection session included a total of six perspectives. All students were present for this reflective session and they were encouraged to participate in defining the situation and performance associated with each significant decision.

Document: Mission Plan. The student leader command teams created these documents immediately prior to the simulation. These document offered veracity of participant statements captured in the reflection session and were used as reference during instructor private feedback to the individual participants regarding their performance on the last day of the week.

Document: Radio Traffic Log. Program staff officers annotated a continuous record of radio communication traffic during the three-day simulation. This document was collected

because it offered further veracity of participant statements captured in the reflection session and during instructor interviews regarding assessment of the participants.

Field Notes: Observations. Observations of participants were planned at five points during the week of training – in classroom activities on the first and third day, during the mission planning sessions on the fourth day, during the reflective session on the seventh day, and during the instructor feedback session that is privately offered to each of the four participants on the afternoon of the seventh day. These notes rounded out rich descriptions of the participants, participant interactions, and evidence of CAM in the leadership program.

Observational Methods

This study employed situational sampling observation of the participants in different conditions and locations in order to minimize the probability that results were dependent on a specific set of conditions (Zechmeister, Shaughnessy, & Zechmeister, 2009). In addition, the investigator conducted direct observation of participants without intervention in natural settings so as to describe behavior. The exception to this was during the mission planning session when the investigator conducted structured observation. Structured observation was a compromise between passive observation and observation of experimental manipulation, in which the master instructors prompted the learner participants' "think aloud" process and thereby minimized intervention by the investigator (Zechmeister et al.).

Process of Collection

Data collection was scheduled over seven consecutive days of training (Appendix C).

Day 1, Sunday 9 a.m. Recruitment began after the initial administrative safety and itinerary briefings in which the four leadership positions were assigned. The investigator invited each of the four leaders to participate in the study and explained the voluntary nature of

participation, withdrawal options, confidentiality, plus researcher and IRB contact information. Each participant then entered another building where they were afforded the opportunity to sign a consent form in the presence of a staff officer who was not associated with the study. A copy of the consent form was provided to each participant leader.

Day 2, Monday 3 p.m. The first interviews and observations were conducted after training had ceased on the second day of training. This time was set aside for personal caretaking and instructors conducted mentor meetings with all other students present for training. That evening, the researcher interviewed each of the four participants individually.

Day 3, Tuesday 8 a.m. The investigator observed informally during training classes and simulation. This observation included interactions of participants with other students and instructors. No interviews were scheduled.

Day 4, Wednesday 4 p.m. The second interviews were conducted in the evening after training has completed for the day during scheduled personal time. The investigator interviewed each of the four participants individually.

Day 5, Thursday 10 a.m. The first video recordings were captured during the two mission planning exercises. The intent was to record interactions of both leader teams as they synthesis their mission plan while master instructors utilize the Socratic method to model the cognitive processes of mission planning. The investigator collected copies of mission plans from both leader teams at the end of the week.

Day 6, Friday 2 p.m. The investigator accompanied the instructors to observe the participants during the three-day decision-making exercise. On the second day of the exercise, the investigator found opportunities during operational lulls and conducted quick interviews with each of the four participants, individually.

Day 7, Saturday 12 noon. The investigator videoed the 2.5-hour reflection exercise, and then collect the radio traffic records from the staff. Additionally, the investigator observed the instructor feedback to individual participants that afternoon. That evening the investigator conducted a focus group interview with all four participants.

Data Analyses

This study utilized a modified technique of the grounded theory analysis method. That is, analysis was conducted sequentially with the order of data collection to identify and address emergent themes within the context of sequenced events over the duration of the seven days. The intent was to identify and address relevant emergent themes through interviews and observations, and also to develop relational concepts and explanations during that process.

This is an inductive approach. Data analyses employed *open coding*, *axial coding*, and *selective coding* toward a theoretical core model. Emergent themes were identified through content analysis and categories were created in order to build up an explanation of relational concepts. This procedure afforded the opportunity to better describe and explain relation of data as emergent themes and concepts were identified over the sequence of the weeklong course.

Open Coding

What is "happening" in the data? Open coding involved line-by-line conceptualization of data that was coded by color and in the margin next to the line of text (Glaser, 1992). This was an iterative process. As more data were coded, emergence of new concepts was anticipated, and data codes were refined.

Analyses included reading data multiple times to create tentative labels for chunks of data that summarize an initial interpretation that was not based on existing theory, but was instead based on the meaning that emerges from data. The investigator established properties of each

code and examples of evidence from coded data.

Axial Coding

What are the connections among the codes? Axial coding was the process of identifying relationship amongst coded categories through a combination of inductive and deductive thinking (Strauss & Corbin, 1990). Categories included:

1. Evidence of the cognitive apprenticeship model.
2. The contextual, intervening, or causal conditions related to that model.
3. The actions and interactional strategies to manage or cope with the model.
4. The consequences of the actions and interactions related to the model.

Selective Coding

How do participants resolve their concerns? Selective coding required the investigator to identify a tentative core model that explained the behavior of the participants (Glaser, 1992). The core model was a consistent thread that linked themes in data. The investigator then selectively coded data using the core model as the guide, excluding evidence in the data that did not support the core model themes. Selective coding also involved theoretical sampling as part of the iterative nature of analysis. Theoretical sampling included the re-reading of transcripts to selectively code any data that relates to the core model. Selective coding permitted the identification of boundaries for the study.

Quality of Rigor and Trustworthiness

This research sought to present a rich description of the participants and their lived experiences of CAM within the leadership education program. The investigator implemented quality measures to ensure reliable and valid data, including triangulation, member checking, peer checking, and purposive sampling. Data triangulation ensured reliability of the study

through cross verification of data sources (Creswell, 2012). Member checks offered interpretive validity that explanations were those of the participants and not the researcher, while peer checks lended theoretical validity that constructs align with the investigator's conclusions (Lincoln & Guba, 1985; Thomson, 2011). Purposive sampling aided in the transparency of the research through an explanation of the investigator's process, interpretation, and conclusions (Thomson). Lastly the investigator controlled for participant bias of this study through mitigation of selection bias, recall bias, and response bias as reported in the section below regarding controls for bias.

Data Triangulation

This study achieved triangulation of data through the collection of participant interviews, staff interviews, and observation videos and field notes. Interview and observation data were collected to address research questions that focused on salient perspectives of learner experience for CAM in leadership education. Additionally, this study collected observation field notes of instructor feedback to the participants. These data were collected to reliably address the second research question – whether or not student perspectives of their own leadership competency development were congruent with instructor perspectives of the learner development.

Member and Peer Checking

This study included member checking both during and after the data collection phase with the four participants of this proposed research. This research also include peer checking for content analysis with a colleague, a fellow doctoral student familiar with the leadership program. Peer checking presented a potential disadvantage of shared bias, as the peer had been involved in the program the previous year. Yet, peer checking also had the advantage of a validity safeguard for theoretical constructs for which the peer is familiar, as well as toward the validity of representations of the culture and vernacular of the institution.

Purposive Sampling

Recruitment of participants was limited to the four learners selected by the institute for a primary leadership role during the course. The value of this sample of the participant population was that these four learners were in the last half of the three-year cycle, plus they had prior exposure to CAM as an instructional method and learning strategy in the leadership education program. Those learners who are newer to the program did not meet these specified criteria.

Control for Participant Bias

Selection bias. Participant selection might potentially be construed as to inaccurately depict the population. To mitigate this potential, the investigator did not select the participants of this study, leaving that task to the program staff instead. Participants were available based on an established criterion of having completed specific coursework and had practical application experiences. Participation in this study was voluntary and assignments to leadership positions within the program were not contingent upon participation in this study.

Recall bias. Participants might potentially experience difficulty in recollection of memory if considerable time elapses between the experience and interview. To improve recall, the investigator conducted interviews in the latter half of the second, fourth, sixth and seventh days of the course. This meant that participants reflected on their perception of events within a 24-hour window of those experiences, and while still immersed in the learning environment.

Response bias. Participants might intentionally respond incorrectly when interviewed on sensitive issues, particularly on issues surrounded by moral or legal controversy. However, this research did not interview participants regarding issues of morality or legality.

CHAPTER 4 - FINDINGS

The central purpose of this research was to explore the lived experiences of learners within a cognitive apprenticeship model (CAM) for leadership education. This study used a modified grounded theory method for interrogation of descriptive narratives of the participants. The intent was to discover learner perceptions and experiences of CAM, particularly as those perceptions pertained to the development of leadership competency.

To explore CAM from learner perspectives and achieve rich descriptions of learner experiences, two research questions were posed:

1. In what ways do learners describe their experiences using a cognitive apprenticeship model in leadership education?
    a. How do learners describe motive for studying through this model?
    b. How do learners articulate metacognitive awareness of their development?
    c. How do learners express connection to the community through this model?
2. To what extent is learner assessment congruent with instructor assessment of the learner's leadership competency development?

Analysis of data included transcriptions from a dozen interviews and one focus group interview with the four participants, two mission planning videos, a reflection exercise video of two and a half hours, plus four interviews with program staff officers. Additionally field notes, participant-written mission orders, and radio call logs were collected in order to provide a referenced framework of the training. While helpful, these documents did not prove suitable for analysis because they did not include participant descriptions of their experiences.

As shown in Table 4 the first phase analysis identified 217 property labels and 122 open codes. Second phase analysis reduced the open codes to 44 axial codes, and finally to just four

emergent themes that appear to thread together data into a clear voice of the participant experiences. Those themes include learner self-efficacy, learner self-determination, autonomy in an authentic scenario, and learner coping strategies.

Table 4

An array of data by first and second phase qualitative analysis (Saldana, 2013)

Data	No.	First Phase Analysis		Second Phase Analysis	
		Property Labels	Open Codes	Axial Codes	Emergent Theme
Staff Interviews	2	17	12	3	N/A
Interviews, PRE-SIM	8	69	37	14	2
Interviews, IN-SIM	4	19	14	5	1
Planning Video, IN-SIM	2	32	16	6	0
Reflection Video, POST	1	23	9	5	1
Focus Group, POST-SIM	1	33	22	8	0
Instructor Interviews	2	24	12	3	N/A
TOTALS	20	217	122	44	4

This chapter includes a description of population demographic, a description of individual participants, and examination of four emergent themes – learner self-efficacy, learner self-determination, autonomy in authentic scenario, and learner coping strategies for CAM.

Description of Population Demographic

This study involved a 33-year-old Expeditionary Learning School (ELS) of leadership development in the Midwest of the United States. The program attracts students worldwide,

although more than 90 percent of the almost 400 students and alumni have been American citizens (Staff, personal interview, September 21, 2014). Student records maintained for the last 189 attendees of the program since 2006 indicated 97 percent self-elect as male and 91 percent claim European ancestral lineage. The age range was broad, running from as young as 14 to as old as 56 years of age at start of the program; but the average age at start of the program was just 20 years old, indicating a leptokurtic skew toward recruitment of younger high school and college-age students. Staff officers stated that high school and college students have been preferentially recruited. At least 30 percent of members are military veterans or go onto military service. Staff officers indicated the majority of community members were from middle class families and well educated. Staff offered as an example a summation of the staff officers' education status as 70 percent having achieved at least a bachelor degree, and 15 percent of the staff officers holding a graduate degree – noting that all staff officers had graduated the leadership program within the past 10 years.

Description of Participants

The four participants in this study were Chase, Sean, Ben, and Cooper (pseudonyms). These participants were recruited because the program staff selected these individuals amongst the 16 attending students for four "primary leadership" slots for the weeklong training course. The base criteria for their selection included that each participant must have completed prerequisite coursework in two semesters of the ELS warrior-training track, two semesters of the ELS leader-training track, and previously served at least at the lower "subordinate leadership" level experience during a field training exercise (FTX) simulation. The criteria were established to ensure that the four primary leaders had a minimum level of training and experience to lead

their warrior teammates during the demanding simulation. All four selected individuals agreed to be participants in this study.

Participant #1: Chase

Chase was a 22-year-old Caucasian male from the suburbs of a large metropolitan city in the Midwest. He was single with no children, and was a full-time student at a community college studying liberal arts. Additionally, Chase worked part-time as a manager in a restaurant.

Four years ago just after Chase graduated high school and completed this leadership program, he enlisted immediately in the US Marine Corps. A leg injury one week before completing the 13-week boot camp was severe enough that it resulted in his medical discharge from service. The Marines told Chase that he could apply to reenlist at the one-year anniversary of his separation from service, provided he could pass the physical exam. Chase has yet to reapply almost four years later. From my conversations with him, he ponders whether that means he's lost his nerve or merely lost faith in the cause due to the political state of the U.S.'s extended involvement in Iraq and Afghanistan (PRE-SIM interview, September 22, 2014).

His experience with the Marines appeared to have had an intense impact on Chase. On one hand he admits that the incident has shaken his self-confidence. At the same time, he seems eager to prove himself in every endeavor. He shared that he misses the physical and mental challenge of martial training, and he identified this as the motivating factor of his renewed participation in the leadership program.

Reflecting on their selection of Chase for the primary leadership position, two senior staff officers offered the following perspective:

(Chase) is the kind of guy who could pick and choose who he wants to hang out with. Maybe not always in the best way – but in this way, for us, he'll be able to draw on those previous experiences with excellent leaders that he served with here.

He hasn't been with us for a while. He's just coming back to us now after a few years off. I think he's dusting cobwebs. Clearing rust. But tomorrow, after he gets out into the field and gets some time doing that, I think all of his previous lessons are really going to come out. That content, that understanding of how we are supposed to act on patrol…and he had really good mentors coming through the program, I think he will default to that training. (Staff, personal interview, September 21, 2014)

Participant #2: Sean

Sean is 28-year-old Caucasian male living in a large metropolitan area in the Midwest. He is a military veteran and a full-time professional firefighter while also managing to run a small training business on the side. Sean is unmarried.

As a veteran of the US Army Infantry and the war in Iraq, Sean fell into an exception for a relatively new policy in the program that recognizes program prerequisites achieved during prior military service. This policy was similar in concept to "transfer credits" and was certified through military documentation (Staff, personal interview, September 21, 2014). What this meant for Sean was that he was only required to complete one semester of training prior to being selected for a primary leadership role. His veteran status and specifically the combat arms schools and leadership courses he attended in the military transferred as having satisfied the warrior training and subordinate leader requirements, in addition to his earlier completion of a single semester of training in the program last spring.

The accelerated timing of his progress through the leadership program also means that many of the other students have not formed personal relationships with Sean. Although his status as a combat-hardened Infantryman earns him well-received respect, it also appears to come with a measure of apprehension on behalf of his peers. No one vocalizes doubt of his experience, but students have wondered aloud whether he appreciates the learning culture this program has established over the past few decades (Researcher field notes, September 24, 2014).

According to the program senior staff, Sean manages this demeanor without arrogance. He does not seek to belittle others, and in fact one gets the sense that Sean sincerely cares about the wellbeing and learning development of those around him:

> Sean wants to make sure that the patrol bodes well, that the mission is successful. Sean has a good personality for our program here. I mean that in the way that – everyone who comes here has to at some point realize that they're going to eventually be under the leadership of someone who may not be as skilled as them. Which is different than in the job world. I mean you see that in the job world, but there's a lot of tension that comes with that. Whereas people who come here, when they experience that they accept it because they know that this is a learning environment. It is safe to fail, and so forth.
>
> So we need that personality that can adapt to new situations. When they come here they are willing to do a little bit of 'losing' because they know this is a learning environment. I think that's the reason why Sean is a good fit for us. (Staff, personal interview, September 21, 2014)

Participant #3: Ben

Ben is a 36-year-old Caucasian male living in another major metropolitan city in the Midwest. He has never been married and has no children. Ben is somewhat older than most of

the students in the ELS and is regarded as something of an intellectual due to having recently completed a master degree, and his professional work in the science industry. His experience has earned Ben an enviable reputation as a masterful navigator due to his extensive knowledge of topographical maps (Researcher field notes, September 22, 2014).

Although my first impression of Ben was that he seemed to be a relaxed, easy-going soul, Ben claims to be a bit of a fussbudget. He insisted that he carefully deliberates on complex problems with multiple solutions. He also claims to be comfortable seeking expert opinions of others, in part because Ben values finding a workable, satisfactory solution for each customer the first time around. Ben insists that precision is a point of pride in his work, and anything less than absolute precision results in a situation that he describes as "needlessly humiliating" (PRE-SIM interview, September 22, 2014).

Staff officers state that Ben is struggling to understand the roles and responsibilities of ethical leadership. From my discussions with him, Ben suggests that his bosses are technically proficient, but lackluster in providing leadership vision or mentoring the leadership talents of subordinates. He has grown frustrated with his professional work environment and the program staff seems to be very much aware of this issue:

> (Ben) is in a place where he understands what leadership in this role means, but he is experiencing a lot of frustration with leadership in his real job. He's having a hard time applying that. He's frustrated…he needs to feel in control, he needs to be himself and get that confidence. (Staff, personal interview, September 21, 2014)

Participant #4: Cooper

Cooper is a 47-year-old Caucasian male, married with two young children still at home. He lives in a large metropolitan city in the Midwest where he owns and operates a small

consulting firm (PRE-SIM interview, September 22, 2014). He is one of the oldest students in the program. Staff officers note that Cooper's age earns him deference from the younger students, and his demeanor makes him a favorite (Researcher field notes, September 21, 2014).

Cooper is highly educated with a master degree in psychology and an MBA in business. At times the stresses of his life show through his normally happy disposition. For example he is still recovering, although remarkably quickly, from serious reconstructive hip surgery earlier in the year (Researcher field notes, September 21, 2014). In Cooper's conversations with me the weight of his concern clearly showed as he voiced his struggle with the inevitability of aging.

Cooper appears to genuinely enjoy learning. Inside that calm veneer, he thrives in new challenges and new adventures. He reveals that he initially attended the leadership program to see if it would be suitable for his children at a later date, but he quickly became passionate about the learning community and formed strong friendships with his peers. The program senior staff also noted that Cooper often dispenses the wisdom of his understanding:

> If you have ever watched (the TV show) *Cheers* and Norm walks in the door and everyone's like, 'Norm!' And that's the thing for Cooper is that every time we come here for a semester and he's here, and everyone says, "Hey. It's Cooper!"
>
> He's one of those guys who doesn't seem to say a lot but when he does, it's like, that was profound. I mean it may be something simple but it's always like – "Whoa. That's really a good concise way of saying that." It's not always about being the loudest voice in the room, it's often more about being the guy who makes the most sense. (Staff, personal interview, September 21, 2014)

The following analysis is founded on data from transcripts of 12 participant interviews, 1 participant focus group interview, 2 mission planning videos, 1 reflection exercise video, and 2

staff officers plus 2 instructors interviews. The four emergent themes to be examined include learner self-efficacy, learner self-determination, autonomy in an authentic scenario, and learner coping strategies in CAM.

Table 5

Research questions in relation to four emergent themes evidenced by PRE-, IN-, POST-SIM data.

	Self Efficacy	Self Determination	Authentic Scenario	Coping Strategy
RQ1.A Motivation to Learn:	PRE-SIM	PRE-SIM POST-SIM	IN-SIM POST-SIM	
RQ1.B Metacognitive Awareness:	PRE-SIM IN-SIM	PRE-SIM POST-SIM		IN-SIM POST-SIM
RQ1.C Connectivity to Community:	IN-SIM POST-SIM			
RQ2. Instructor Congruence:	POST-SIM			

Learner Self-Efficacy

As established in Table 5, the first of the major themes to emerge from participant narratives was self-efficacy, a term defined by Bandura as a belief about one's own ability to succeed in specific circumstances (1997). During analysis self-efficacy emerged as each participant described their roles and responsibilities as a leader, and articulated how he might best approach leadership tasks and challenges during the weeklong semester.

Learner self-efficacy relates to CAM through the processes of exploration and reflection. Through such experiences learners expand and affirm belief in their ability to succeed as leaders. While the theme of self-efficacy was a constant thread that wove together conversations and each participant asserted a level of confidence to lead his fellow students into the battle simulation, the participants were remarkably different in their assessment of themselves and the situation. It seemed no two participants described similar concerns regarding their ability to lead and the challenges they perceived.

Chase's Perspective. Program staff officers relayed some concern for Chase's self confidence due to his medical separation from the Marine Corps (Staff, personal interview, September 21, 2014), and Chase admitted he struggles with that negative experience. When he discussed it his body tensed up and he leaned into the conversation, "I got out of Marine Corps after I was medically discharged…a week from graduation. I was essentially a day away from being a Marine" (PRE-SIM interview, September 22, 2014). Chase let out a long sigh, shook his head and forced a smile. I sensed some anger there.

Interestingly, that unsatisfactory experience with the Marines doesn't seem to have had much negative impact on Chase's faith in himself to lead. He simply looked elsewhere for a role model, and he found it within a family member already well established in the leadership program, "Someone who has been a huge example in my life is my cousin, and he has been a phenomenal leader figure…I want to be like him. I feel confident that I can be a good one" (PRE-SIM interview, September 22, 2014).

Why? I want to know the source of that confidence to lead, so I continue to prod Chase in conversation, trying to pull that out of him:

> I love seeing the look on the faces of people when they succeed. Through my help – through my leadership, I love seeing people succeed. I just enjoy guiding people to be where they want to be, what they want to be. I like being part of that. I have the capabilities of getting something done for them and leading them into that direction, helping them in that situation. (PRE-SIM interview, September 22, 2014)

Yet in seeking approval from others as a competent leader, Chase also recognizes that he has possibly set himself up for an impractical challenge to simultaneously help people by asking them to do uncomfortable, difficult tasks while also wanting to be liked. He is young, but not naïve about this conflict:

> I care too much about people, not just their well being but how they feel. I don't want people to feel bad – I don't want you to feel that way, so that I'm saying, "I really don't want you to do it." (laughter) But sometimes I also know that – no, you got to do it. You know, there are those people who just say, "Man I just want to fall asleep. I don't want to pull security." Then I find myself saying, "Man I understand. I don't want to pull security either. Just go and grab some sleep."
>
> Then I turn around and tell the next guy, "Man, you gotta pull security." So I'm too - I feel like sometimes I'm trying to be too nice. Saying "no" to people…I've struggled with that my entire life. (PRE-SIM interview, September 22, 2014)

Chase appears to derive a sense of self-efficacy from watching those around him (Staff, personal interview, September 21, 2014). Not only does he observe others in order to model successful behavior and processes, but he also seeks affirmation of his progress and effectiveness as a leader through members of the community. And that demonstrative method has instilled an intuitive gut sense that he can effect positive outcomes as a leader, even after being away from

the community for several years, "I like being a leader here in this program – so coming back after three years it just came upon me. And you know what? I'm okay with that. I'm confident enough to think that I'll do just fine" (PRE-SIM interview, September 22, 2014).

Sean's Perspective. Sean exudes a quiet, strong confidence that is reflected in conversations with me over the week of training. He recognizes that his status as a combat veteran earns him immediate deference from the community members, both younger and older. "I try to be really humble about it. I try not to be that guy who abuses the power of the position – using authority for power. The best leader is a person who surrounds himself with people who help. You don't have to do it all" (PRE-SIM interview, September 22, 2014).

When I ask him how he knows that he's an effective leader, Sean describes an experience from his time in the Army in which he not only felt a keen sense of his effectiveness, but also became aware of the burden of leadership accountability to subordinates and to the organization:

> As I was getting out, a lot of the newer guys wanted me to stay in because I was one of the few guys that – there was probably 12 of us that we're getting out at that time, veterans – so for me it was a lot of working out and making formations, but I would still go to the field with these guys. I owed it to them to train them up, and share my experiences.
>
> Then my platoon leader and my first sergeant took me to the side, and they said, "You can't leave. You can't get out. You owe it to these guys to stay." But my mind was made-up. And I exited the service with the plan to become a firefighter. (PRE-SIM interview, September 22, 2014)

Conversely, in spite of Sean's leadership experience in the service and his own training business, he readily concedes that he's struggled to find opportunities at higher levels of an institution. "I

was put in and out of team leader spots. The way they worked that back then was that you'd be a team leader until an NCO came in and replaced you from another unit." And when I asked him how that situation impacted his leadership experiences, Sean offers, "I maxed out as a corporal. There was no upward mobility. That's another reason I left" (PRE-SIM interview, September 22, 2014).

I wanted to follow up on this issue of seeking new challenges through higher levels of leadership. I caught up with Sean later in the week during the FTX simulation on the heels of two decisive and victorious battles with enemy forces just hours before our interview. At that moment Sean appeared to be charged with energy. His behavior and words were assertive and he seemed self-aware as we conversed. Yet even then he immediately acknowledged the novelty of his situation. Sean discussed his newfound challenge of indirect leading – that is, not necessarily leading warriors, but instead directing and coordinating subunit leaders who in turn were responsible for direct leadership of the warriors:

> There's definitely some refining and growing into the APL role that needs to happen! You know, especially with my training cycle in my company. We train at the fireteam level, a team of four. I usually function as the fireteam leader. So managing larger teams doesn't happen a lot for me.
>
> This experience goes beyond my normal experiences. It needs to happen more often so that I become more comfortable with it. Not necessarily more comfortable, but more familiar with it. I'm trying! But you know… stress. (laughter)
>
> I mean, I gotta take more steps to try to explain things. Because in the military you just gotta say, "No. Just do it 'cause I fuckin' say!" And so sometimes it's just, "Do

> what we tell ya to do, and we'll get you through it." (IN-SIM interview, September 26, 2014)

Through our discourse Sean tended to describe his confidence to lead as flowing through his past experiences. It appeared to me that Sean gained a level of awareness for improvements still necessary as a leader through self-assessment of his own performance and outcomes, such as during the simulation, "This experience goes beyond my normal experiences. It needs to happen more often so that I become more comfortable with it" (IN-SIM interview, September 26, 2014).

Ben's Perspective. Ben, too, seems to derive his sense self-efficacy from past experiences and through his personally identified performance standards, although his criteria appear to be based on the outcomes of the project and his ascent through the corporate ranks more so than based on other people's perception of his performance:

> I got into the work world and assumed a leadership role at the level that I'm working. I came in with the mentality of, "I want your job." And I've segued aggressively over the course of ten years to progressively higher levels of leadership responsibility. So to me as a leader, my leadership and management styles have to evolve if I want to continue to move up in the organization. (PRE-SIM interview, September 22, 2014)

More recently Ben's confidence has been shaken. He's moved purposefully and predictably along his career trajectory over the past dozen years. Yet he describes coming to a crossroads in which the burden of responsibility has increased at his work, but mentorship has faded and there is no guidance on how to proceed or improve. "It may be frustrating for me at this point in time, but I don't want to evolve into those leaders that frustrate me now" (PRE-SIM interview, September 22, 2014).

The result, as Ben explains is that he is now reluctant to seek leadership positions at work. "I don't necessarily go out and seek those leadership roles. If it's a completely unknown task, I approach it with caution." When I ask why he feels that sense of apprehension, he responds, "It's critical that whenever I implement something it goes off flawlessly. But… maybe that's not always the best model for every situation. Maybe I might not necessarily want to be so detail-oriented. You know?" (PRE-SIM interview, September 22, 2014). Here again Ben is very much aware of his self-imposed requirement to manage the details down to the minutiae, and yet he also recognizes that leaders at higher levels of an institution must focus on the bigger picture, thereby allowing subordinates to seek and input solutions:

> When you have lower-level and mid-level managers who know the technical specifics and are trying to feed that up the food chain to higher managers…maybe there's a conflict, they don't agree. So I think it's really important that higher levels of management communicate not only their vision, but also are listening to what the lower tier managers are saying because they have a finger on the pulse of what is going on. (PRE-SIM interview, September 22, 2014)

Ben's own words played out later during the FTX simulation. I caught up with him in middle of the week, and true to form, Ben's criteria of performance weighed into his assessment. At this point in the simulation he had been in contact with enemy forces and his patrol faired very well on both occasions. Yet in his description Ben referred to his earlier comments regarding an awareness of the challenges of leadership communicating with subordinates:

> Oh boy. There's definitely room for improvement. I'll tell you that. No, I uh… I was definitely relying too heavily on written notes for some of the procedural type things. Uhm, just through my inexperience I'm finding I have to defer to a lot of other people.

So when you are in this type of experience in a leadership position, I think confidence builds. You come up from being a rifle carrier, to a radio carrier, and now I'm the one making the calls.

I still need a lot of improvement, but uh… I need to be maybe a little more forceful with my opinions. I definitely have a concept of what will work out here, and I think we can do it. But, you know, I'm also deferring to other peoples experience. I need to be a little more forceful of "no – I know this will work. I've war gamed this enough." So. Yeah. There are definitely some things I see in myself that I don't necessarily like. As part of my personality traits, I get frustrated sometimes. I get a little passive-aggressive. I just need to rise above that and address it right away. (IN-SIM interview, September 26, 2014)

Cooper's Perspective. Cooper's sense of self-efficacy might best be described as stemming from pragmatism. He certainly has a half lifetime of leadership experience at various levels, "I directed operations for a church furniture plant for about two years, and then at a sink manufacturing company for about four years, and that was supervising 30 people directly and another 60 people indirectly." When I asked him what impact those experiences had on him, Cooper stated emphatically, "I would much rather be in a leadership position than following a bad leader. I tell you what, once you supervised year after year after year it just becomes second nature" (PRE-SIM interview, September 22, 2014).

Older and more mature, Cooper doesn't reveal a need to prove himself as a leader. He sits comfortably, speaks confidently, and readily anticipates my questions. He often gives long pauses to consider his answers, seemingly without much regard for the silence caused by his thoughtful deliberation. If anything, Cooper is more concerned with physically keeping up with

the younger students, “At this point in my life, I’d really like to be in better shape. You know, to be physically capable of doing everything that I ask anyone else to do. This whole hang up with not being able to really run is bugging me” (PRE-SIM interview, September 22, 2014). So he seems keenly aware of his physical limitations due in part to his age.

When it comes to leadership opportunities, Cooper was assertive but also careful to be inclusive of others:

> If someone else comes up with a better course of action, then I’d be willing to go along with that. Being objective means always keeping an open mind and not letting ego, bias, or emotions cloud my judgment. I could follow someone with a better plan, or lead with their plan, it wouldn’t matter to me. The important thing is that we try and find the best course of action and follow through with it.
>
> You see a way of getting something done - and it’s not just telling people what to do - it’s just that yeah, I’d much rather lead than follow. Unless someone has a better idea! Then I’m willing to follow. It’s a matter of being objective. If I have a course of action that everybody agrees with, then “Follow Me!” (PRE-SIM interview, September 22, 2014)

When I caught up with Cooper during the FTX simulation later in the week, his struggle to balance this inclusive approach against his pragmatic preference to take the lead played out through his role as patrol leader. His patrol was tasked to avoid enemy contact while conducting a reconnaissance mission. Instead, the enemy twice engaged Cooper’s patrol with nearly ruinous results. Cooper’s demeanor remained relaxed, but in his words he appeared to be questioning his earlier decisions:

You know it's been – it's been a double-edge sword having (an experienced student) out here. He's great. He knows so much, and he's been a tremendous help, and I really appreciated having him out here. He's been on top of so much, so many things that I don't know to think about because I haven't been in these shoes before. So… that's the good. He's done a fantastic job, and I'm glad he's out here.

The other side of that sword is that he comes up with these ideas, and I uhm, if I buy into them – I needed to stop and think about them to change the plan if I don't like it. That whole idea of shooting the snipers on the hill…uh, I bought into it. After that I started thinking about what's being presented, and coming up with alternative ideas. And that has worked out well, too.

You know, he's definitely a take-charge kind of guy, and if I don't put any brakes on it, he'd be calling the shots all day long out here. So now that I know what I'm dealing with, it's easier to manage. But I'm glad to have him out here. (IN-SIM interview, September 26, 2014)

Learner Self-Determination

The second major theme to emerge from participant narratives was perspectives of the participants' motivation to lead, to learn through the program, and to become a member of this community. Just as Deci and Ryan delineated in their theory of self-determination, motivations expressed by the participants fell into the dyads of approach vs. avoidance conflict; intrinsic vs. extrinsic incentive; and internal vs. external value (1985). Here I seem to be consolidating two constructs – motivation and self-determination. What I mean to intimate is that participants described the learner-centric aspect of self-determination within the program as the motivating factor to learn through the leadership school. This is consistent with Deci and Ryan's theory.

Chase's Perspective. For Chase, membership to this program and community presented motivations of both conflict avoidance and conflict approach. He stated emphatically that completing his college studies was at the time the main priority in his life, yet he also expressed a great deal of dissatisfaction with that experience (PRE-SIM interview, September 24, 2014). When prompted for examples of leadership Chase was almost despondent, "I can't even describe how there's no leadership at my school… Outside of this program everyone is just kind of a cluster fuck." I asked him if he could be more specific and he offered the following perspective:

> School is the biggest thing in my life right now. I talk about that a lot. And so the teachers come into class, and it's like "I got to take attendance." And then "okay I have the subject matter I have to teach" – and then that's about it.
>
> There's no motivation on trying to make the class fun. There's no motivation to bring outside learning into the class – I mean things that aren't in the book. It's all textbook.
>
> And when it comes to leadership there's no motivation within themselves for the teachers to even say, "Hey class let's be quiet. Let's all get together, let's go do something." It's just… it's just… they play it by ear.
>
> It's just the way that they learn. I think it's the way they were taught how to teach. They're teaching methods are just very… In school, it's just that the teachers teach it to you, test you, and if you fail it – that's it. (PRE-SIM interview, September 24, 2014)

Through his conversations with me Chase stated on several occasions that he was looking for a safe haven. When Chase was a young teenager, he and his younger sister had to move in with his aunt and uncle due to neglect by his mother, a single parent struggling to make her own way

through life. It was at that time that he formed strong, lasting bonds with his extended family and his younger sister. It's not difficult to imagine that Chase felt a great sense of responsibility that may have influenced his decision to join the Marine Corps. After his involuntary medical separation from the Marines, his confidence was shaken:

> Confidence. This place is giving me confidence to, you know, keep going through my life. I had a dark point in my life. I kind of wanted to…give up.
>
> Uh, and it's not what I have done here – not the hikes, it's not the sitting in the dirty foxholes; it's nothing like that. It's just… the kind of people that are here, the love, and what this program is about that kept me going.
>
> But the confidence also helped me with, you know – I've had some shitty times. Just roughing it. And whatever I'm going through right now, I can deal with it. I can still move forward. That's what's going on here. You can always move forward, you can always keep going. So this program is kind of like church for me. It's kind of like a sanctuary, a religious sanctuary. (PRE-SIM interview, September 24, 2014)

Sean's Perspective. In addition to being a combat-experienced military veteran and firefighter, Sean has a small training company on the side. He had heard about this leadership program years earlier but only recently made a commitment to enroll as a student. Sean has been remarkably candid about his motivation to learn through the program – he intends to emulate much of the instructional principles and practice within his own training business. Sean is here to learn the trade, and specifically the instructional models employed by this not-for-profit leadership program. The staff appears to be comfortable with Sean's expressed goal (Staff, personal interview, September 21, 2014).

I asked Sean pointedly why he joined the program. He was quick to respond, "The professionalism, the cadre, the assets - and once each class is over there are a lot of circles of a really great conversation. We have a lot of educated, smart, tuned-in guys here. There are a lot of good people here." I ask what makes these students "good" in his mind. "The people here in this program – they want to be here. They're willing. They're a special kind of people who truly gets it. They're motivated" (PRE-SIM interview, September 24, 2014).

Our conversation focused on various technical aspects of the equipment and his experiences in the military and the war in Iraq. After a few minutes Sean relayed an emotional fissure. He said misses the military life and even the overwhelming responsibility he still feels for his Soldiers. Sean brought the conversation back to the program:

> I finally made it down here last semester. I was halfway through my first semester, and I could already tell that I loved the community here. A lot of it is the esprit de corps, that same kind of drive. You know, patrolling tactics, education.
>
> But it goes beyond that. It goes beyond that. It gets to what people think and feel on personal level. We may not all be exactly in line, but I feel like we're all going the same direction. This community in particular – and man I'll definitely be coming back, but this community in particular, it's the professionalism.
>
> This program is willing to look at itself, evaluate, and look for better ways to do things. So the professional cadre, and the brotherhood, it feels like what I had in the Army. So then we can get people out there to assess, you know, "We got this good – we got this good – on this we failed. How do we make it better next time?" This is realistic.
>
> Yeah… this'll be a little hard to explain. But even (the instructors) who have no military experience, they teach it like they've been there. It's almost like they've been

there and done that. That means that the instruction they received through this program was so good, they can teach it like they were there – like they went through training in the US Army. I mean, basically what this program is, that's what the US Army should be, wants to be, but can't be for whole bunch of reasons.

You know I'm sitting in class at times and I'm thinking to myself, "Why wasn't I taught this? Why wasn't I taught this properly in United States Army?" But I also think that if this program can do it here, at least for 11 Bravo Infantry - if this program can do it here, then the US Army can do it. They just don't want to. Or they don't know they can. I think the core answer is the institution doesn't have the heart to get it done. Maybe certain people do, but they are walled in by the institution.

The military will or it won't. But the people inside the institution generally won't. They don't have that motivation. And they usually half-ass it.

It speaks volumes about the character of the staff and cadre, the character that's behind this program. It helped me get a grasp on my training business, and the direction I wanted to take it. Not that I want to be exactly the same. I want to fit into my piece of the puzzle. But just that help initially from this program's staff, at first, that just help me tremendously there.

On a personal level I want to learn the competencies (this program) teaches. For my own personal benefit, you know, higher levels of team leading at the squad and platoon tactics that I learned in the Army but need to refine.

The stressful situations – that helps me with my own business. That helps me at my work in the firehouse, you know, I'm set up to handle that kind of stress or deal with

> that kind of stress and so this helped me all the more. That's the honest truth. (PRE-SIM interview, September 24, 2014)

Sean's discussion here appears to evidence in personal terms the motivational value of self-determination. As I listened to Sean, it seemed to me that he was looking for a surrogate brotherhood to replace the one he left behind in the US Army. And in this leadership program he describes the added benefit of being able to direct his own learning outcomes that are personally relevant to the goals he's set for himself.

Ben's Perspective. Ben indicated that he was looking to set himself apart from his peers at work. But more recently he had also decided that as he moved up the corporate ladder, he wanted to provide better quality leadership than was provided to him. It was the principles of efficiency and effectiveness that drove Ben into the woods two weeks each year (PRE-SIM interview, September 24, 2014).

"It helps (me) understand how leadership styles have to change to adapt for each individual the higher they go in an organization," Ben asserted. I asked him how his leadership has transformed over time; what's changed, what's different? Ben responded, "At the lower levels of leadership, you're leading by example. You're leading out front. The higher you get in an organization, the more you lead by relying on other people to support you, because you can't do it all. You have to delegate." When asked for an example, Ben refered me to an incident I had observed that very afternoon:

> For example, today we're on a patrol. We are doing reconnaissance. Now, I am the platoon leader and I've designated my different squads to pull up the front and the rear. I'm not necessarily at the front of the group, nor the back, I'm in the middle. So I can't

> see exactly what's over the next hill, but I have that squad leader out in front of me. He's my eyes and ears.
>
> It's my job to take that information and turn it back to Higher (Command). So it's dissemination of information, it's a flow.
>
> Now that helps me at work by delegating to the junior individuals I work with by giving them a task. Then I can transition that up to the higher portions of work. So it's working within an organization. Understanding how information flows back-and-forth, kind of the dynamics of groupthink and different leadership capacities. (PRE-SIM interview, September 24, 2014)

While historically half of the students in the program went in to service in the Armed Forces, the other half of the student body did not (Staff, personal interview, September 21, 2014). In many ways Ben's participation in the program illustrated this fact. He readily committed to the military nature of each mission, he even claimed to revel in it, but he was also quick to explain how each lesson learned transferred back to the corporate world:

> If you are able to surround yourself with intelligent people, with people you have confidence in to do their job, you don't have to micromanage them. That has helped me at work by taking me out of some of the decision-making that I simply didn't have time for in the day-to-day trench warfare that goes on at work," Ben insists (PRE-SIM interview, September 24, 2014).

I asked Ben if that was his primary motivation to be involved in the program. He responded, "It's the next logical step from Boy Scouts. (laughter) But way better! That is kind of the draw. It's Boy Scouts with guns, and no adult supervision." Ben admits that the military nature of the training had a strong appeal for him:

> You know there are a lot of different aspects to it that are appealing. I've always been drawn to the military history, military culture. What I found is that many of the aspects I find appealing here in this program, the leadership, the structure, the camaraderie – even the strategy, these are the things I enjoy doing. In my free time I enjoy the outdoors, shooting, camping, doing land navigation. It's kind of a culmination of all the different things I like to do. (PRE-SIM interview, September 24, 2014)

Cooper's Perspective. Cooper married a bit late in life and did not have his first child until he was almost 40 years of age. He described how that event changed his carefree outlook on life, and he came to the realization that he would be responsible for the wellbeing of other people. Cooper said this was initially unnerving. "I had never even owned a gun, my family didn't do a lot of shooting, and my mom is even against guns. But when the day came right after the birth of our second son, it was an epiphany - that I now had two sons and wife, and I realize I had no way of protecting them" (PRE-SIM interview, September 24, 2014).

I asked Cooper if he felt this program allowed him to achieve that goal. Did he feel that this program enabled him to protect his family? Cooper redirected my inquiry, "I think I would've loved to have a military career. I have a cousin who went into the military right out of college. He's a colonel today and he's experienced all of the events we've had. And maybe I'm feeding off of that at this stage in my life" (PRE-SIM interview, September 22, 2014).

When I caught up with Cooper a couple days later, I wanted to ask him about his motivations to enroll in this training. Clearly he was motivated, evidenced by the fact that he was still recovering from hip surgery. Few people would even think to be out patrolling in the Ozark Mountains with soaring temperatures and 90 pounds of gear just four months after any type of surgery, let alone hip reconstruction. I interpreted the situation as evidence of Cooper's

genuine drive. Was this just a response to a mid-life crisis? I had resolved to ask him about this directly and wasn't quite sure how he would respond. Cooper smiled at me and shook his head. No, he assured me he didn't wear a tinfoil hat. Yes, he was concerned about national and world politics and the potential of society to fracture during armed conflict, economic collapse, or natural disaster. Cooper insisted he believed such outcomes were possible, though improbable. It seemed to me the learning outcomes Cooper established for himself in this program were more conventional than I had imagined. Yet they also reflected the motivation for self-determination:

> Any business out there, you know manufacturing, we're all these cogs in the wheel. We are all being used to make this thing work. And then there's all the office politics. There's a lot of funny business, a lot of unethical things – even illegal things. And people just get used up. Where's the reward in that? In a lot of cases people are just stuck in cubicle. You know, here's your pay and here's your job.
>
> This program, this is all by choice – for fun. You either like it or you don't. And you come back because you want to, because you're having a good time and you enjoy learning. But you know…I'm here checking it out for my sons. I want them to come through the program one day. Those were my initial reasons for coming, to see what you were doing. But then I got hooked and I keep coming back! So I'm looking forward to the day that I can bring my sons out here.
>
> The leadership taught in this program is fantastic. I've liked everyone that I met and worked with. I'm talking about the cadre (staff). They're great people. And uh…if it weren't that way, then I wouldn't have come back. I've appreciated their mentorship. They've taught me so much in just four semesters. It's a great program with great people. (PRE-SIM interview, September 24, 2014)

Autonomy in an Authentic Scenario

The third of the major themes to emerge from participant narratives can best be described as autonomous interactions with an authentic scenario. Autonomy affords apprentice learners the authority to make decisions in problem solving without the master instructor's approval. Authentic scenario affords the apprentice learner a realistic, believable problem that is both ill-defined and ill-scripted enough that no single "correct answer" can be presented (Spiro, Feltovich, Jacobson, & Coulson, 1995; Lynch, Ashley, Aleven, & Pinkwart, 2006). Autonomy in an authentic scenario is essential to learner exploration and elaboration of possible solutions (Holec, 1981; Dickinson, 1994; Jonassen, 1999).

Here again there appeared to have been a push-pull, attraction-avoidance relationship. The participants vocalized conflicted feelings about the realism in training (Researcher field notes, September 25, 2014). It seemed participants wanted their mettle tested, and firmly believed the training would do exactly that – yet at the same time each participant was either intimidated or at times frustrated by their autonomy in an authentic learning environment. It was as if they wanted the adventure without the risk of failure.

Chase's Perspective. I caught up with Chase again during the FTX simulation. Most of the week training lanes took place across the open hay fields, and Chase had physically collapsed twice earlier in the week due to an extreme allergic reaction to the pollen. His reaction resembled a severe case of asthma. But at the start of the 3-day FTX simulation Chase's nasal track ruptured and the hemorrhaging was so profuse that he had to be medevac'd to a nearby hospital emergency room for a hormonal treatment. He rejoined the training the next day in high spirits, but by then his leadership position had been filled by another student (Researcher field

notes, September 25, 2014). So Chase joined the "White Cell" – an administrative team that controls all operations of the simulation through a radio communication center.

The White Cell center was 5 miles away from the battles raging in the lush Ozark valley during the late summer. I wondered if this situation would dampen Chase's spirits, to be so far removed from the action, but true to form he greeted me with almost giddy excitement. It seems Chase was always happy. Perhaps that's why the nature of our discussion caught me so off-guard.

I sat with Chase in a tent with two radios cackling in the background and a periodic flurry of activity by the White Cell personnel. I noticed immediately that Chase's nose had stopped bleeding and he seemed to be breathing normally. So I teased him a little about his seemingly new ability to breathe. He smiled and regaled me with his version of the events and a story of the cute nurse at the hospital (Researcher field notes, September 26, 2014).

I asked him if he was enjoying the relatively light work at the White Cell and he nodded, "I remember my first FTX – Dolphin's Head. It was a 20-mile hump!" We both shook our heads in agreement. He continued, "No, I feel great, and I'm coming back for more semesters. I'll be back for the next spring semester" (IN-SIM interview, September 26, 2014).

With Chase not being immersed in the simulation, I had not made up my mind yet as to what angle I would take in this interview, so I shot him a general question about how the week of training was going for him so far. And I was a bit caught off-guard when his demeanor changed so rapidly. He grew quiet and stood motionless as if he were in deep thought:

> I told the director at the beginning of the week, "I'm not having fun." And that was before my medical issue – "I'm not having fun. This is not fun. I don't want to be here."

> I don't know why that is. I just kind of… felt… maybe I was feeling more emotion because what I saw with the rest of the troops and their distrust in the program staff? And uh…but I don't understand it, though…because this program really hasn't changed that much.
>
> I think it's because I haven't been challenged, per se, for two years now. So, it was just… my last experience with being challenged was a terrible one and it sucked. Yeah, the Marine Corps. My emotion came right back out. It was like, "I don't wanna be here any more." (IN-SIM interview, September 26, 2014)

I took a few moments to let that sink in. I didn't know how to interpret it, or how to follow it up. After a short silence I asked Chase if he thought others felt this way. Was there in fact a "distrust" of the staff by the students? He assured me there was, "And in fact, I even felt that same way at the beginning of the week. I felt that this program has changed so much that I… didn't really trust White Cell in the beginning." I prodded further, a bit cautiously now. I asked him if there was a source or a turning event that he could recall, but Chase struggled to offer any single example. Instead he suggested that it was more a gut feeling, perhaps some anxiety of the impending FTX simulation at the end of the week:

> Morale is low. Uh… you can't drill them, but there's a lot of concern going around with trust – like tricking them, or being mean.
>
> It's not something that I can say, "That was it." But it was my emotions and how I was feeling was – I kind of reverted back to (Marine) basic training and was like, "No matter what, you have to do this. It's going to suck. You just have to do it."

> And… it's not one of those things where I'm like, "Oh well, this program is 'nice' so I'm just gonna say I'm not gonna do this." Because of course I'm gonna do it. But it just felt like I had no choice, no matter what. (IN-SIM interview, September 26, 2014)

Chase's words rocked me back on my heels a bit. Up to this point in my research I had heard repeatedly that the students and participants of this study were intentionally seeking a greater sense of agency. That sense of agency was one of the motivations, the draw to continue training through this program. The authenticity of the FTX simulation was designed as a culminating experience of that agency. It represents the opportunity for self-determination in the learning experience in which the students take the reigns of control from the staff and direct the combat operations of their own patrols for three solid days.

Yet now, here was Chase, describing a very real sense of dread of that event. I had to wonder if his feelings were more common and widespread amongst the other participants. Had the training lanes and activities placed too much burden of responsibility on the participants? Had that sense of duty, responsibility to the team detracted from participant perceptions of agency and self-determination? (Researcher field notes, September 26, 2014).

Sean's Perspective. I found Sean camouflaged with his patrol in a hide position late on the afternoon of the second day of the FTX simulation. The location was overgrown with dense brush as they sat nearby one of the rock bed creeks that ran through the steep-walled valley. They were waiting for an extraction from the valley and preparing to enter enemy territory some five miles away, but Sean insisted he had a few minutes to talk with me. So we stepped over to the creek for a private interview (Researcher field notes, September 26, 2014).

Right away I asked him if he was feeling the weight of the training. He nodded emphatically, "Stress – especially in these ambushes! That deer that came down while we were

waiting in ambush, and I mean my heart was pumping. It was pounding because I was in man-hunter mode again. So it brings it all back. It definitely does. This program does a great job of creating that."

I asked if he had been struggling with anything specifically, I was probing, but also attempting to leave it open-ended enough so that I did not put words into his mouth. Sean conceded readily that not everything had been going according to his plan during the simulation, but his concerns were placed elsewhere:

> You know, it's been hard to find the line within this program and realism like what you want to establish in the military. This program is very military. Like we discussed earlier, everyone out here – no one half-asses the tactics.
>
> It's just that when we sit down and, okay were pulling security now. We have to *create* that atmosphere where it's like, "The enemy is still out there and ready to come kill you." Because they are! With the MILES 2000, it lends to the "okay – these people are coming in to kill you." It's like real-life 'cause those aren't lasers flying. It's 'lead.' I go to the team leaders and say, "Make sure one guy is pulling security, and make sure one guy is changing his socks, you know, cleaning his weapon."
>
> As far as the firefight goes, the command authority has been there. Once we slow down though, it's a newer task for me to be the guy that says, "Hey, pick up your fucking head and pull security." I mean, I try not to say it in so many words like that. I think it's pretty good. There are some, you know, warrior tasks for sure. But managing skills during firefights are, I feel, on point. (IN-SIM interview, September 26, 2014)

Sean certainly did not seem to be experiencing a sense of dread; or none that he let on, anyway. It almost seemed the opposite for him. He appeared consumed with getting others to feel the

same sense of impending urgency he had felt. He wanted the others to get a sense of the seriousness of the threat within the simulation. But in retrospect I might have anticipated that from a combat experienced veteran. Sean's discomfort came from being removed from direct leadership of the warriors, and instead having to deal with the new situation of influencing the mission and wielding his combat power in battle through the synchronization of his subordinate commanders:

> At some point they need to use that – not common sense but thinking forward. They need to ask themselves, "Okay what am I doing? What happens if we take contact right now?"
>
> I think they get too much of a feeling of security when they sit down. You know it's like, "We're safe. We're at our (base camp) – we're home." And hopefully – you know we got engaged twice and had to move our (base camp). And hopefully that illustrates that indeed you are *not* safe there. Just because you're in a little tight circle doesn't mean you're safe. (IN-SIM interview, September 26, 2014)

I decided to follow this line of thinking. I asked Sean if he felt this aspect, the other students' relaxed attitude during the patrol security halts, was it detracting from his learning experience? Sean quickly dismissed this line of questioning, "You know even the leaders who are more experienced still have to be reminded on that aspect. And some of it is that they're new to it, for sure." He seemed to be reasonably grounded on this issue and instead of lamenting a lack of his peers' commitment to the mission, Sean did the opposite and complimented the attitudes of his fellow students:

> I'm impressed with these everyday civilians that you guys have instructed on how to do this. And they don't half-ass it! You know the guys even in the military – they do.

It's impressive that they can do that! They stick to it. They have the heart. 'Cause a lot of civilians in training say, "You know, this isn't for me. I'm not in the military." But these guys stick with it and they really don't complain about it. (IN-SIM interview, September 26, 2014)

Ben's Perspective. As I strode over to Ben, he was sitting in middle of the halted patrol writing intently in a notepad. He looked up and asked me if I was ready for him. We stepped over to a more discreet position. I decided a direct approach would be best with Ben. I asked him if he recalled any sense of dread in the days prior to the FTX simulation. No. He insisted he felt a sense of excitement and viewed it as a chance to prove his mettle. But he also admitted that the simulation was more physically and mentally demanding than he had bargained for:

This is very physically taxing. I find as my abilities improve, it's offset by physical and mental fatigue. So I've got to continue to double-check things. Tasks that were harder at the beginning are getting easier, but they are getting more difficult yet because I'm fatigued. (laughter) But these are all skills that will build upon themselves. So the more leadership opportunities I get to do in these different field crafts and tasks, the better I'll get.

Often times I'm pushing myself, and others, beyond what I think I'm capable of. Which is an awesome deal – and I'm still here. So I'm learning a lot about myself, a lot about these guys. They're good people to be around.

It seems like I've got the big picture plan in my head. It's going through all the steps to put that big picture into motion. And it's getting easier as I delegate more. You know, I think…I've got the skills to lead, it's just that I have to hone them a little bit better. (IN-SIM interview, September 26, 2014)

I redirected my line of questions to see if he felt the staff had held him back during the week or had he perceived the staff as having placed undue, unnecessary stress on him. I had avoided using the word "staff" and instead spoke in terms of the training, the situation, and opportunities. I might have confused Ben because he looked at me for a long moment and then paused a little longer to put his words together:

> I was letting Sean take over command. Counteracting –we were basically talking over each other. So I took him to the side and told him, "Hey. This is supposed to be my learning experience here, for good or for bad. Ya know?"
>
> I think the best thing that I did over the entire outing so far is that I pulled Sean aside and said, "Hey. We need to get this sorted out." And I think we've got it sorted out. We've each taken different approaches to it.
>
> You know, I am deferring to him a lot for his knowledge and his interactions with the guys. I'm trying to look at the overall strategy here. Then, I have to swoop in from the 30,000-foot big picture and check on my guys from time to time. (IN-SIM interview, September 26, 2014)

Ben's discussion of lessons learned for troop management seemed important, but it seemed he misunderstood my question regarding the influence of the program staff on his learning experience. I considered for a moment being more direct in my question, but at that moment I failed to find the words. I decided the direct approach of asking what he despised most about the program staff would not likely be productive. Moreover, Ben's story of how he searched for leadership opportunities and then even found himself protecting those opportunities by setting boundaries was interesting in its own rite. My interpretation of his description that he not only recognized the opportunity to lead, but would also assert himself to protect it. And yet he had

been artful enough to pull in the talents of Sean, his assistant patrol leader. So in a sense, Ben too had clearly looked to engage meaningfully, genuinely in the authenticity of the simulation.

The transport vehicles were inbound, I could hear them grinding down the gravel road in the distance. I thanked Ben, signaling the end of our interview, and asked him if there was anything I could do for him at the moment. He said there wasn't, and I made some polite comment about the physical fatigue being over soon – 24 hours left in the simulation. "I've got a really good group of guys with a lot of different capabilities. But everyone's giving 100 percent, you know? I'm not gonna lie. These guys – you got to wanna be out here doing this kind of activity because this is not like departing to play Ultimate Frisbee. This is pretty hardcore stuff," Ben added before returning back to his patrol as they collected their weapons and rucksacks and prepared to mount the trucks (IN-SIM interview, September 26, 2014).

Cooper's Perspective. Five miles away on a grassy hilltop I caught up with Cooper. He smiled politely but as I stepped into his patrol's security halt, there was a flurry of activity. Cooper was trying to respond to a dozen issues, requests, demands, and reports. His face was strained with exhaustion, tired and agitated. I mentioned that I could conduct the interview later, but Cooper insisted now was a good time. I sensed some anger in his voice as we stepped outside of the security halt and moved just beyond earshot behind a few evergreen trees that offered some shade. At least a breeze had picked up. Cooper took off his battle rattle and headgear and we both sat in the tall grass (Researcher field notes, September 26, 2014).

I jokingly asked if there might be some dissention in the ranks, trying to break the tension. Cooper was dismissive of the need and insisted he was not angry. In fact, he claimed to be impressed with the members of his patrol, "All the guys have really done a great job, and I've put them through the wringer here. We have walked over 10 kilometers in 24 hours, and minimal

complaints. I know we're all hurting, we are all tired, and then to make them pack up in middle of the night and move was just… you know, ah…" (IN-SIM interview, September 26, 2014).

I had heard from the administrative White Cell that Cooper had experience dissention in the ranks the previous night. In middle of the night Cooper's patrol was instructed to reestablish a patrol base deeper into the enemy valley. It was steep, rocky terrain in pitch darkness with each warrior carrying upwards of 100 pounds of gear. No one saw the need for the move, and there had been some tense grumbling about assuming unnecessary risk. Tempers were high.

"We had to do it. But I'm looking at mutiny here! I'm thinking – how do I get these guys happy, or get them to understand the reason for it?" Cooper implored of me. I nodded my head in understanding, but I was not prepared to defend the White Cell's orders. I also realized that this sort of conflict was what I had been looking for, or at least looking for evidence of, and clearly I had found it. Cooper's frustration confirmed friction between the students and the staff, and it further evidenced some of that dread that Chase had referred to earlier. But I suddenly found myself unprepared to deal with the anger and questions of decisions I had not been a part of. So instead I attempted to refocus the interview and simply ask how Cooper felt things had been going for him up to that moment in the FTX simulation. "Uh… for my first time I think as well as can be expected. There're things that have gone wrong, things that could've been improved, and things that went really well. So we've got the whole spectrum of experience," Cooper estimated, his voice was calm now (IN-SIM interview, September 26, 2014).

White Cell had informed me that Cooper's patrol had gotten into a couple of decisive battles, which is odd for a reconnaissance mission. Typically a reconnaissance patrol avoids a pitch engagement with the enemy force. And Cooper's patrol was large, but isolated a couple of miles behind enemy lines. A battle would put him in a particularly vulnerable situation:

(Yesterday) The minute we stepped into the AO (area of operations), the very first thing we're coming down the path and we are not even thinking recon. I mean, we are doing our patrol formation – but we walked right into a far ambush at the power lines.

I'm thinking, "Okay." So three guys go out. The shooting started. We all started running, and three of our guys got picked off! It was like shooting ducks at the carnival. I look back and I'm like - why was I so stupid? Why would we purposefully run in front of a far ambush? (laughter)

Yeah, that was dumb. We weren't even thinking about, you know… we hadn't even been out here maybe 20 minutes, 30 minutes. So, anyway that went wrong. (IN-SIM interview, September 26, 2014)

Now this struck me as curious, and yet it went right to the heart of the issue of a sense of self-determination in learning. When Cooper discussed mistakes he made from his own decision, or at least from the decisions of his own patrol members, he could readily point out those mistakes and even make light of them. It was their decision. They owned it, as well as the consequences of that decision. But when discussing what was perceived as poor judgment on behalf of the staff in the White Cell, Cooper and his patrol members didn't feel they had any buy-in or sense of agency in the decision. It appeared to have aggravated them on an emotional level.

Cooper was in a talkative mood by then. The anger had gone and he thought out loud, assessing his mission over the past day and a half. He recognized that in the couple of battle engagements with the enemy, his patrol had taken a beating in terms of casualties, and he complimented the enemy team, "They kicked our butts every time we ran into them. They creamed us." At the same time, he seemed to genuinely take solace in the fact that his patrol had indeed completed its mission of reconnaissance:

> They failed to interfere with our reconnaissance on the creek and the road. So, boom. Score one for us. They never managed to catch us in a *near* ambush. They had one set up this morning, and I sent out a recon team to scout out how to get out of the AO. And luckily, (his assistant) took two other guys with him and sniffed this thing out.
>
> Now, (his assistant) got shot. But the other two guys got away. And they came back with the Intel of where the ambush was and what's going on. So we were able to plot another route to get out of there. We got out without incident. No one else got killed. (IN-SIM interview, September 26, 2014)

So for Cooper, anyway, the authenticity of the FTX simulation seemed to be a bit of a double-edge sword. From our discussions it was clear that he had enjoyed that level of intensity and the challenges he and his patrol had faced. Yet it was also clear that when Cooper and his teammates felt as though they could not influence the decisions that pushed their patrol through the battlespace, they felt robbed of self-directed learning. Too, they expressed a measure of resentment that decisions had been made by Higher Command that did not appear necessary or risk-appropriate to the situation on the ground.

Learner Coping Strategies

The fourth major them to emerge from this study included the coping strategies with which each participant engaged CAM. Apprentice learner coping strategies involve the entire process of the CAM experience. During exploration learners must answer the question, "What do I do now?" During reflection learners ask, "How did I do that?" During articulation learners restate the answers to the previous two questions in front of the master instructor and peers, and then ask, "Was that correct?" Each answer to each question requires coping strategies.

The completely unscripted nature of both mission planning exercise videos, the 2.5-hour reflection exercise video, and the semi-structured focus group interview permitted an unimpeded opportunity to observe CAM during the natural progress. Participants articulated reflections on the three questions presented above in front of their peer teams and the master instructors. Three critical incidents were discussed more frequently and often with considerable emotion. They include (1.) the opposing force (OPFOR) nighttime movement; (2.) the first battle of the simulation; and (3.) the "friendly fire" incident. It appears these three incidents provided the learners with the greatest learning points precisely because of the learner-perceived failure or high risks (Researcher field notes, September 27, 2014). Presented below are the first two battles since Cooper described the OPFOR nighttime movement in the previous section of autonomy in an authentic scenario. Discussion of all three incidents will be further explored in Chapter 5.

The First Decision to Engage in Battle. After each of the participant leaders described in a brief their plan in terms of "what was supposed to happen," the master instructor directed their attention to the very first battle at the onset of the FTX simulation, three days earlier. Cooper nodded his head and offered an explanation, "We were supposed to go in and recon areas of interest along the creek and a possible road looking for passage for small vehicles. So we were on a recon mission" (POST-SIM, reflection video, September 27, 2014).

The master asked for the first question of the Battle Drill Matrix (Appendix C). Ben responded, "Should we engage?" The master agreed, and then asked Cooper for his decision-matrix at the point just prior to engaging in contact. Cooper described the course of events that let his patrol to the power lines cut through the dense, hilly forest. The open area of the power lines cut presented his patrol with an obstacle that could render them vulnerable to enemy attack

even from a far distance. That would leave him little capability to respond to such an attack. Had Cooper used the decision matrix?

> We just finished 1.2-kilometer hike and now we are stepping into the AO for the first time. And I mean, you know, not thinking – I wasn't thinking.
>
> We got these guys on the hill. So what are we going to do? And then my APL said, "Let me take these three guys and I'll go cover. Then you run the team straight by." I thought, "Cool. Let's do it." And I just went with it. The whole matrix thing – there was no matrix! There was no thinking process. (laughter) (POST-SIM, reflection video, September 27, 2014)

Another master asked Cooper if the situation had presented him with a polarized decision of attack or withdrawal? Cooper agreed that in retrospect he had multiple options available to him at that time, and a lengthy discussion evolved with input from Coopers peers, including the other participants of this study, in how Cooper might have turned that situation into a success instead of the failed attempt to get across the power lines cut. Cooper lost three members of his patrol in that initial battle. Furthermore, his decision to attack alerted the enemy force that his reconnaissance patrol was in their AO. Cooper concluded, "We had these tall weeds and cover, we could've just crawled everyone across the danger area. We could've gotten through that opening without anyone having gotten shot" (POST-SIM, reflection video, September 27, 2014).

A "Friendly Fire" Incident. Fratricide is that act of unintentionally killing one's own comrades during battle. Warriors colloquially refer to fratricide to as "friendly fire." Aside from the obvious injury, morale suffers tremendously from incidents of fratricide. The act is regarded as evidence of a unit's lack of professional discipline and is an anathema to the warrior ethos.

Ben's and Sean's patrol had fared much better, but did not get away unscathed. In fact, of the three casualties they took in the first 24 hours of fighting, one casualty was self-inflicted fratricide that may have also resulted from a refusal to employ the cognitive model for issuing contingency plans (Appendix E).

One of Ben's subordinate patrol members described the event. He explained that as Cooper's OPFOR patrol engaged and halfway encircled their patrol base, what began as an easily commanded fight became much more complicated as the OPFOR mixed in with the blur force (BLUFOR) fighting positions. Even in broad daylight, the dense vegetation and shadows allowed for very close, personal battle engagements. Sean had pushed a couple of two-man teams out from their patrol base in an attempt to stop the enemy OPFOR from encircling their position, however once again, neither Sean nor Ben had issued these team members a contingency plan as to what to do if their situation became untenable. More to the point, because no contingency plan had been issued, such a plan could not be communicated to the other members of the Ben's BLUFOR patrol. In the middle of battle, everyone seemed to recognize that the lack of a contingency plan and even situational awareness of friendly positions created an unnecessary vulnerability for the BLUFOR patrol (POST-SIM, reflection video, September 27, 2014).

Sean discussed the complications of the situation, "They started pushing in from our left side (motions with his arms in a high angle arch), and that's where we got our fratricide. I killed on of my teammates because, I was calling them in – we had pushed out, and uh…" The master asks Sean where he was located at the time of this event. Sean described, "I was returning from talking to the PL (Ben). So as I approach (that side of the patrol base) I just recall seeing one of them facing in toward us – " (POST-SIM, reflection video, September 27, 2014). Another patrol

member discussed how he and a couple others had just fought off a probing attack by the enemy OPFOR while Sean was reporting back to Ben in the center of the patrol base. To protect from that angle again, Sean's patrol member had to turn in almost the opposite direction because the enemy had intermixed in their defensive line.

Upon hearing the engagement and moving rapidly back to give these warriors further guidance to withdraw, Sean saw the menacing outline of a warrior taking up a fighting position beside a thick tree trunk and facing in towards their patrol base. The bright sun and dark shadows prevented him from identifying a specific uniform color. It didn't help that exhaustion was setting in and the battle had drawn out for over ten minutes now. With the fighting so close, command and control of the situation was rapidly deteriorating, and as these warriors discussed the situation, they realized even then they should have pulled back into the relative safety of the patrol base once the enemy had gotten to their exposed flank. But they hadn't been issued a contingency plan and were hesitant to approach their own teammates' positions in middle of an intense battle. So they decided to stay put and simply reorient their defensive fires.

"I was like – (Sean raises his arms with an imaginary rifle) BANG! BANG!" The tent erupts in laughter. "Yeah. One of my more incredible mistakes," Sean said and then shook his head and laughed at himself (POST-SIM, reflection video, September 27, 2014). At this point members from both the BLUFOR and OPFOR patrols begin to playfully tease the patrol member who had been shot by Sean. It had been his birthday and so several of the warriors bid him "Happy Birthday!" and making shooting gestures in his direction. In fact, the teasing seemed to be more an indirect rebuke of Sean, but everyone enjoyed a good laugh. The potential for shame in this situation appeared to have been deflected and Sean saved face. In this manner the

fratricide incident revealed that apprentice learners often use humor as a prominent coping strategy during the articulation phase of CAM.

Summary

Data analysis identified four emergent themes from participant descriptions of their experiences in CAM. Those themes include learner self-efficacy, learner self-determination, autonomy in an authentic scenario, and learner coping strategies. Analysis was derived from the transcripts of 12 participant individual interviews, 1 participant focus group interview, 2 mission planning videos, 1 reflection exercise video, and 2 staff officers plus 2 instructors interviews.

Chapter 5 offers a theoretical core model that serves to thread together the four emergent themes. Each of the four themes identified here is then discussed through an interpretive lens of the theoretical core model. Finally, Chapter 5 will offer recommendations for future research.

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This research was conducted in an attempt to bridge a gap in our understanding of the cognitive apprenticeship model (CAM) within education. To date, the gap of understanding has involved the lived experiences of learners as identified by other researchers in the field (Jarvela, 1998; Lajoie, 2009). Although not exhaustive, some research findings describe awareness of instructor experiences, perspectives, motivations, and strategies as they've designed and leveraged CAM (Schoenfeld, 1998; Sugar & Bonk, 1998; Hmelo-Silver & Barrow, 2006). However there exists remarkably little interpretation of how *learners* perceive or experience CAM (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011).

A qualitative approach to the issue of learner perceptions of CAM seemed most appropriate precisely because of that gap in our understanding. Moreover, this study sought no quantitative analysis of CAM – neither to determine a correlation of phenomenon nor to predict the frequency of learner behaviors. Instead, through analysis of learner lived experiences this study sought to describe how learners perceived CAM within the situational confines of leadership education in an expeditionary learning school. Research questions focused on how learners described their motivations and coping strategies while learning through CAM. How did learners articulate metacognitive awareness of their development as leaders? How did learners perceive themselves and the community while using CAM? Lastly, were learner assessments of their own leadership development congruent with the instructor assessments of the learners?

As described in chapter four, the major findings of this study included four emergent themes – learner self-efficacy, learner self-determination, autonomy in authentic scenario, and learner coping strategies. In this chapter each theme will be discussed, conclusions will be

offered, and recommendations made for future study. Emergent themes will be used to answer the research questions:

1. In what ways do learners describe their experiences using a cognitive apprenticeship model in leadership education?
    a. How do learners describe motive for studying through this model?
    b. How do learners articulate metacognitive awareness of their development?
    c. How do learners express connection to the community through this model?
2. To what extent is learner assessment congruent with instructor assessment of the learner's leadership competency development?

Discussion

The theoretical core model of the four emergent themes within this study may be described as one of "reconciliation." I will elaborate through this discussion a depiction in which reconciliation is evidenced in data of each emergent theme. Throughout their narrative accounts of learning through CAM, participants consistently describe the experience of having to reconcile the new and oftentimes uncomfortable model of learning through CAM with past learning strategies and past experiences of success or failure.

Learner Self-Efficacy

It appears from participant descriptions that learner self-efficacy may be achieved through an intuitive confidence that stems from observing the success of others, combined with a headstrong faith in one's own ability to succeed. This seemed to be the case with Chase, for example. Rather than learning a descriptive cognitive process, he preferred to instead model the behavior and attitudes of the master instructors. "Someone who has been a huge example in my life is my cousin, and he has been a phenomenal leader figure…I want to be like him. I feel

confident that I can be a good one" (PRE-SIM interview, September 22, 2014). Or in lieu of such a reference to imitate, Chase would reconcile his desire for success with a faith in himself that he would eventually achieve a successful outcome after multiple failures. In such cases Chase would commit to playing the game in a sort of wing-it strategy while observing the outcome. The master instructors noted that over time Chase developed a keen sense for when the situation was going badly or in generally in his favor, and he'd adjust accordingly, often with positive results. "His greatest strength right now is his confidence. He knows he can lead, he knows it in his heart. That confidence is very important for leader because you don't have to second-guess yourself. Chase isn't afraid to make a bad decision" (Instructor, personal interview, September 28, 2014).

Participants also appeared to achieve self-efficacy through deliberate reflection on one's own past successes. When presented with a new challenge, Sean often seemed to reflect on his own experiences as a way of reconciling those past strategies with a strategy for the new situation:

> There's definitely some refining and growing into the APL role that needs to happen! I usually function as the fireteam leader, so managing larger teams doesn't happen a lot for me. This experience goes beyond my normal experiences. It needs to happen more often so that I become more comfortable with it" (IN-SIM interview, September 26, 2014).

In this example Sean defines how the novelty of this new situation is different from his past experiences. He then strategizes that with more exposure to this sort of situation he will appreciate greater comfort, and thereby be more successful.

Perhaps most surprising was that when participants attempted to use cognitive models during game play, as those models were prescribed in class lectures and discussions, strict

adherence to the cognitive model seemed to produce failure outcomes. When Ben was most focused on the cognitive model, for example, it was at the exclusion of awareness of the bigger picture of the battlespace in which the game was unfolding, "There's definitely room for improvement. I'll tell you that. I was definitely relying too heavily on written notes for some of the procedural type things… When you are in this type of experience in a leadership position, I think confidence builds" (IN-SIM interview, September 26, 2014). Ben more often achieved successful outcomes if he loosely played with the cognitive model rather than strict adherence.

This realization challenged my own assumptions of CAM. Now I, too, found myself having to reconcile my assumptions with my observations and data analysis. It appears that the cognitive model is just a tool to work the problem, not a solution to the problem, per se.

I also observed that in learning development, evidence of metacognitive awareness shows most prominent during reflection on incidents of failure. This is consistent with other research in productive failure (Kapur, 2008; Tawfik, 2012) in which learner performance and argumentative reasoning is increased through experiences of initial failure. In this study of CAM, participants' performance expectation and their actual performance or situation creates a cognitive dissonance that in turn provokes reconciliation through introspection. Ben struggled with his sensitivity to peer criticism, "There are definitely some things I see in myself that I don't necessarily like. As part of my personality, I get frustrated sometimes. I get a little passive-aggressive. I just need to rise above that and address it right away" (IN-SIM interview, September 26, 2014). This is an example of an avoidance motivation technique whereby the learner is specifically driven not to experience an unpleasant condition (Deci & Ryan, 1985). And Ben said as much earlier in the week, ""It may be frustrating for me at this point in time, but I don't want to evolve into those leaders that frustrate me now" (PRE-SIM interview, September 22, 2014). So here again is an

example of a participant reconciling his own past experiences with his current performance, as prompted by the reflection process in CAM.

However, in my observations I noted that failure, alone, generally did not provoke such reflection. Perhaps this is because failure did not present cognitive dissonance if the participant did not expect to succeed in the first place. Said another way, only when the task appears authentic and within the participant's reasonable expectation for success does the participant become fully engaged in the task. And if failure is the outcome, the participant then must reconcile his expectations of success with the actual outcome of his performance. For Cooper this occurred when his assistant patrol leader (APL) who was subordinate to his leadership kept seizing command upon enemy contact. The outcome of the APL's aggressive tactics produced terribly high casualties for Cooper's patrol, "You know, he's definitely a take-charge kind of guy, and if I don't put any brakes on it, he'd be calling the shots all day long out here. So now that I know what I'm dealing with, it's easier to manage. But I'm glad to have him out here" (IN-SIM interview, September 26, 2014).

That dissonance of Cooper's expectation and performance outcome provoked a cognitive dissonance that Cooper truly wanted to reconcile. This might be described as a combination of approach and avoidance motivation. Specifically, Cooper was motivated by a desire to avoid higher casualties to his patrol members, while also motivated by a desire to find solutions that might have resulted in a superior performance. I observed that participants often seem eager to attempt a task again once they have reconciled to the point of a proposed solution.

The theme of learner self-efficacy presented the broadest emergent theme in the sense that it was apparent throughout analysis of pre-simulation data (PRE-SIM), in-simulation data (IN-SIM), and post-simulation data (POST-SIM). Not surprisingly, analysis and interpretation

of learner self-efficacy provide partial answers to both Research Question (RQ) 1.A relating to participant motivations to learn, and RQ 1.B regarding the manner in which learners leverage CAM to articulate a metacognitive awareness of their development as leaders. Participant descriptions of self-efficacy also help answer RQ 1.C concerning the importance of connectivity to the community in order to model success, avoid pitfalls, and to gage one's own performance relative to other community members, particularly peers and the master instructors. Lastly, the emergent theme of self-efficacy plays out again in answering RQ 2 through the remarkably consistent congruence between master instructor assessments of participant performance when compared to the participants' own assessment of themselves.

This finding is intriguing precisely because so little is offered regarding the apprentice learner's self-efficacy in past research on CAM. Yet these findings are consistent with previous seminal research in self-efficacy that indicates a positive impact on learner motivation and willingness to accept leadership assignments (Deci & Ryan, 1985; Bandura, 1997). Furthermore, Schoenfeld's (1998) work and research by Cope, Cuthbertson, and Stoddart (2000) with master instructors strongly suggests that apprentice learners prefer to form bonds with the master instructor and community, and preform better as a result of such bonds.

Learner Self-Determination

To varying degrees and with diverse goals, each of the participants expressed a desire for a greater sense of agency in learning. Much of the participant discussion of self-determination could be classified as approach-and-avoidance motivation. That is, all four participants at some point expressed a desire to avoid experiences of past disappointment in other institutions, coworkers, or bosses.

Chase relayed a strong desire to leverage learning for an exploratory experience in the same manner as he had learned to do in this leadership program. Yet on more than one occasion during personal interviews Chase lamented disappointment in his current learning experiences at college, "I can't even describe how there's no leadership at my school… In school, it's just that the teachers teach it to you, test you, and if you fail it – that's it" (PRE-SIM, personal interview, September 24, 2014). This discussion presented one of several incidents within this study in which a participant suggested a preference to use CAM in a learning environment outside the leadership program. In a very real sense Chase's lived experience was an endorsement of CAM as a preferred learning model. And the basis for such preference was the perceived benefit of self-agency, self-determination in learning.

Sean's criticism of training in the military illustrates the level of frustration participants described regarding the lack of learner-centric education, "If this program can do it here, then the US Army can do it. They just don't want to. Or they don't know they can. I think the core answer is the institution doesn't have the heart to get it done. Maybe certain people do, but they are walled in by the institution" (PRE-SIM, personal interview, September 24, 2014). Here again if we look past the finger pointing, such comments present compelling indication of avoidance motivations, and these descriptions evidence a strong desire for self-determination by the participants in learning experiences.

For Cooper the leadership program presented an approach motivation, an internal and intrinsic reward of participating in the program itself. Cooper expressed his appreciation for the program by contrasting it to his dissatisfaction of experiences within the corporate employment, "Then there's all the office politics. There's a lot of funny business, a lot of unethical things…even illegal things. And people just get used up. Where's the reward in that?" (PRE-

SIM, personal interview, September 24, 2014). At some point all of the participants described their desire for self-determination through comparison to other experiences. These motivations seemed to be based at least in part on approach motivation. Chase was seeking to regain self-confidence; Sean was looking to reattach to the military professionalism; Ben wanted an adventure; and Cooper was searching for camaraderie.

> Chase: Confidence. This place is giving me confidence to, you know, keep going through my life… Whatever I'm going through right now, I can deal with it. I can still move forward. That's what's going on here… This program is kind of like church for me. It's kind of like a sanctuary, a religious sanctuary. (PRE-SIM, personal interview, September 24, 2014)
>
> Sean: Once each class is over there are a lot of circles of a really great conversation. We have a lot of educated, smart, tuned-in guys here… The people here in this program, they want to be here. They're willing. They're a special kind of people who truly gets it… So the professional cadre, and the brotherhood, it feels like what I had in the Army. (PRE-SIM, personal interview, September 24, 2014)
>
> Ben: It's the next logical step from Boy Scouts. But way better! That is kind of the draw. It's Boy Scouts with guns, and no adult supervision… I've always been drawn to the military history, military culture. (PRE-SIM, personal interview, September 24, 2014)
>
> Cooper: This program, this is all by choice – for fun. You either like it or you don't. And you come back because you want to, because you're having a good time and you enjoy learning. (PRE-SIM, personal interview, September 24, 2014)

Yet not everyone in the program agrees with the concept of self-determined learning. During my field observations on the last day of the week I was fascinated to witness students rebuke the idea

of self-determination in learning. The most prominent incident occurred as both teams were gathering in the large classroom tent minutes prior to the reflection exercise. A group of half a dozen students, none of them participants of this study, repeatedly and emphatically insisted that performance-based evaluations should be required *of their leaders* prior to assignment of senior leadership roles for the 3-day simulation (Researcher field notes, September 27, 2014). None of the participants in this study expressed a desire for performance testing. Quite the opposite!

As I will discuss over the next emergent theme of leveraging CAM, participants of this study appeared to prefer exactly the opposite. They expressed a desire for more autonomy in their decision-making as leaders. The discrepancy in student perspectives regarding performance requirements for leadership assignments might be explained as a result of these four participants having been in the program longer and understanding the experiential nature of the learning.

The theme of learner self-determination was most apparent in the analysis of PRE-SIM data and POST-SIM data as seen in Table 5. Analysis and interpretation of learner self-determination provides in part an answer to Research Question (RQ) 1.A relating to participant motivations to learn through CAM. It appears from participant descriptions that learners are indeed motivated by the opportunity to direct their learning goals and outcomes. Furthermore, in regard to RQ 1.B how learners leveraging CAM to develop metacognitive awareness of their development as leaders, it seems that the reflection of their performance creates an awareness within each apprentice learner of his preparedness and inclination to accept gradually increasing leadership challenges.

While to date the apprentice learner's perspective as to the conditions that create a readiness and willingness to autonomously explore the problem has not been established, the findings of this study are consistent with CAM as proposed by Collins, Brown and Newman

(1987). Clearly the apprentice learner desires an opportunity to explore the problem. But the motivations and manner by which these conditions come about remains unresolved. It appears to be the case that without assessed evaluations or consequences, the act of *playing* seems to be a preferred coping strategy for learners leveraging CAM. Humans learn to adapt to unpredictable situations through play (Behncke-Izquierdo, 2011) and the participants of this study seemed to prefer situations in which they could play, unevaluated. If so, one could hypothesize that learner self-direction and self-efficacy through play might set conditions in which the learner becomes self-aware of his desire and intent to explore the problem autonomously.

Autonomy in Authentic Scenario

The four participants of this study verbalized an approval of the simulation scenario as both authentic and challenging. Yet participants struggled to reconcile their desire for self-directed experiences with those encounters imposed by the design of the scenario simulation. Simply put, it was more often the case that participating leaders responded to the demands of Higher Command, the actions of enemy opponents, or environmental conditions of weather, visibility, and terrain, rather than inspiration of their own self-directed interests.

Indeed, all four of the participants at some point during the simulation questioned the wisdom of accepting higher levels of risk for learning through the three-day simulation. There was clearly some learner discomfort with decision-making in an ill-defined, ill-structured domain. This became evident in conversations on individual agency and the empowerment for each leader to make a decision that might potentially overrule orders from Higher Command. During the simulation, a specific incident exemplifies the learner's discomfort with a perceived risk. Cooper's opposing force (OPFOR) patrol was ordered to conduct a one-kilometer march with full rucksacks in steep terrain during the middle of the second night of the simulation

(Researcher field notes, September 26, 2014). During the reflection exercise at the end of the week, Cooper and every subordinate member of his patrol voiced their disapproval, believing this task was too dangerous. "It's experience. Having the experience to make that call." Cooper insisted (POST-SIM, reflection video, September 27, 2014). Other leaders and members of the patrols team chimed in:

> Sean: But not everyone is empowered like that. You guys said, you know, "Safety. Safety. Safety." And the master instructors priority is safety. At what point can master instructor interject? You know, they're on the ground. They're basically the authority to us. We're the subordinates, and not everyone is as empowered as some of the more experienced community members in this program. When can the master instructors interject and say, "Wait a minute. No. That's sounds dumb. I gotta look out for these guys"? (POST-SIM, reflection video, September 27, 2014)

There was general agreement by the students that leaders were unaware or uncomfortable making a decision that defied Higher Command. One master instructor insisted that the leader's decision isn't always binary in nature. He insists the decision may not be as simple as "do it" or "don't do it." The master instructor suggested that sometimes it is a matter of conducting the mission at a later time when the conditions are better suited. This way the patrol leaders accept less risk. The tension of the situation abated, but it was clear that the students thought the night movement in steep terrain with rucksacks was too risky and poorly conceived by Higher Command (Researcher field notes, September 27, 2014).

> Cooper: I think I see everything involved and why it happened. There was a communication issue between Higher and I. They didn't know that we had been in the

AO, and they were moving us out to the AO. Fine. You know, that's a communication issue and, uh…I get it. I figured you guys knew we had completed our mission.

When that order came in to move our control based in middle of the night…you guys didn't hear me. You were asleep. I was hot, and I was swearing like a motherfucker! I was pissed. I was ticked off. And this is the only guy (points to a master instructor) who could keep me under control! And I was like, "Alright. This is a rite of passage. And we all gotta prove we can do what we need to do. So don't question orders." So I didn't call in and question that one. That's on me. (pats his chest) Alright? Now I know we're allowed to do that. And anyone else who is sitting here, who one day may be a patrol leader, you now know you have the authority to do that. Alright?

So between a lack of communication and me not questioning authority, we ended up doing a nasty-ass night hike. And we did it. We pulled it off. No injuries, so…yeah. (POST-SIM, reflection video, September 27, 2014)

At that point the master instructor made a light-hearted comment about his fear of being buried alive by the OPFOR platoon. This comment elicited laughter from an otherwise emotionally intense discussion (Researcher field notes, September 27, 2014).

The incident of the OPFOR patrol's march through the Ozark valley under darkness in hazardously steep terrain serves to illustrate a blurring of the line between "learner" and "leader" within CAM. In the exploration phase of CAM the learner *becomes* the leader. Not just in name, but in fact a leader with decision-making authority. The leadership program purposefully designed the three-day simulation as the chief opportunity of the exploration phase of CAM. Indeed, it was explained to the participating leaders that the master instructors intentionally scaffold their involvement during this three-day period. They observed nearby. Yet they will

only interject when acting in the role of Higher Command communiqué, or when any patrol member takes action that the master instructor perceives as a critical safety risk that is certain to produce injury. But even this explanation did not satisfy the participating leaders or team members:

> Ben: I don't know what the traditional roles of the mater instructors are…if they're just a hole in the wall, just kinda sitting back. But it sounds like maybe they need to be more in an advisory role. You know, not necessarily giving direction…but, they have more experience. If there is a decision made that is probably not the best idea, and the master instructor says, "How about you approach it this way." That might clear up a lot of the confusions. (POST-SIM, reflection video, September 27, 2014)

It slowly becomes clear to me that the participating leaders are trying to reconcile past learning experiences and models with their newfound autonomy within CAM. On one hand, learners articulate a desire for greater autonomy and authentic situations in which to solve problems. On the other hand, they appear to be remarkably uncomfortable when granted that authority. In the case of the OPFOR patrol's night march, participants expressed anger that the master instructor hadn't interjected to insist that the march was too dangerous, too risky. To their dismay, the master instructor stated clearly that he decided not to interject precisely because he didn't think it was too risky. In fact, he had conducted similar marches under similar conditions countless times in his years of experience. The master instructor was willing to say that he disagreed with Higher Command's insistence that the move was necessary. But again, the master instructor reiterated that the night march was well within the confines of acceptable risk (Researcher field notes, September 27, 2014).

Only afterwards, during the focus group interview and at the social barbeque, did the participants of this study express some appreciation for the less desirable missions they had encountered. There seemed to be a begrudging concession that they had gained a learning experience and a measure of confidence (Researcher field notes, September 27, 2014).

> Sean: I think I enjoy this program's method of teaching – you know, you show them and then you have them do it kind of in a controlled environment. And then you go out and you do it on your own, in an environment where it's safe to fail. You get in there and get experience.
>
> Ben: I guess uh, the advantages of this type of learning style…it's immersive. It's completely hands-on. Whereas my masters program was kind of do it at your own pace. Here's the information, figure it out on your own. And then in this program it's more like – here's the information. We are going to demonstrate it. Now, apply it.
>
> Cooper: I'll just add that the biggest advantage of this program is that it hands-on. And people learn best by getting hands on and doing stuff rather than just reading. That's the best thing. We're out here and we get to do it. And that's more fun! (Focus group interview, September 27, 2014)

Along with the previous discussions of learner self-efficacy and self-determination, the theme of autonomy in an authentic scenario helps answer RQ.1 regarding participant motivations to learn within CAM. Yet the question isn't a simple one to answer. The leadership program is non-traditional and completely voluntary. The participants consistently articulate their desire to be part of this expeditionary learning school because it perceived as challenging but also a fun place to learn through game play. Game play allows a wonderful sense of self-agency. It also offers powerful insight to self-efficacy. However the nature of an authentic scenario is a bit of a

double-edged sword that elicits strongly conflicted feelings in the participants. On one hand they are attracted to the adventure and the promise of autonomy, but they are often uncomfortable and frustrated with their newfound authority as leaders in the highly dynamic and demanding game simulation. How do learners describe their experiences of CAM? They describe it as a welcome challenge, but conflictingly also describe the inherent emotional, mental, and physical stress. This finding is most intriguing because to date I have found no research that offers descriptions of learner experiences with CAM.

Learner Coping Strategies

While the expeditionary leadership program observed in this study did not specifically instruct classes on the topic of CAM to student learners, the staff and master instructors designed CAM constructs deliberately enough that they were applied in a predictable cycle. The learners were repeatedly given the opportunities to explore, reflect, and articulate. Each time they did so after the master instructors had modeled the process, and then coached the learners through their turn working the problem. Scaffolds were faded as master instructors gradually reduced their coaching advice over the duration of the week of training. The week culminated with a three-day simulation, a game in which the learners would assume decision-making autonomy.

Simulations in this leadership program are exceptionally challenging. To suggest that the game simulation is the main attraction would be an understatement. This program ran solely as a gaming community from its inception in 1981 until 1995 when it was deliberately transitioned to an expeditionary learning school. Arguably it is the challenge of the authentic simulation that remains the foremost recruiting attraction – authentically dynamic and physically challenging.

Physical, mental, and emotional stresses are designed into the simulation and are readily anticipated by all participants. The impending hardship is embraced, even sought-after, but it

also produces a sense of anxiety in the learners, as Chase so clearly stated, "No matter what, you have to do this. It's going to suck. You just have to do it… Because of course I'm gonna do it. But it just felt like I had no choice, no matter what" (IN-SIM interview, September 26, 2014).

While members of the community seem to readily anticipate stress in the simulation, the impact of stress on the cognitive models may not have been expected. This claim is difficult to assert because at no time during this study did anyone announce an assumption that the learners would dutifully adhere to the cognitive process models under stress. And yet the fact that a master instructor had modeled the cognitive process as a tool he would personally use to solve similar problems over years of experience…well, such an endorsement seemed to suggest that the cognitive process would work even under extreme cases of physical, mental, and emotional duress. To be certain they did. I observed numerous times during the week of training that when leveraged by the participant leaders, the cognitive models proved beneficial.

However, at times emotional duress appears to supersede a logical cognitive process as modeled by the master. For example, Cooper's emotional desire for revenge on the first day of the simulation lead to a repeated rejection of the cognitive model. He did not fail to implement the model correctly. Instead in his desire of revenge for earlier casualties inflicted upon his patrol by enemy forces, Cooper deliberately opted to abandon the model when the logical process suggested he should *not* engage the enemy, "I just went with it. The whole matrix thing – there was no matrix! There was no thinking process" (POST-SIM reflection video, September 27, 2014). It's worth noting that Cooper's decision to abandon the known protocols was enthusiastically supported and shared by his subordinate leaders and members of this patrol. OPFOR patrol members insisted they were motivated by "revenge" and "payback" for casualties inflicted during earlier battle engagements (Researcher field notes, September 27, 2014).

This entire episode challenges the assumption that the cognitive process model is conducted rationally under stressful conditions. The cognitive model anticipates elevated levels of stress and excitement in decision-making, but perhaps the model does not anticipate learner coping strategies regarding emotional states or the desire for excitement to break the long periods of tedious work. Yet I must wonder if the opportunity to explore and elaborate an emotion-based solution still benefits the learner in reinforcing the cognitive model? This question wasn't within the scope of this research, and I did not have the opportunity to explore this issue further.

A final surprise from my observations over the week of training was the function of humor as a learner coping strategy. Playful teasing and in particular laughter seemed to be habitually leveraged as a sort of stress-release valve. It appeared very common that participants attempted to diffuse emotionally difficult situations with seemingly inappropriate laughter or a macabre joke. It also seemed to be a remarkably effective technique when reconciling shame or embarrassment with an earnest desire to learn from mistakes.

Sean's fratricide incident presents the most salient example of humor as a coping strategy. Fratricide is colloquially referred to as friendly fire, the act of accidentally shooting one's own team members. It happens, but it is a dreadful mistake. Aside from the issue of crippling morale, fratricide physically disadvantages the team during battle engagement. There are numerically fewer warriors and weapons in the fight. And one warrior can make a difference in a small unit battle engagement. Thus, fratricide is one of the more detestable mistakes.

Sean's fratricide incident late on the first day of the simulation was a serious mistake by an experienced leader. Yet two days later during the reflection exercise, it was Sean's act of humility in readily accepting responsibility for his mistake that seemed to gain sympathy from the rest of the learners, particularly those on his team. After Sean recognized his mistake and

took responsibility for it, there was an awkward moment of silence. This silence was quickly broken by congratulatory remarks of "Happy Birthday" to the victim of the fratricide incident, as the first day of the simulation had been this learner's birthday. Laughter roared through the tent. Sean joined in the fun with a comment of, "I was like – (raises his arms with an imaginary rifle) BANG! BANG!" The tent erupts in laughter again. "Yeah. One of my more incredible mistakes," (POST-SIM, reflection video, September 27, 2014).

The humor here was intelligently leveraged. Other learners did not tease Sean directly, but instead employed a technique of redirection and made fun of the victim. This had an effect of acknowledging a terrible mistake made by a respected combat seasoned veteran, but allowing Sean to save some face at the same time. Indeed, the macabre humor of the situation seemed to further encourage Sean's reflection on the incident (Researcher field notes, September 27, 2014).

The theme of learner experiences in leveraging CAM was identified as almost exclusive to the simulation, and then immediately afterwards during the reflection exercise. By design CAM is used throughout the week of training. However, as expected, I only had the opportunity to observe learners describing their experiences of CAM during personal interviews in the middle of the simulation and during the reflection exercise. It was then that participants could articulate reflection on their explorative experiences. This emergent theme completes the answer to RQ.2 regarding the manner by which learners achieve metacognitive awareness of their leadership development. The answer is that learners become aware of their own leadership development primarily through discussion with the community – yes, certainly self-agency and self-efficacy play a major role in metacognition as each learner anticipates his opportunity to explore the problem and then is given the opportunity to autonomously elaborate solutions. But ultimately it is during the learner's conversations with the community peers and master

instructors that each learner reifies and refines knowledge. This process of 'think-do-discuss' seems to be absolutely essential to metacognitive development of leadership competency. This finding is consistent with the model proposed by Collins, Brown and Newman (1987).

Conclusions

The overarching purpose of this research was to explore learner lived experiences of the cognitive apprenticeship model within leadership education. This study sought to contribute to our collective knowledge of CAM from the *learner's* side of the model precisely because so little is known regarding how learners experience, cope, or perceive learning through this pedagogical model (Jarvela, 1998; Lajoie, 2009; Alfieri, Brooks, Aldrich, & Tenenbaum, 2011). At this point I must conclude from analysis and interpretation of interviews and field observations that the four participants of this study preferred learning through CAM due to a greater sense of self-agency. Paradoxically when participants were presented with the opportunity for autonomous leadership and the authority to make decisions, they experienced uncertainty and frustration, due in part to the demanding nature of the authentic simulation. This is analogous to the imagined experience of a fledgling as it is pushed out of the nest for its first flight. Aristotle commented on exactly this phenomenon when he claimed, "The things we have to learn *before* we can do them, we learn *by doing* them" (Rackham, 1926). Hence, it was only after completing the three-day simulation and meeting the challenges presented therein that leaner participants expressed an almost begrudging admission of confidence in their capability as leaders.

The research questions posed in this study can now be addressed. RQ. 1 *In what ways do learners describe their experiences using a cognitive apprenticeship model in leadership education?* They describe it as a welcome challenge, but conflictingly also describe the inherent emotional, mental, and physical stress of exploration through the 'think-do-discuss' process.

RQ. 1A *How do learners describe motive for studying through this model?* Participants' primary motivation to engage in a cognitive apprenticeship to develop leadership competency was the opportunity to get hands-on experience as leaders. Critical to that desire for experience was also the opportunity to work directly with master instructors for mentorship as participants explored leadership opportunities. While all of the participants expressed personal reasons for joining the program, the commonality in motivation was the opportunity to actually lead while being mentored by experienced leaders.

RQ. 1B *How do learners articulate metacognitive awareness of their development?* Participants achieved a metacognitive awareness of their own capabilities and the development of leadership competencies throughout the week of training. All four participants began the week with what appeared to be elevated levels of self-efficacy. That is, they expected of themselves very capable leadership performances prior to the simulation. However during the three-day simulation confidence noticeably waned as each participant struggled with his own limitations and setbacks in the face of an opponent team and under the observation of the master instructors. This waning confidence appeared to categorically elicit emotions of anger and frustration in the participants that became particularly evident during the reflection exercise when the participants articulated their experiences. Curiously, within a couple hours after the emotionally volatile reflection exercise, all four participants seemed to have noticeably recovered their confidence. Each participant discussed an awareness of their development as leaders over the week, and during the focus group interview they expressed a deep appreciation of the opportunity to learn through the cognitive apprenticeship model.

RQ. 1C *How do learners express connection to the community through this model?* All four participants repeatedly stated a fundamental sentiment that while the opportunity to play the

game was their initial attraction to the program, it was the quality of interactions with their peers and the opportunity to work with and be mentored by the master instructors that kept them coming back to the program each semester. Relationships were evidenced as members of the community – staff, instructors, students, and participants of this study often reference each other in familial terms such as "brother" and "platoon daddy." A bond to the community appears critical for learner retention in this leadership program.

RQ. 2 *To what extent is learner assessment congruent with instructor assessment of the learner's leadership competency development?* Participant self-assessment was remarkably congruent with master instructor assessment of the learners. When master instructors predicted before the simulation that a specific participant learner would resort to focusing on small details to a fault when under pressure, examples of this behavior were almost invariably observed. Afterwards, the participant articulated during reflection and identified this very behavior as needing improvement. When master instructors predicted or assessed that a specific participant would resort to aggressive micro-management under pressure, examples of this behavior were observed. Again the participant articulated during reflection having identified this behavior as needing improvement. At every step along the learner's development, the masters seemed to have an acute awareness of where the learner was in his development and how he would behave.

Such remarkable congruency may be explained by the fact this leadership program is not merely a single week of training. Rather it is designed as a six-week program, and the learner participants of this study were in the last half of the program. That is to say that the master instructors had already formed bonds with these learners, and in fact, a committee of master instructors selected each of the learner participants. So familiarity between instructor and learner had already been established months or even years prior to the conduct of this research.

Future Research

Moving beyond the research questions set forth at the onset of this study, my analysis and interpretations identified four assumptions that compelled me to rethink and refine the model. These four assumptions serve to inform future research within CAM, particularly as this model relates to learning through failure experiences that are inherent in the experiential nature of CAM and appear to be so central to the learning process.

First Assumption. Cognitive models present a mastery-level procedural-based solution to an ill-defined, ill-scripted domain. On the contrary, findings through this study suggest that while vital to the participant learner's success, the learners were more successful when applying cognitive models in an extemporaneous and less prescriptive manner through play within the parameters of the simulation. In this light the cognitive model appears to be merely a tool, and not a procedural solution. Therefore, affording opportunities to explore without consequences through the act of *playing* seems to be a preferred coping strategy for learners leveraging CAM. How do they learn through this process of play? Can that learning be measured in quantitative assessment of performance and argumentation?

Second Assumption. Learners are motivated to improve their performance through experiencing failure. To refine that just a bit, it seems that the participants of this study were not motivated by failure – unless they had first expected to succeed in the task. In that case, the cognitive dissonance of not achieving success produced a combination of avoidance-approach motivations that appeared to further encourage learner improvement. Can further qualitative study identify the causal mechanism that compels learners to return to a failure experience and pursue that task to some level of mastery? What level of exploring will satisfy the learner?

Third Assumption. Team failure outcomes often elicit emotions of anger and resentment amongst the team members. Certainly there was the potential for that, but the participating leaders of this study and their subordinate team members frequently exhibited humor as a coping strategy to defuse the situation, particularly when reflecting on incidents of failure. Using a technique of redirection, such as playfully teasing the victim of the fratricide incident instead of the offender, the team verbally admonished the mistake without shaming the offender. In one-on-one personal interviews with the participants, self-deprecating humor was the normative coping strategy as each leader discussed his past mistakes. Future research might include a comparative case study that looks at collaborative learning groups that are discouraged from using humor as contrasted to collaborative learning groups that are encouraged to use humor as a coping strategy. Using a mixed methods approach, learner performances could be assessed and analyzed for comparison between the two groups.

Fourth Assumption. When an applicable cognitive model is known, the learner will leverage that cognitive model in seeking a solution to an ill-defined, ill-scripted problem. A critical finding of this study suggests that the learner's emotional state has a precarious impact on whether or not the learner will employ the cognitive model. This dynamic was observed on multiple occasions as participants of this research reported consciously rejecting a cognitive model that they had previously used with successful outcomes. When asked for a rationale of their decision, the participants offered explanations of feeling an overwhelming sense of anger – "mad," "pay-back," and "revenge." In a single situation that played out over a 10-hour period, one of the participant leaders abandoned a familiar cognitive model four times, each time with disastrous outcomes for his patrol. Each failure outcome produced greater emotion, anger and resentment, and spurred the next decision to again abandon the cognitive model. Only after

distancing his patrol from the situation for another 10-hour period, and calming down, did the participating leader then begin to use the cognitive model again to his success. Future research might focus on quantitative assessment and analysis of argumentative performances of each participant to determine whether or not a combination of adherence to and rejection of the model results in a deeper comprehension of the cognitive model.

Limitations of Study

This research sought to understand learner lived experiences as they used the cognitive apprenticeship model in leadership education. Yet the findings presented through this research represent only a single case, and while I'm confident the conclusions put forth faithfully describe the participant learner experiences and therefore successfully answer the research questions, further research will be required to substantiate these conclusions. Learner experiences of CAM in an expeditionary school for leadership education may or may not be generalizable to other discipline areas and learning environments.

Moreover, I am both the principal investigator of this research and one of the founders of the expeditionary learning school participating in this study. Although I have not served on the program staff or as a master instructor in several years time, I recognized that my passion for the leadership program presented considerable opportunity for bias. I had to conscientiously create protective measures to guard against bias. Protective measures included interview questions that deliberately avoided direct comparisons to similar leadership programs, and a personal decision to explore participant dissatisfaction within the program when such sentiments were discovered. Yet the potential for bias noted, the advantage of being a "community insider" should not be overlooked. I believe my nuanced understanding of the culture and program methodology afforded unique insight to the four assumptions that have been put to question in this study.

Recommendations

It would be beneficial for further research to explore the four CAM assumptions that were challenged in this study. This is particularly true regarding the fourth assumption that learners will diligently employ the cognitive processes modeled by the master instructor. This study found that while that is often the case, it is not always the case when emotional stress is present during the learner apprentice's turn to independently explore a simulated problem. Yet this begs the question whether or not the opportunity to explore and elaborate an emotion-based solution still benefits the learner in reinforcing the cognitive model? Further research may help us to better understand learner experiences in CAM and ultimately answer this question.

The value of understanding cognitive apprenticeships from the learner's perspective is that this knowledge better informs more effective design of, and instruction within, the cognitive apprenticeship model.

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APPENDIX A. IRB APPROVAL

Campus Institutional Review Board
University of Missouri-Columbia

485 McReynolds Hall
Columbia, MO 65211-1150
PHONE: (573) 882-9585
FAX: (573) 884-0663

May 9, 2014

Principal Investigator: Larsen, Christopher E
Department: University of Missouri

Your Application to project entitled *A Case Study of Learner Experiences within Cognitive Apprenticeship of Vocational Leadership Education* was reviewed and approved by the MU Campus Institutional Review Board according to terms and conditions described below:

IRB Project Number	1211731
Initial Application Approval Date	May 9, 2014
IRB Expiration Date	May 9, 2015
Level of Review	Exempt
Project Status	Active - Open to Enrollment
Regulation	45 CFR 46.101b(2)
Risk Level	Minimal Risk

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All unanticipated problems, serious adverse events, and deviations must be reported to the IRB within 5 days.
3. All modifications must be IRB approved by submitting the Exempt Amendment prior to implementation unless they are intended to reduce risk.
4. All recruitment materials and methods must be approved by the IRB prior to being used.
5. The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date.
6. Maintain all research records for a period of seven years from the project completion date.
7. Utilize the IRB stamped document informing subjects of the research and other approved research documents located within the document storage section of eIRB.

If you have any questions, please contact the Campus IRB at 573-882-9585 or umcresearchcirb@missouri.edu.

Thank you,

Charles Borduin, PhD
Campus IRB Chair

APPENDIX B. INSTRUMENTATION

Pre-Set. *Staff* Rationale for Primary Leader Selection: (Day 1 START)

i. Tell me about (Participant) – what qualities does s/he bring to the position?
ii. Why was (Participant) chosen over other leaders?
iii. What are your expectations of (Participant) in this leader role?

Set A. Perspectives of Self-Efficacy & Motivation: (Day 2A PRE-Exercise)

1. What leadership or martial experience have you had to date? Please explain.
2. Why do you want to be a leader?
3. What does being a leader mean to you, personally?
4. What might you change about yourself as a leader?

Set B. Perspectives of Relation to the Community: (Day 2B PRE-Exercise)

5. How do you remain actively connected to other leaders?
6. What draws you to this particular leadership community?
7. What did you appreciate most about your interactions with the community?
8. Can you describe a challenge this community has helped you overcome?

Set C. Expectations of the Learning Environment: (Day 4 PRE-Exercise)

9. What are your expectations of the simulation?
10. What do you expect from the cadre instructors?
11. What do you expect from your peers?
12. What do you expect of yourself in the simulation?

Set D. Metacognition of Learning Experiences: (Day 6 MID Exercise)

13. How do you assess your own performance in the exercise thus far?
14. How do you assess your subordinates and peers performances?
15. How do you assess your opponents' performance in the exercise?
16. What might the instructors and teammates say about your performance this far?

Set E. Motivations for the Instructional Model: (Day 7E POST Exercise)

17. In your past educational experiences, was learning enjoyable?
18. What advantages/disadvantages do you see to this model of instruction?
19. This week, have you experienced a conflict between what you wanted to learn and what you actually studied?
20. This week, have you felt at times like you wanted to run the lane and solve the problem without the cadre – how do you know you're ready to lead?

Set F. Summarizing the Experience: (Day 7F POST Exercise)

21. How has this leadership program impacted you?
22. Can you tell me how you've changed as you've progressed as a leader?
23. What might you change about this program or instructional method?
24. What are the long-term outcomes of this program for you, personally? Why?

Post-Set. *Instructor* Assessment of Primary Leader Participant: (Day 7 END)

iv. What is your overall impression of (Participant)'s performance?
v. What improvement have you observed of (Participant)'s leadership?
vi. What are (Participant)'s strengths and weaknesses as a leader?

APPENDIX C. INTERVIEW SCHEDULE

Day 1, Sunday 9 a.m. Recruitment begins after the initial administrative safety and itinerary briefings. The investigator invites each of the four leaders to participate in the study and explains the voluntary nature of participation, withdrawal options, confidentiality, plus researcher and IRB contact information. Each participant then enters another building where they were afforded the opportunity to sign a consent form in the presence of a staff officer who is not associated with the study. A copy of the consent form is provided to each participant leader.

Day 2, Monday 3 p.m. The first interviews and observations are conducted after training had ceased on the second day of training. This time is set aside for personal caretaking and that evening, the researcher interviews each of the four participants individually.

Day 3, Tuesday 8 a.m. The investigator observes informally during training classes and simulation. This observation includes interactions of participants with other students and instructors. No interviews are scheduled.

Day 4, Wednesday 4 p.m. The second interviews are conducted in the evening after training has completed for the day during scheduled personal time. The investigator interviews each of the four participants individually.

Day 5, Thursday 10 a.m. Video recordings capture the two mission planning exercises. The intent is to record interactions of both leader teams as they synthesis their mission plan while master instructors utilize the Socratic method to model the cognitive processes of mission planning. The investigator will collect copies of mission plans.

Day 6, Friday 2 p.m. The investigator accompanies the instructors to observe the participants during the three-day decision-making exercise. On the second day of the exercise, the investigator conducts quick interviews with each of the four participants, individually.

Day 7, Saturday 12 noon. Video the 2.5-hour reflection exercise, and then collect the radio traffic records from the staff. Observe instructor feedback to individual participants that afternoon. That evening conduct a focus group interview with all four participants.

APPENDIX D. TROOP LEADING PROCEDURES

Step 1. Receive the Mission

Step 2. Issue a warning order

Step 3. Make a tentative plan

Step 4. Start necessary movement

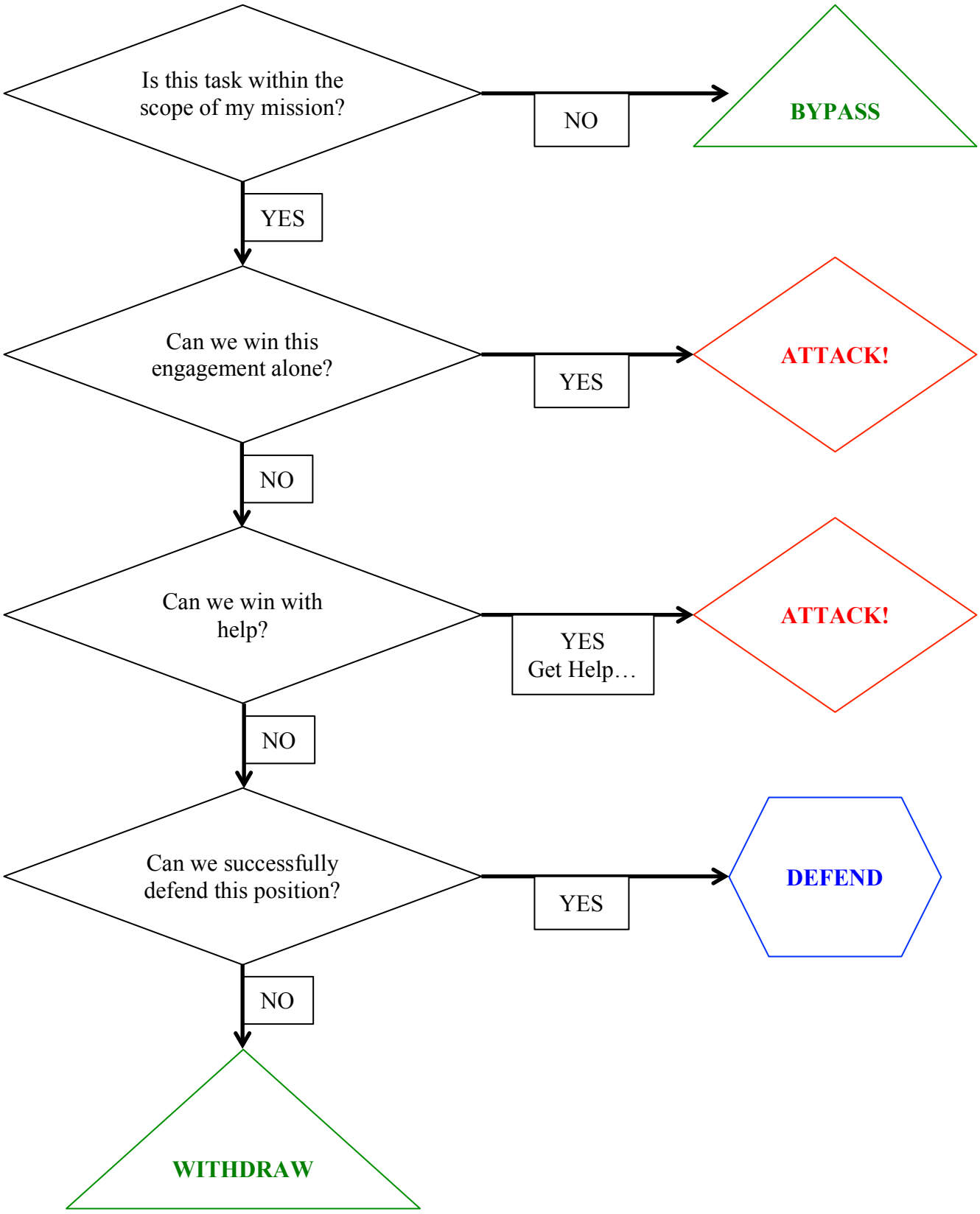
Step 5. Reconnoiter

Step 6. Complete the plan

Step 7. Issue the complete order

Step 8. Supervise

APPENDIX E. BATTLE DRILL MATRIX



APPENDIX F. CONTINGENCY PLANNING

Acronym: GOTWA

Going – Where I am going as I separate from your element.

Others – Other personnel I will take with me as I separate from your element.

Time – The time to anticipate my return to your element.

What – What actions both elements (you and I) will take if I do not return.

Action-on-contact – Actions to take if either element (you or I) engages the enemy.

APPENDIX G. REFLECTION EXERCISE

After Action Review

The After Action Review (AAR) as a cognitive tool to facilitate reflection and then to articulate those reflections in a productive format. While the AAR is an internal function of the team, a staff officer or cadre instructor referees the process.

Redemption is the goal. Tempers may flare; accusations are often hurled; but the referee staff officer mustn't allow the AAR to become a visceral brawl. Redemption is the goal.

It is imperative that team members participate, explore, and derive meaning from this process. The AAR has no value when "offered" by an outside source precisely because that source does not come from within the team's experience.

The AAR follows four steps in a more-or-less sequential pattern:

1. The Plan
2. The Performance
3. The Issues – causing a gap between plan and performance
4. The Fix – to sustain or improve future performance

The Plan: The patrol leaders briefly describe the mission plans and commanders' intent. It is important that leaders refrain from discussing the performance in this step.

The Performance: In this step the entire team reflects on the performance of the mission as conducted. There will be a natural tendency to boast while falling into discussions of "who shot whom" – and to some degree this is acceptable, but the referee must not allow the process to divert from learning. Encourage warriors to engage in such discussion over meals.

Accountability is also important. Warriors will lay responsibility at the feet of those whom they believe saved the day, or dropped the ball. As long as overt acts of shaming are curtailed,

there is significant learning through accountability. Although at times emotional, such discussions should be allowed in as much as they seek to learn.

The Issues: The issues explain gaps between the plan and the performance. More often than not, the issues arise through the discussion of performance in step two. This is particularly true when engaged in emotional discussions of accountability.

Because a seamless reflection and articulation of the issues is desirable, it is acceptable to allow exploration of the issues in discussion of the performance. The two steps can be merged as one, in as much as the issues are subsequently emphasized as a discrete list.

The Fix: The fixes identify solutions to improve or sustain the team's next performance. With a discrete list of issues, the community works together to articulate manners in which the issues can be improved or sustained.

Realize that sometimes the issue is a case of performing better than anticipated. This performance should be sustained. The warriors must identify how that will be achieved.

Fixes are address by name and time frame. "Who is responsible for this fix?" is the guiding question, and must be answered with a specific warriors name. Additionally, a due date or time is required so that the community understands when to expect the fix.

A common technique is for the referee to move the conversation in a circular pattern and ask select warriors for either an "improve" or a "sustain" from their own observations in training. Particularly effective is to invert the warrior's voice – that is, ask the most vocally critical warriors to identify a successful performance to sustain, and ask the most vocally confident warriors to identify an unsuccessful performance to improve. This technique ensures engagement and a wide range of perspectives.

The AAR presents warriors with the opportunity not only to reflect individually, but also to collaboratively share the articulation of that reflection. In this manner, our community of practice is brought together to explore productive failure within situated learning (simulation) and through a cognitive apprenticeship.

VITA

In 1967 Christopher E. Larsen was born the third child of seven to Roger and Carolyn Larsen. He was raised in a Roman Catholic family in the rich traditions of professional warriors and journalists. This unique combination of perspectives resulted in libertarian-minded warriors who tended to break ranks and dare to ask, "Why?" – and egalitarian-minded journalists who demanded personal accountability of their profession. The common thread between the two ideologies was the firm conviction that they could achieve any goal they set for them selves.

After dabbling briefly in journalism, Christopher established himself as a warrior scholar. He served a total of nine years in the U.S. Army as an Infantry non-commissioned officer in four regiments: 1/17th INF Buffalos; 5/20th INF Regulars; 3/187 INF Rakkasans; and 1/314th INF(M). Shortly after separating from uniformed service Christopher accepted a teaching assignment with the South Korean (ROK) Ministry of Education teaching third grade elementary students English for two years. This experience confirmed Christopher's interest in education. He returned to the United States to pursue a master degree in educational technology at the University of Missouri, completing his studies in 2002. In 2003 Christopher was deployed as a military advisor to the Iraqi Army east of Baghdad near Baquba in the Diyala province. Subsequent assignments took him to the U.S. Army Command & General Staff College and the Human Terrain System at Fort Leavenworth, Kansas before returning to the University of Missouri for his doctorate.

Christopher continues to explore emergent pedagogical theory within live, constructive, and virtual game-based simulation environments to codify a novice-to-expert trajectory of leadership competency development. His publications reflect his ongoing endeavors in leadership education within the defense industry. When not relaxing in the company of family and friends, Christopher can often be found in the field with fellow warrior scholars.