A case study of instructors' cultivation of creative thinking in an adult learning environment

by

Patricia Anne Brown

B.S. ED., Michigan State University, 1982
M.S. ED., University of Virginia, 2002

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Educational Leadership
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

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Abstract

The world is changing at a frenetic pace. Current creativity research and literature reveals how important it is for adults to live and work in environments conducive to creative learning and thinking. In education, we know that instructors influence the learning environment significantly, but we do not have a clear understanding of how instructors cultivate a climate for creative learning and thinking for adult learners. The purpose of this research was to understand how instructors cultivate a climate for creative learning and thinking for adult learners. This qualitative case study explored the experiences of a small group of instructors qualified to teach the Red Team Member Course, a unique four-week course that is part of the Red Teaming Education Program conducted by the Department of the Army. Three instructors volunteered from this group using convenient sampling. Four semi-structured interviews and three classroom observations were conducted with each instructor. Data from interviews, observations, course documents, and instructor artifacts were analyzed for emerging concepts, patterns, and themes using the theoretical framework of the investment theory of creativity. Results emerging from the findings confirm evidence of the six creativity constructs of the investment theory of creativity exists in the learning environments of the Red Team Member Course instructors. The convergence of the six creativity constructs, personality, motivation, knowledge, intellectual abilities, environment, and thinking skills, provides evidence of how instructors cultivate a climate for creative learning and thinking for adult learners in this unique learning environment. These findings have implications for professional development and training for adult educators and the learning experiences for adult learners.

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Table of Contents

List of Figures

List of Tables

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Dedication

This research is dedicated to my husband, Bob, the love of my life for nearly 50 years. You have been my biggest advocate throughout this entire journey, and I am truly grateful for your love and support. Your motivation and encouragement kept me going, while your love of life diverted my attention at times, many times, but for all the right reasons! I could not have done it without your incredible support. Your total commitment and unconditional love encouraged me to persevere and see it through. I love you so very much.

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Chapter 1 - Introduction

"There is little that shapes the human experience as profoundly and pervasively as creativity. Creativity drives progress in every human endeavor, from the arts to the sciences, business, and technology" (Paul & Kaufman, 2014, p. 3).

Creativity is a convoluted topic of literature and research in social psychology. Broadly defined as an idea or outcome that is both novel and useful, creativity has been identified as a desirable trait of individuals, groups, teams, and leaders permeating all aspects of society (Edelson, 1999; Glaveanu & Kaufman, 2019; Harding, 2010; Hennessey & Amabile, 2010; IBM, 2010; Kaufman & Sternberg, 2019; Reisman et al., 2016; Tsai, 2012). Research conducted within organizations and businesses since 2010 suggested climates conducive to creative collaboration and thinking support innovation and agility (IBM, 2010; 2018). Extensive research conducted in early childhood, primary, and secondary (P-12) education since 1950 continues to suggest that fostering a climate for creativity in the classroom encourages creative learning and thinking in students, and teachers play an important role in cultivating that climate (Amabile,1983; Amabile & Pillemer, 2012; Gardner, 1983; Guilford, 1950, 1967; Reisman, 2017; Torrance, 1966, 1987).

Literature and research exploring instructors' roles in fostering creative learning environments in adult education are far more limited. Creativity in the context of adult learning and education did not appear in the literature until the later part of the 1990s with a modicum of research predominately situated in arts-based education and continuing education (Csikszentmihalyi, 1990; Edelson, 1999; Harding, 2010; Reisman, 2017; Tsai, 2012). Additionally, much of the research on how instructors cultivate learning environments for creative thinking was conducted with P-12 educators. The few studies conducted in higher

education reveal a gap in creativity research in adult education. Yet creativity researchers continue to emphasize the significance of environmental influence and creative capital on societies and social change (Florida 2019; McWilliam & Dawson, 2008). With globalization and the unpredictable challenges that affect the world, developing creative thinking skills and supporting learning environments where creative thinking can thrive, is essential to our existence (Florida, 2019; Glaveanu & Kaufman, 2019; McWilliam & Dawson, 2008).

Creativity

Defining Creativity

Often described as ambiguous and fluid, the definition of creativity and the relevance of creativity in the learning environment have continued to evolve since the 1950s. The seminal work of modern creativity theorists suggest that creative potential is enriched when educators value creativity and foster creative learning environments (Amabile 1983; Csikszentmihalyi, 1996; Guilford, 1950; Sternberg, 1999; Sternberg & Lubart, 1991). While a single definition of creativity for education is elusive, concepts such as divergent thinking, tolerance for ambiguity, fluency, flexibility, originality, elaboration, brainstorming, intrinsic and extrinsic motivation, openness to new ideas and others' perspectives, perseverance, problem solving, novelty, relevance, and finding unique solutions to complex problems reverberate throughout creativity literature (Amabile, 1983; Csikszentmihalyi, 1990; Edelson, 1999; Guilford, 1967; Harding, 2010; Reisman, 2017; Sternberg & Lubart, 1995; Tsai, 2012). The most widely accepted definition among creativity experts and social psychologists of the twenty-first century defines creativity as a unique or novel idea, concept, or way of thinking, that provides a solution or solves a problem in a contextually relevant or appropriate way (Amabile, 1996; Barron, 1955; Gardner, 1988; Hennessey & Amabile, 2010; Kaufman & Glaveanu, 2019; Lubart, 1999;

Reisman, 2017; Runco & Jaeger, 2012; Simonton, 2012; Sternberg, 2017). This definition was selected because it can be applied across all domains, to all levels of creativity, and it is relevant for implicit as well as explicit theories of creativity (Niu, 2019; Niu & Kaufman, 2013; Sternberg,1985; Sternberg & Lubart, 1999).

Two definitions for creative thinking emerge that are relevant for this research. Nickerson (1999) defined creativity as the ability to develop novel solutions to complex problems in a contextually relevant or appropriate way. This definition closely aligns with the creativity definition selected for this research. However, Sternberg's (2010) definition, the ability to think flexibly and adaptively in rapidly changing situations, is relevant for the context of this research. Therefore, both definitions will be used to define creative thinking.

Early Creativity

The influence of creativity on society and social change has been pondered since the time of our earliest philosophers (Glaveanu & Kaufman, 2019; Paul & Kaufman, 2014; Tsai, 2013a, 2013b). Evidence of creativity in literature is documented as early as the sixteenth century (Edelson, 1999), yet creativity as an aspect of psychological science did not emerge until after World War II (Albert & Runco, 1999; Glaveanu & Kaufman, 2019; Paul & Kaufman, 2014, Sternberg & Lubart, 1999). Emerging from concepts of genius, imagination, and invention, historical review suggests creativity is a more modern concept, influencing all aspects of society and universally necessary for humankind to continue to evolve (Edelson, 1999; Glaveanu & Kaufman, 2019).

Creativity as a psychological science was not fully recognized until Guilford's (1950) Presidential speech to the American Psychological Association where he defined creativity through the personality traits unique to each individual (Glaveanu & Kaufman, 2019; Reisman,

2017; Simonton, 2019). Stating "creative personality is then a matter of those patterns of traits that are characteristic of creative persons" (Guilford, 1950, p. 444) Guilford's definition is attributed with the resurgence in creativity as a subject of psychological science, energizing empirical creativity research from 1950 to the early 1980s. His structure of the intellect model (SOI, Guilford, 1956) emphasizing flexibility, fluency, and originality, and the psychometric approach as a means to measure creativity, paved the way for modern creativity assessments and measurement tools, such as the Torrance Test of Creative Thinking (TTCT, Torrance, 1966), still in use today as a viable assessment tool (Amabile, 1996; Sternberg, 1999). The four p framework posited by Rhodes (1961) categorized the study of creativity into four components: person, process, product, and press (i.e., environment).

An historical review of creativity literature reveals that many creativity experts studied creativity within one or more of these categories. Amabile (1983) studied creative products and motivation, Sternberg (1985) studied creative persons and later studied creative processes (Sternberg & Lubart, 1991, 1992, 1995). However, creativity as a valid psychological science remained tenuous until the 1980s.

Creativity of the Mid-Twentieth and Twenty-first Centuries

From 1950-2021, the majority of creativity research worldwide has been conducted in business and P-12 education (Amabile, 1983; Guilford, 1967; IBM, 2010; Torrance, 1966, 1980). Creativity surfaced as an important yet understudied component of adult learning in the later part of the 1990s (Csikszentmihalyi, 1990; Harding, 2010; Reisman, 2017; Tsai, 2012, 2013b), and only since the early twenty-first century has creativity been mentioned in the context of military learning and education (McClary, 2009; United States Army Combined Arms Center, 2015).

Creativity in P-12 Education

Extensive research and literature exist supporting student creativity in P-12 learning environments and teacher education and training to foster and nurture creativity in the classroom (Amabile, 1983; Amabile & Pillemer, 2012; Gardner, 1983; Guilford, 1967; Sternberg, 2017; Torrance, 1966, 1987). In the second half of the twentieth century, the focus of creativity research emphasized identifying creative traits among children, identifying creative teaching strategies that would enhance creativity in children in the P-12 education arena, and assessing creativity based on a set of traits, intellectual ability, and outcomes or products (Amabile, 1996; Gardner, 1983; Torrance, 1980). Since the beginning of the twenty-first century, creativity research has focused on instructional strategies to enhance creativity in the classroom and in support of classroom climates conducive to creative learning and thinking (Sternberg, 2017). Divergent thinking, tolerance for ambiguity, fluency, flexibility, originality, elaboration, brainstorming, intrinsic and extrinsic motivation, openness to new ideas and others' perspectives, perseverance, problem solving, novelty, and relevance, are basic components and traits of creativity and creative thinking supported by seminal creativity theorists such as Barron (1955), Guilford (1956), Rhodes (1961) and Torrance (1966) and have withstood the test of time. Empirical creativity research emerging from Europe and Asia since 2011 provides quantitative evidence to support the possibility of a causal relationship between teacher personality and a creative classroom climate (Cheung & Leung, 2014; Cheung & Mok, 2018; Karwowski, 2011; Karwowski et al., 2018).

Creativity in Adult and Higher Education

Much of the early literature written on creativity in adult education emphasized arts-based education, continuing education, entrepreneurial innovation, and intrinsic motivation

(Edelson, 1999; Hennessey & Amabile, 1998). Literature written since the late 1990s encouraged and promoted creativity in adult education and adult learning environments, often recommending it as a topic for future research. However, few researchers addressed how adult educators foster a creative learning environment or whether instructors' openness to creativity helped cultivate a climate for creative thinking for adult learners (Tighe et al., 2003; Tsai, 2012, 2013b).

In their case study research on the relationship between student creative growth and university engineering pedagogy, Daly et al. (2014) suggested evidence of creativity existed in classrooms where instructors self-reported personally valuing creativity and encouraged creative thinking in their classrooms. The researchers recommended additional research to understand how instructors perceive creativity and what instructional support could be provided to encourage creative pedagogies in the classroom.

Research conducted since 2010 has addressed the influence of a creative learning environment on student learning in higher education (Fan & Cai, 2020; Tsai, 2015). Yet, aside from music and creative arts programs, the existence of creativity in adult learning is limited, and faculty development and training programs for adult educators to learn how to cultivate environments conducive to creative learning and thinking are almost nonexistent (McWilliam & Dawson, 2008; Reisman, 2017).

Organizational Creativity

Cultivating creativity in organizational settings continues to emerge as an area of significant research. Cultivating workplace climates that support and stimulate creative thinking, creative collaboration, and innovation as well as creative leadership attributes continue to add to the discourse on creativity in this domain (Florida, 2019; McWilliam & Dawson, 2008; Mumford, et al., 2019; Rigolizzo & Amabile, 2015). Human capital or the value of an individual

or group's skillset, knowledge, and experience has given rise to creative capital or the value of an individual or group's creative thinking expertise. Organizations are becoming more aware of the value of creativity and leveraging the talent of those individuals who have the skills, knowledge, and judgement to work collaboratively to develop creative solutions to complex problems (Florida, 2019; McWilliam & Dawson, 2008). Managerial attitudes toward creativity and how those attitudes effect creative thinking within an organization, are additional areas of interest in creativity literature and research (Florida, 2019; McWilliam & Dawson, 2008).

In 2010, IBM conducted interviews with 1,500 Chief Executive Officers (CEOs) worldwide. The results of the study indicated creativity was the most important leadership attribute (IBM, 2010). "CEOs saw the need to seed creativity across their organizations rather than set apart 'creative types' in siloed departments like product design" (IBM, 2010, p. 30). In 2018, IBM interviewed 2,100 global CEOs about the significance of global partnerships in today's world. The outcome of the study reinforces the expectation that businesses must innovate globally, requiring creative solutions and agile thinking to meet the complex demands of today's world (IBM, 2018).

Creativity in Military Education and Training

Popular culture depicts military training as behavioristic, rife with mindless, rote repetitious training. In 2011, the Department of the Army revamped their learning model seeking to improve the quality of instruction in army training and education (Cornell-d'Echert, 2012; Department of the Army, 2011, 2017; Persyn & Polson, 2012). Updated in 2017, one of the primary elements of The Army Learning Concept for Training and Education (ALC-TE) is to create agile learners who are critical, creative thinkers, who are able to solve complex problems

in myriad environments amid ambiguity and uncertainty (Department of the Army, 2011, 2017; United States Army Combined Arms Center, 2014, 2015).

Studying the relationship between creativity and tolerance for ambiguity in a military course (McClary, 2009) found that creativity exhibited by military students in a program-culminating assignment was influenced by the instructional style of the seminar leader. The seminar leader is the instructor assigned to a group of students for the duration of the program. While identified as an area for future research, no research has been conducted to address this gap.

Theoretical Framework

The guiding theoretical framework for this research was Sternberg and Lubart's (1991) investment theory of creativity. This theory provided appropriate alignment for studying how instructors cultivate a climate for creative learning and thinking for adult learners because it encompasses implicit as well as explicit attributes of creativity embedded within the six creativity constructs of the theory (Niu, 2019; Sternberg & Lubart, 1991). Within the field of creativity, implicit theories consider how creative mindsets influence creative decisions and outcomes of individuals, and their ability to identify creativity in others (Niu, 2019; Sternberg, 1985). Few theories incorporate both implicit and explicit creativity but Sternberg and Lubart's (1991) investment theory of creativity combines Sternberg's implicit theory (1985) and the triarchic theory of successful intelligence (Sternberg, 1999) to support both concepts.

The attraction of this theory as a viable framework for this research was the confluence of creativity constructs embedded in this theory (Sternberg and Lubart, 1991). According to the investment theory, creativity occurs when the six constructs, personality, motivation, knowledge, intellectual abilities, environment, and thinking styles converge (Sternberg, 1985, 2017;

Sternberg & Lubart, 1991). The confluence of constructs does not need to be of equal parts. Depending on the domain some constructs will be more prevalent than others. Additionally, each construct is defined by a set of creativity attributes that may be evident in varying degrees or not at all.

Personality

Comprised of the creativity attributes of tolerance for ambiguity, openness to experience and others' perspectives, perseverance, sensible risk-taking, self-efficacy, and a growth mindset Sternberg and Lubart (1995) described this construct as "a preferred way of interacting with the environment (p.205)." Tolerance for ambiguity is the ability to withstand uncertainty and tolerate discomfort and ill-defined problems (Sternberg & Lubart, 1991, 1995). Openness to experiences is the curiosity and willingness to try new things. Rigolizzo and Amabile (2015) suggested "an atmosphere of openness" (p. 71) promotes creative learning and thinking. Openness to others' perspectives is the ability to consider others' thoughts and ideas even if you disagree with them. Perseverance is defined as the ability to persist when faced with obstacles (Sternberg & Lubart, 1995). Creativity attributes within this construct are self-regulated and fluid, emerging or retracting with environmental influence. Environmentally dependent, changes to these creativity attributes can be developed and enhanced over time (Sternberg & Lubart, 1995).

Motivation

The motivation construct is comprised of intrinsic and extrinsic motivation. Intrinsic motivation is the internal drive or desire to do something just for the sake of doing it, while extrinsic motivation is driven by reward or acknowledgment (Amabile, 1983, 1996). While intrinsic motivation is more often considered a creativity attribute than extrinsic motivation

(Tighe et al., 2003) environmental conditions can encourage or discourage motivation (Sternberg & Lubart, 1995)

Knowledge

The knowledge construct is comprised of formal knowledge and informal knowledge. Three types of knowledge emerged from this research, domain, content, and creativity knowledge. Domain and content knowledge are aspects of the formal knowledge attribute. Creativity knowledge is an aspect of the informal knowledge attribute. According to Sternberg and Lubart (1995) a certain level of domain knowledge is necessary for novel and useful ideas and solutions to complex problems to emerge. They also contend that too much domain knowledge has the potential to hinder creativity. Informal knowledge is more susceptible to environmental change than formal knowledge (Sternberg & Lubart, 1995).

Intellectual Abilities

Embedded within this construct are the ability to redefine problems, insight, and problem solving. The creativity attribute of redefining problems is the ability to process information and think unconventionally (Sternberg & Lubart, 1995). The creativity attribute of insight is the ability to activate prior knowledge or make unique connections to see something in a new or different way (Sternberg & Lubart, 1995). The creativity attribute of problem solving is the ability to find appropriate solutions to complex problems (Sternberg & Lubart, 1995). The ability to identify the relevant problems from the irrelevant ones is an important aspect of this attribute

Environment

Embedded within this construct are the creativity attributes of student-centered, mutual respect/trust, collaboration, empowerment, and cultural awareness/cultural empathy. To foster creative learning and thinking, Sternberg & Lubart (1995) recommended cultivating

environments where these creativity attributes are evident, and creativity and creative potential are explicitly valued. A student-centered learning environment is one that puts students' needs first, where instructors provide engaging, relevant instruction, facilitate learning with meaningful assignments, and develop positive instructor-student relationships from a learner-centric perspective (Kettler, Lamb, & Mullet, 2018; Sternberg & Lubart, 1995). Mutual respect and trust are defined by terms such as appreciation, credibility, authenticity, competence, and confidence (Brookfield, 2006; Sternberg and Lubart, 1995). Collaboration is defined by working interactively and collectively with others (Sternberg, 2017). Empowerment in a student-centered environment is one where instructors and students share power. Cultural empathy is an appreciation of similarities and differences of other cultures. Cultural awareness is recognition that there are similarities and differences between and among cultures.

Thinking Styles

This creativity construct encompasses how instructors think and how that thinking influences the instructional climate they create (Sternberg & Lubart, 1995). Embedded within this construct are the creativity attributes of a legislative teaching style, self-awareness/self-reflection, and metacognition Teaching style comprises instructor personality, instructor-student interactions and instructor selected methods and strategies (Sternberg and Lubart, 1995). Self-awareness is consciously understanding one's own beliefs, values, and opinions. Self-reflection is introspectively assessing oneself and adjusting accordingly. Brookfield (2006) refers to these attributes as "mindful teaching" (p. 28). Metacognition, or thinking about your own thinking, is described by Nickerson (1999) as "…a matter of paying attention to one's own thought processes and taking responsibility for one's thinking" (p. 417).

The investment theory of creativity provided a solid foundation from which to conduct this research. The domain relevance of the six creativity constructs provided appropriate support for this unique learning environment The six creativity constructs and their accompanying attributes provided viable scaffolding to analyze themes emerging from multiple data sources. A visual representation of the creativity constructs and attributes of the investment theory of creativity is illustrated in Figure 1.

Figure 1.

Concept Map of the Investment Theory of Creativity (Sternberg & Lubart, 1991).

The Investment Theory of Creativity
(Sternberg & Lubart, 1991)

Personality
- Perseverance
- Sensible Risk-Taking
- Self-Efficacy
- Growth Mindset
- Tolerance for Ambiguity
- Openness to Experience
- Open to Others' Perspectives

Motivation
- Intrinsic
- Extrinsic

Knowledge
- Formal/Domain
- Formal/Content
- Informal/Creativity

Creative Thinking

Intellectual Abilities
- Redefine Problems
- Insight
- Problem Solving

Thinking Styles
- Legislative Teaching Style
- Self-Awareness/ Self-Reflection
- Metacognition

Environment
- Student-Centered
- Mutual Respect/Trust
- Collaboration
- Empowerment
- Cultural Empathy/Awareness

Problem Statement

To encourage critical and creative thinking in adult learners, adult educators are needed who can model and promote creativity (Brookfield, 2006; Kettler, Lamb, & Mullett, 2018; Reisman, 2017). Creativity literature suggests adult educators must be agile and critical creative thinkers. They must be self-reflective and self-aware of their teaching style, capable of taking risks in their learning and teaching, experiencing different levels of ambiguity and intellectual discomfort in the process (Boyer, 2015; Cornell-d'Echert, 2012; Persyn & Polson, 2012; The United States Army Combined Arms Center, Army University, 2015). Yet, research supporting this implementation is miniscule. Even with the inclusion of critical and creative thinking as part of military leadership education, few military education courses include creativity in the pedagogy and even fewer professional development opportunities exist for instructors to learn how to foster creative learning and thinking (Department of the Army, 2017; McClary, 2009). No research was found that explored how instructors cultivate a climate for creative learning and thinking among adult learners in a military learning environment. The paucity of literature and research exploring creativity in military learning and adult education environments provides justification for this research.

Statement of Purpose

The purpose of this research was to understand how instructors cultivate a climate for creative learning and thinking for adult learners. Researchers have posited that instructors influence the learning environment significantly but *how* instructors cultivate this type of environment for adult learners remains unclear (McClary, 2009; Reisman, 2017; Tsai, 2013a). Studying how instructors determine what methods to employ to foster creative learning and thinking among students within their learning environments has important societal considerations

with global implications (McWilliam & Dawson, 2008; Mumford et al., 2002, 2019; Sternberg & Kaufman, 2018).

Research Questions

This qualitative case study was guided by the following primary research question and sub-questions:

1. How do Red Team instructors manifest the six constructs of the investment theory of Creativity in the learning environment?

    a. How do instructors demonstrate the personality construct?

    b. How do instructors demonstrate the motivation construct?

    c. How do instructors demonstrate the knowledge construct?

    d. How do instructors demonstrate the intellectual abilities construct?

    e. How do instructors demonstrate the environment construct?

    f. How do instructors demonstrate the thinking styles construct?

Research Design

This qualitative case study was conducted to understand how instructors cultivate a climate for creative learning and thinking for adult learners. According to Merriam and Tisdell (2016), basic qualitative research seeks to make meaning out of the lived experiences of the participants. Three definitions of case study provide support for this research methodology. Defining case study, Yin (2018) stated "a case study is an empirical method that investigates a contemporary phenomenon (the *case*) in-depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (p. 15). Additionally, Stake (1995) defined case study as "the study of the particularity and complexity of a single case" (p. xi) and how the researcher comes to understand the unique context of the case.

Finally, Merriam and Tisdell (2016) defined case study as "an in-depth description and analysis of a bounded system" (p. 37).

Qualitative case study methodology was selected because the case, how instructors cultivate creative learning and thinking, is bound by the context of a unique learning environment, a Red Teaming Education course, within a military framework that occurred over a four-week period with a small sample of qualified instructors. The unit of analysis was the instructor. The phenomenon of instructors cultivating a climate for creative learning and thinking in a military course for adult learners supported single basic qualitative case study as an appropriate methodology for this type of qualitative research. The unique experiences of each instructor and the contextual explanation expressed by each instructor informed my understanding of the case (Stake, 1995; Yin, 2018).

Research Setting and Sample

In 2011, the Department of the Army included critical and creative thinking as part of the military leadership education plan for the entire force (Department of the Army, 2011). In 2017, the Army updated all education and training programs, making them more learner-centric and placing more emphasis on innovation and creative thinking (Department of the Army, 2017). Unfortunately, few military education courses include creative thinking in instructor training or professional development, and research conducted to understand how instructors cultivate a climate for creative learning and thinking are limited (Department of the Army, 2017; McClary, 2009; Sternberg & Kaufman, 2018).

Setting

The research was conducted with instructors of the Red Teaming Education program, at the University of Foreign Military and Cultural Studies (UFMCS), Fort Leavenworth, Kansas.

Identifying a need for the military to be able to thrive in times of ambiguity and uncertainty, the goal of Red Teaming Education courses was to develop adult learners to become critical creative thinkers, to become more self-aware and self-reflective, to be open to others' perspectives, to become more culturally aware and empathetic, to find alternate solutions to complex problems, and mitigate group think within a student-centered environment. (Hoffman, 2017; The Red Team Handbook, 2019). The graduate level courses for mid-career military and civilians were taught throughout the year.

Sample

Research participants are referred to as instructors or facilitators. The instructor pool consisted of active-duty and retired military personnel who have successfully graduated from the course. All instructors undergo formal facilitator training lasting up to three course cycles. During the first cycle of training, new instructors observe and support instructor mentors. During the second cycle, new instructors co-teach with their instructor mentors. During the third cycle of facilitator training, new instructors facilitate their first course independently, with mentor instructor oversight and support. Courses are offered concurrently throughout the year.

Using convenient sampling, three instructors volunteered from the pool of Red Teaming Education instructors qualified to teach this course. Convenient sampling was used to select instructors because the pool of qualified instructors was small and the sample reflected the typical population of those trained to teach this unique course (Merriam & Tisdell, 2016).

Impact of COVID-19 on Research

In March 2020, the COVID-19 pandemic emerged forcing educational institutions around the globe to shut down (Roy et al., 2022). As weeks turned to months educational institutions turned to virtual learning platforms restructuring their delivery systems (Mishra et al., 2020).

Many institutions of higher education in the United States provide virtual and hybrid learning options to meet the needs of their student population, but COVID-19 completely changed the landscape of learning and continues to impact the learning environment two years later (Mishra et al., 2020; Roy et al., 2022). Courses without hybrid, virtual, or online options had even greater challenges as they scrambled to find solutions. While my research began in April 2021, a full year after the initial COVID-19 outbreak, the effects impacted my research.

The Red Teaming Education courses were designed for in-person learning. Courses are collaborative, student-centered, project-based, and interactive. Several classes are conducted at other locations such as museums and water treatment plants to reinforce concepts and provide rich experiences. Department of Defense (DOD) guidelines during the timeline of my study restricted in-person learning so I conducted my research in the virtual learning environment.

Data Collection

Data were collected through instructor interviews, observations, and document analysis. The collection of data from multiple sources provided a more comprehensive understanding and helped provide a more accurate representation of evidence emerging from the data through triangulation (Stake, 1995; Lapan, 2004; Kim, 2016; Yin, 2018). The research and data collection were conducted over a four-week period. Instructor contact began one week prior to class instruction and ended after the last observations, interviews, and member checks.

Interviews

As a data source, semi-structured interviews were selected for this research because they provide an opportunity for responses to the guiding questions emerging from the research questions within a loose conversational structure, allowing for open-ended responses and elaborations (Kim, 2016; Yin, 2018). Interview questions provided greater depth of

understanding and more insight into instructors' thoughts and experiences, making interviews a very significant and rich data source (Hays, 2014: Yin, 2018).

Interviews provided opportunities to gain insight into instructors' thoughts and were used to clarify data collected while analyzing documents and conducting observations (Stake, 1995). Interview questions provided a deeper understanding of the instructors' thinking about course content, instructional strategies, and creative learning and thinking in the context of this course (Appendix A). Four 60-90 minute semi-structured interviews were conducted with each instructor. Interviews were conducted using Zoom video conferencing software. The first interview provided an opportunity for clarification of the overall study, rapport building, and responses to initial interview questions (Merriam & Tisdell, 2016). Three subsequent interviews occurred during weeks one, two, and three of the course. Interviews were conducted after each weekly observation to provide instructors an opportunity for reflection and clarification. All interviews were conducted privately between individual instructors and the researcher.

Observations

Observation was selected as a data source to provide contextual reference to information revealed during interviews and to gain first-hand knowledge of the learning environment resulting in a more comprehensive understanding of the case (Merriam & Tisdell, 2016; Stake, 1995; Yin, 2018). Three naturally occurring observations were conducted with each instructor during weeks one, two, and three of the course. Observations were conducted in the virtual learning environment using Microsoft Teams. Due to the sensitive nature of the military learning environment UFMCS used the DOD version of Teams which required instructor access. The focus of the observation protocol was on the instructors rather than the students (Appendix B). I took the observational stance of *observer as participant* because the observation was my primary

focus (Merriam & Tisdell, 2016). Observations occurred overtly with all instructors aware of my presence and the purpose of the observations, but I did not participate in any class discussions or activities (Merriam & Tisdell, 2016; Yin, 2018). I captured classroom observations using the observation protocol checklist and detailed field notes. The focus of the field notes was on the instructors and their in-class instruction and instructor-student interaction.

Documents

Documents were selected as a data source to supplement and provide more depth of understanding of the data emerging from interviews and observations (Creswell & Poth, 2018; Merriam & Tisdell, 2016). Program, course, and instructional documents were requested from the Red Teaming Education director, the curriculum director, and instructors. Requested documents were emailed to me and reviewed electronically. Red Teaming Education documents were selected for review to provide additional insight into how creative learning and thinking are situated at different levels within the program.

Data Analysis

Data analysis is the process of taking many pieces of data, identifying which pieces of data are relevant to the research questions, recognizing patterns, and determining themes from relevant data (Creswell & Poth, 2018; Merriam & Tisdell, 2016; Saldaña, 2016). In qualitative research, evidence is verified through triangulation (Stake, 1995) whereby multiple sources of data are used to corroborate the findings of the study (Yin, 2018). Data source triangulation was used to determine whether data found in interviews, observations, and document analysis were evident in the other sources (Stake, 1995).

Data from interview transcriptions, observation protocol field notes, and documents were analyzed using iterative coding, initially coding for concepts then coding for themes. According

to Saldaña (2016) concept coding is a good choice for case study research because it encourages the researcher to look beyond the initial words and develop a deeper understanding of the concepts emerging from the data. Data were analyzed with the support of NVivo Computer Assisted Qualitative Data Analysis Software (CAQDAS). Thematic coding was used to identify patterns from the coded concepts that emerged into themes using codes and queries generated from my interpretation of the data. Finally, I conducted member checks to further corroborate the findings (Merriam & Tisdell, 2016). Participants had the opportunity to review all transcripts and confirm or question their participant information (Merriam & Tisdell, 2016). I received participants confirmation of their representation prior to finalization of this document.

Assumptions

There is one assumption considered for this research. It was assumed the participants would truthfully participate in interviews, sharing their experiences and answering questions truthfully.

Limitations

1. Conducting this research in the context of a single military course could limit the transferability of the findings.

2. The findings might not be relevant to others because they do not have the specified training system and it might be difficult to replicate in certain contexts due to resources and time.

3. The small number of faculty qualified to teach the course limits the pool of participants, therefore affecting the sample size for the study.

Researcher Background

Conversations with graduates of the course over several years collectively described the course as the most unique military learning experience of their careers. From these anecdotal conversations, graduates stated the course challenged them to think critically, reflectively, and creatively, to find creative solutions and become more open to others' perspectives and cultures. These conversations piqued my interest to find out how instructors were cultivating this type of learning environment.

My background as an educator informs my thinking and colors the lens through which I conducted this qualitative case study research. I consider myself a lifelong educator and learner. My career began in 1983 with my first teaching assignment and continued through 2011 as a consultant for a non-profit education research company. I had the opportunity to teach and mentor students and educators in seven states and one territory of the United States, at the K-12 and undergraduate university levels of public education.

Teaching at the elementary and middle school levels of public education, I became interested in how instructors nurture and cultivate creative learning and thinking. That interest led me to the University of Virginia where I studied creativity and creative teaching strategies, receiving my Master of Education degree in educational psychology and gifted education in 2002. I became a proponent of facilitated instruction, and student-centered, relevant, project-based learning. One of my professors used a phrase coined by Torrance and Safter (1990) that defines my role as an educator. She said, your goal as an educator is to "make the strange familiar, and the familiar strange". To me, this quote describes passion and curiosity enmeshed with competence and confidence. As an educator, one needs to be competent, having enough knowledge to clearly explain the concepts that are strange. One needs enough confidence to

present familiar concepts in new and different ways, and one needs the passion and curiosity to empower one's own creativity to do so. Testing these theories in my own classrooms and discussing them with like-minded colleagues made me think about how teachers are trained, mentored, and coached, and whether creativity should be included in teacher professional development.

As a district level mentor and coach for other P-12 educators, an adjunct professor teaching classroom management at a small university in the Pacific Northwest, and an education specialist for a non-profit research education organization in the Pacific region, I worked with educators to find more creative ways to engage students in their classrooms. I emerged from these experiences believing educators need time to self-reflect, they need to be encouraged to try new things without fear of failure, and they need opportunities to think about and understand creativity and how to nurture it within their learning environments.

Beginning my doctoral journey at Kansas State University in 2014, my initial focus was on teacher training and professional development. Having access to the military community while living at Fort Leavenworth, Kansas, I became curious about creativity in the context of military courses and whether creativity was a component of instructor training. In 2015, I became aware of a Department of the Army course with a unique approach to learning and instructor training. That course was the Red Team Member Course (RTMC) and I began my deep dive into learning more about what and how they teach.

With nearly 30 years in the field of education, I am aware that my experience and passion for cultivating creativity will, most certainly, color the lens through which I analyze the data. However, I acknowledge I must remain open to whatever evidence emerges from the data.

Significance of Study

The world is changing rapidly, more connected and innovative than ever before. Innovation is creativity in action. It is the implementation of creative thoughts that are novel and useful (Reiter-Palmon et al., 2019). Creativity is the essential component driving all innovation. Creativity social psychologists claim creativity pervades all aspects of humankind and is critical to our future existence (Edelson, 1999; Glaveanu & Kaufman, 2019; Harding, 2010; Hennessey & Amabile, 2010; Kaufman & Sternberg, 2019; Paul & Kaufman, 2014; Rigolizzo & Amabile, 2015). Creativity should no longer be limited to arts-based education, P-12 education, and siloed in traditionally creative departments of businesses and organizations (Florida, 2019). Creativity researchers suggest instructors are needed who can model and cultivate creative learning and thinking (Brookfield, 2006; Reisman, 2017; Rubenstein et al., 2013).

Implications for this study are far-reaching. This research could inform instructor education and training programs at all levels, while informing the current discourse on how to leverage creative capital by retaining the most innovative and creative members across all domains (Florida, 2019; McWilliam & Dawson, 2008; Sternberg & Kaufman, 2018). Providing more creativity training and awareness for instructors of adult and higher education could help prepare students to meet societal demands for creativity and innovation. Providing business and organizational creativity training programs could help them remain vital in today's global economy (Florida, 2019; IBM 2010; Reisman, 2017; Tsai, 2012, 2013a). Military training and education programs could benefit from instructor training that emphasizes creative learning and thinking. Learning how to cultivate creative learning and thinking and how creativity scaffolds the demand for more agile and adaptive military learners and leaders. As organizations, education, and the military form partnerships to navigate, innovate, and thrive in a complex

world, the implications for understanding how to cultivate climates for creative learning and thinking are limitless.

Definition of Terms

Agile learning/agility. For the purpose of this study, agile learning is defined as the ability to reflect on past experiences, identify patterns in a timely manner, to think flexibly, to adapt and transform learning, and to relinquish old ideas, skills, and perspectives that are no longer relevant, and replace them with new ones. Specific components include performance, risk-taking, innovation, and reflection (DeRue et al., 2012; Mitchinson & Morrison, 2011).

Convergent thinking. The ability to identify commonalities and make connections between seemingly unconnected ideas (Reisman, 2017), and the ability to select those ideas that are relevant and combine them to form a single solution (Csikszentmihalyi, 1996).

Creativity. A unique or novel idea, concept, or way of thinking that provides a solution or solves a problem in a contextually relevant or appropriate way (Amabile, 1996; Barron, 1955; Reisman, 2017).

Creative capital. Emerging from the term *human capital*, the concept describes the significance of creative thinkers in an organization who have the capacity to provide unique and relevant ideas and concepts to complex problems (Florida, 2019; McWilliam & Dawson, 2008).

Creative personal identity. Self-perceptions of one's own creativity within a specific domain, and the significance one places on creativity as part of their own identity. (Karwowski et al., 2018; Tierney & Farmer, 2002).

Creative self-efficacy. Believing in one's own creative capacity and ability (Sternberg, 2017; Tierney & Farmer, 2002). This concept defines the potential relationship between self-efficacy and creativity first posited by Bandura (1997).

Creative thinking. The ability to develop novel solutions to complex problems in appropriate or relevant ways (Nickerson, 1999). The ability to think flexibly and adaptively in rapidly changing situations (Sternberg, 2010). This definition provided better alignment to the context within which this research was conducted, a military learning environment.

Divergent thinking. The ability to identify patterns between seemingly unrelated unique and different thoughts or ideas that result in multiple solutions that are relevant to the situation (Csikszentmihalyi, 1996; Reisman, 2017).

Elaboration. The ability to expand on ideas, add details, embellish (Reisman, 2017).

Extrinsic motivation. The desire to accomplish something or to be outwardly inspired by external rewards, accolades, or acknowledgment (Amabile, 1996).

Flexibility. The ability to generate many unique ideas or solutions, brainstorm, (Reisman, 2017; Torrance & Safter, 1990).

Fluency. The ability to generate many unique and different solutions to complex problems in a timely manner, brainstorming (Reisman, 2017).

Human capital. An economic concept whereby an employee's asset value to the company is commensurate with their knowledge, skills, and experience (Florida, 2019; McWilliam & Dawson, 2008).

Innovation. The implementation of a unique or novel idea, concept, or way of thinking that provides a solution or solves a problem in a contextually relevant or appropriate way. Indicators include tolerance for ambiguity, intrinsic motivation, ideation fluency, intellectual risk-taking and flexible thinking (Boyer, 2015).

Intrinsic motivation. Inwardly driven or personally inspired to accomplish something because it is personally relevant or enjoyable resulting in personal satisfaction (Amabile, 1996).

Originality. The ability to generate new and unique ideas, solutions, or concepts that are also relevant to the situation (Csiksentmihalyi, 1996; Reisman, 2017).

Red teaming. A practice that improves the effectiveness of an organization by challenging the status quo through critical and contrarian thinking so that adversarial perspectives are taken into account and vulnerabilities are exposed while finding creative solutions to complex problems (Hoffman, 2017).

Reflective self-awareness. For the purpose of this study, reflective self-awareness is defined as the ability to become actively aware of one's own teaching from all aspects of the teaching paradigm and to knowingly and willingly modify instruction to best meet the students' needs (Brookfield, 2006). Indicators of self-reflection include instructional preparation, the execution of the instruction, capturing thoughts and feelings after instruction, and identification of modifications or adjustments for the future.

Resistance to premature closure. The ability to keep an open mind, to remain open-minded and receptive to others' perspectives and solutions without rushing to judgement (Reisman, 2017).

Risk-taking. The ability to tackle complex problems in a risk tolerant, student-centered yet high-stakes environment (Mitchinson & Morrison, 2011).

Tolerance for ambiguity. A willingness to accept a level of discomfort and uncertainty while working toward a solution (Reisman, 2017).

Summary

This chapter provided an introduction and overview of the study to include a brief review of the literature and gaps identified in the research. Specifically, this chapter focused on the significance of cultivating climates conducive to creative learning and thinking in our world

today. Studying instructors' cultivation of creative learning and thinking for adult learners could

have extensive implications for leveraging creative capital on a global scale. The next chapter

will review the literature on these topics in detail.

Chapter 2 - Literature Review

"Creativity is one of the most important constructs studied by psychology and related disciplines – it represents the future of humankind" (Kaufman & Sternberg, 2019, p. 3).

In this chapter, literature associated with creativity and creative learning and thinking will be examined to provide some perspective for this research. Reviewing the literature confirms that creativity is a culturally important phenomenon that permeates all aspects of our society (Edelson, 1999; Glaveanu & Kaufman, 2019; Harding, 2010; Hennessey & Amabile, 2010; Kaufman & Sternberg, 2019; Rigolizzo & Amabile, 2015). Influences of creativity on twenty-first century political, social, environmental, and economic change have instantaneous and global implications, more so than any other time in history (Florida, 2019; Glaveanu & Kaufman, 2019; McWilliam & Dawson, 2008). Further evidence in the literature confirms creativity is an important aspect of leadership and innovation in our society, permeating education, business, and government at all levels (Edelson, 1999; Harding, 2010; Hennessey & Amabile, 2010; Mumford et al., 2019). Additionally, literature suggests that just as innovative leaders encourage creative thinking in their organizations, educators are the innovative leaders of their learning environments, playing an equally important role in cultivating creativity and creative thinking. Ultimately, more research is needed to understand the ramifications of this role (Beghetto, 2017, 2019; Cheung & Mok, 2018; Edelson, 1999; McClary, 2009; Reisman, 2017; Reiter-Palmon, et al., 2019; Simonton, 2012; Tsai, 2013b).

This literature review explores definitions of creativity, identifies relevant theoretical frameworks, and examines creativity research within different contexts and domains, within the United States and abroad. While the study of creativity is extensive, the literature and research of early childhood, primary, and secondary (P-12) education, organizational education and training,

adult and higher education, and military education included in this review, provide relevant information, context, and evidence to support an investigation into how instructors cultivate a climate for creative learning and thinking for adult learners.

Search Methodology

Conducting several document searches for this literature review revealed nearly twice as many peer-reviewed articles and books published from 2000-2019 than the entire twentieth century. A search of peer-reviewed literature on the PSYCHINFO and ERIC databases using the key words *creativity* and *education*, without limiting filters or date parameters, revealed 6,164 and 7,785 publications respectively from 1900-2019. Adding date parameters of 2000-2019 revealed over 4,400 publications for both databases and 3,009 and 4,013 publications from 2010-2019, respectively. Conducting two different searches without date parameters and using key words *creativity* and *children* and *education*, for the first search, and *creativity* and *leadership*, for the second search, revealed 1,351 peer-reviewed publications for the first search and 1,138 for the second search on the PSYCHINFO database. Adding date parameters revealed over 60% of the first search and 80% of the second search were published in the twenty-first century.

Using the key words *creativity* and *higher education* revealed 319 peer-reviewed publications written from 1966-2019 and 222 from 2010-2019 on the PSYCHINFO database. A search on the ERIC database revealed significantly more publications for the same date parameters and key words with 2,682 publications from 1968-2019 and 1,592 from 2010-2019. Using the key words *creativity* and *adult education* revealed 28 peer-reviewed publications written from 1974-2019 and only 12 publications written from 2013-2019 on the PSYCHINFO database. Using the same parameters, the ERIC database revealed 216 and 118 publications respectively. The number of peer-reviewed publications dwindles further using key words

creativity and *teachers' perceptions.* Document searches without date parameters on PSYCHINFO and ERIC revealed 42 and 13 publications written respectively and 26 and 10 publications written from 2010-2019 respectively. These results confirm a gap in creativity literature. Comparing references from the literature revealed seminal work and theorists published prior to 1978 consistently informed more recent work in the field of creativity.

History of Creativity Research

Evidence of creativity research is documented as early as the sixteenth century but stagnated as a topic of psychological research until after World War II (Albert & Runco, 1999; Edelson, 1999; Glaveanu & Kaufman, 2019; Sternberg & Lubart, 1999). Much of the early literature emphasized the personality traits of creative genius evident in the most famous artists, writers, poets, composers, and entrepreneurs in history (Florida, 2019; Glaveanu & Kaufman, 2019; Simonton, 1988, 1999). Emphasis on intellect and cognitive function flooded the literature of the 1950s and 60s as the Russian American space race pushed researchers to find the best ways to identify and measure intellectual ability and genius potential among America's youth (Esquivel, 1995; Glaveanu & Kaufman, 2019; Sternberg, 1999; Torrance, 1966; 1980).

Giftedness emerged as an area of interest in P-12 education as creativity became connected with exceptional intellectual ability (Amabile, 1983; Guilford, 1967; Renzulli, 1976; Torrance, 1966, 1980; Treffinger, 1986). Some of the earliest creativity research of the mid-twentieth century focused on psychoanalysis of conscious and unconscious thought and how those thoughts potentially affect creative processes (Kubie, 1958; Sternberg & Lubart, 1999).

While understanding the personality traits and processes of creative geniuses and acknowledging their significant cultural contributions is important, emphasis on everyday creative contributions has permeated creativity literature since the beginning of the twenty-first

century. (Beghetto &Kaufman, 2017, 2017; Kaufman & Beghetto, 2009; McWilliam & Dawson, 2008). From 1950-2020, the majority of creativity research worldwide was conducted in P-12 education and within organizations and businesses (Amabile, 1983; Guilford, 1967; IBM, 2010; Torrance, 1966, 1980). Creativity in the context of adult learning and higher education did not appear in the literature with any significance until the late 1990s (Csikszentmihalyi, 1990; Edelson, 1999; Harding, 2010; Reisman, 2017; Tsai, 2012) and only since the early twenty-first century has creativity even been mentioned in the context of military learning and education (McClary, 2009; United States Army Combined Arms Center, 2015).

Defining Creativity

Creativity is a challenging topic of study. Exacerbating this challenge and confusion are the multiple theories of creativity focusing on personality traits, processes, products, environmental influences, motivation, differentials, and various compilations of theories, as well as the disagreement among experts on one conclusive definition of creativity (Amabile, 1983; Gardner, 1983; Guilford, 1950; Torrance, 1977; Treffinger, 1986; Sternberg & Lubart, 1999). From the 1950s through the 1990s many researchers used processes, products, personality traits, and environmental influences as their theoretical foci to define creativity (Plucker & Renzulli, 1999; Rhodes, 1961). For example, defining creativity as a series of traits possessed, in varying degrees, by those individuals identified as having a creative personality, Guilford (1950) claimed that creativity and creative aptitude or readiness may be influenced by hereditary, biological, or environmental factors. In turn, creative tendencies require nurturing and support for creative outcomes to emerge.

While a single definition of creativity for education remains elusive, attributes and traits such as divergent thinking, tolerance for ambiguity, innovation, brainstorming, intrinsic and

extrinsic motivation, openness, perseverance, problem solving, novelty, and relevance, recur throughout creativity literature (Amabile, 1983; Csikszentmihalyi, 1990; Edelson, 1999; Guilford, 1967; Harding, 2010; Reisman, 2017; Sternberg & Lubart, 1995; Tsai, 2012). Additionally, creativity literature supports prolific idea generation, the ability to ascertain good ideas from bad ideas, and the ability to generate novel and useful ideas, concepts, and solutions as judged by current society and confirmed by experts in the field. (Amabile, 1983; Csikszentmihalyi, 1990; Sternberg, 2017). Despite the definitional discord, creativity researchers seem to agree that a certain level of intelligence must be present, and a certain depth of knowledge must be attained, for creativity to occur (Mumford et al., 2019; Sternberg & O'Hara, 1999).

Twenty-first century creativity researchers support the notion that all humans are capable of creativity, albeit in varying degrees (Beghetto, 2019; McWilliam & Dawson, 2008; Sternberg 2019; Tsai, 2013a). The terms *novel* and *useful* are used prolifically throughout twenty-first century creativity literature to define creative solutions or outcomes.

For the purpose of this study, a broad definition acknowledged by many creativity experts has been selected. Creativity is defined as a unique or novel idea, concept, or way of thinking, that provides a solution or solves a problem in a contextually relevant or appropriate way (Amabile, 1996; Barron, 1955; Gardner, 1988; Hennessey & Amabile, 2010; Kaufman & Glaveanu, 2019; Lubart, 1999; Reisman, 2017; Runco & Jaeger, 2012; Simonton, 2012; Sternberg, 2017). This definition is a good fit because it aligns with the aforementioned creativity traits, it can be applied to implicit as well as explicit creativity, and it is applicable at all levels on the creativity continuum, from every day, local creativity to legendary, global creativity (Niu, 2019; Niu & Kaufman, 2013; Sternberg,1985; Sternberg & Lubart, 1999).

Definitions for creative thinking are more clearly stated. Creative thinking is defined as the ability to develop novel solutions to complex problems in appropriate or relevant ways (Nickerson, 1999). This definition was selected because it aligns with the definition selected for creativity for this research. However, a more recent definition from Sternberg (2010) defined creative thinking as the ability to think flexibly and adaptively in rapidly changing situations. This definition provided better alignment to the context within which this research was conducted, a military learning environment.

Theoretical Frameworks of Creativity in Education

Creativity theories of the mid-twentieth century emerged from Guilford's (1950) plea for more creativity research during his address to the APA (Plucker & Renzulli, 1999; Sternberg & O'Hara, 1999). The impetus for scientific creativity research was the psychometric approach popularized by Guilford (1950), and Torrance (1966) whereby creativity and creative potential were measured quantitatively through a series of creativity tests. This approach was the catalyst for three other approaches: The cognitive approach, which focused on creative thought; the social-personality approach which focused on environmental, motivational, and personality variables and the influence of those variables on creativity; and the confluence approach which focused on creativity as the result of the convergence of multiple factors (Albert & Runco, 1999; Kaufman & Glaveanu, 2019; Simonton, 2012; Sternberg & Lubart, 1999). Many theories and models emerged from these approaches, each an attempt to find the most comprehensive way to measure and understand creativity (Kaufman & Glaveanu, 2019; Plucker & Renzulli, 1999). While an exhaustive review exceeds the scope of this literature review, ten of the most influential theories will be reviewed in detail.

The Art of Thought

One of the earliest models of creativity was Wallas' (1926) art of thought. Initially

describing the creative process in four stages, preparation, incubation, illumination, and

verification, Wallas (1926) added a fifth stage, intimation, to make his model more complete.

The preparation stage is the acquisition of knowledge and the identification of a problem. The

incubation stage involves reflection and unconscious thought, as if consumed by the idea or

problem. The intimation stage is the awareness that an idea or solution is imminent. The

illumination stage is the breakthrough and realization of the idea or solution, the *aha* moment.

The verification stage involves testing the idea or solution, revising and testing again until the

idea or solution is validated (Kaufman & Glaveanu, 2019; Reisman, 2017; Wallas, 1926). Direct

descendants of this model are Guilford's (1956) structure of intellect model (SOI) and

Csikszentmihalyi's (1999) systems model.

Structure of Intellect Model (SOI)

Attempting to show a relationship between creativity and intelligence, Guilford's (1956)

SOI emerged from a compendium of 120 distinct traits or abilities exhibited by creative people

that were validated through multivariate factor analysis using three dimensions: contents,

operations, and products. His research challenged mid-twentieth century educational thinking

about the lack of support for creativity within educational settings, and expanded our thinking

about creative production and output, processes and content, and behavioral characteristics

(Guilford, 1967; Sternberg et al., 2019). While the assessments emerging from Guilford's (1956)

model have been challenged as psychometrically unstable over the years, the model has been

validated with extensive amounts of data (Plucker et al., 2019; Sternberg et al., 2019). His

divergent thinking assessments influenced the TTCT, still considered one of the most significant

34

tests of creativity and divergent thinking in use today (Torrance, 1966). The relationship between creativity and divergent thinking and how fluency, flexibility, originality, and elaboration are important components of creative problem solving provided one of the most salient contributions to creativity research (Guilford, 1967; Sternberg et al., 2019).

The Incubation Model of Teaching and Learning (TIM)

Devoting nearly his entire life to the study of creativity, Torrance was one of the most fully immersed and prolific scholars of creativity (Hébert et al., 2002). Influenced by behavioral psychology of the 1950s and 60s, Torrance was curious whether it was possible to accurately measure creative abilities (Hébert et al, 2002; Torrance, 1966). Identifying his own study of creativity as process focused, Torrance (1966, 1977) sought to understand the personality traits of creative individuals, the types of environments needed to nurture creativity, as well as the types of creative products or outcomes that emerged from the creative process. He was particularly interested in little-c or everyday creativity rather than big-c or genius level creative accomplishments (Torrance, 1977). Unlike other creativity researchers of the mid-twentieth century, he believed creativity continued to evolve over a lifetime (Torrance & Safter, 1990).

Conducting a 22-year longitudinal study, Torrance (1980) concluded that adult creative achievement could be predicted from creativity assessment scores on the TTCT. Initially assessing 400 elementary students at two schools, in grades one through six, over three years, he analyzed the responses of 220 participants to follow-up questionnaires 22 years later. The outcome of this study supported Torrance's hypothesis of how creativity and a passion for and motivation toward a future interest can be influenced by an educator or mentor who nurtures creativity and creative thought (Torrance, 1977, 1980).

In his quest to educate and train teachers to cultivate creativity in their classrooms, Torrance developed the TIM. "This instructional model is a three-stage model that provides opportunities for incorporating creative thinking abilities and skills into any discipline at any level from preschool through professional and graduate education and the elderly" (Torrance & Safter, 1990, p. 3). In the first stage, *heightening anticipation*, the teacher heightens motivation and expectations, making students curious, piquing their interest to know and discover. In the second stage, *deepening expectations*, the teacher provides opportunities for students to dig deeper, allowing time for exploration, expanding their depth of understanding, and encouraging elaboration. In the third stage, *keeping it going*, the teacher encourages students to challenge their thinking, to go beyond what they have learned in the classroom and apply what they have learned elsewhere (Torrance & Safter, 1990). While Torrance and Safter (1990) acknowledged the significance of a great teacher and role model on the learning environment and while the teaching strategies recommended in this model promote creative teaching and learning, this model is a better fit for P-12 education than within the military education context of this research. However, the TIM provides a viable roadmap to help teachers navigate their way by teaching specific skills that promote creativity and creative thinking in students (Reisman, 2017).

Theory of Multiple Intelligences (MI)

Using *intelligences* to define eight distinct cognitive areas, Gardner (1983) posited that expressions of creativity emerge exclusively within each of the areas of linguistic intelligence, musical intelligence, logical-mathematical intelligence, visual-spatial intelligence, bodily-kinesthetic intelligence, interpersonal intelligence, intrapersonal intelligence, and naturalist intelligence. Emphasizing the different ways people learn, MI theory significantly influenced teacher training in the later part of the twentieth century, especially in gifted education. Social

psychologists of the twentieth century who claimed all individuals possessed varying amounts of general intelligence, albeit in varying degrees were challenged by Gardner's (1988) thinking.

Conducting in-depth research on eminent scholars and artists such as Freud, Einstein, da Vinci, and Mozart, Gardner's (1983) purpose was two-fold: (1) to avoid criticism for his claims by using indisputably creative geniuses, and (2) to support his contention that the confluence of a supportive environment, a supportive mentor, and self-motivation provide the impetus for large-scale creativity to occur. However, even the smallest acts of creativity benefit from the convergence of these three areas. Although Gardner's (1983) theory has informed my understanding of intelligence and creativity for nearly 25 years, it not suitable for this study because the emphasis on individual creative profile and how understanding multiple intelligences can inform instruction is beyond the scope of this research. However, Gardner's (1983) MI theory deserves mentioning because of the influence it has had on teaching and learning creatively in the twentieth and twenty-first centuries.

Systems Theory of Creativity

Laying the groundwork for his systems theory of creativity, Csikszentmihalyi (1996) asserted that the quest for creativity is less about the product, and more about the process and how it emerges, and the environment within which it emerges. Consisting of three areas, the domain, the field, and the person, Csikszentmihalyi (1996) defined *domain* as an area or body of knowledge with certain generalizations, rules, and procedures. Business is an example of a domain. The *field* is defined as a group of experts in a domain, the gatekeepers (Csikszentmihalyi, 1996). Economics is an example of a field in the domain of business. Finally, the *person* is defined as the one with the novel idea or approach that is recognized by the field in

a specific domain. Ultimately, the systems theory is about connecting the potentially creative individual to the field of experts within a specific domain or discipline (Csikszentmihalyi, 1996).

Creativity and the Person

Suggesting that creative people are more inclined to focus on the *how* rather than the *why*, Csikszentmihalyi (1996) suggested that creativity is the result of multiple factors coming together at the right place and the right time. Conducting interviews with 91 men and women across multiple domains Csikszentmihalyi (1996) indicated that luck, curiosity, being in the right place at the right time, and acknowledgment by experts in the field determined *greatness* or discovery of creativity. Comparing people identified as creative with others not identified as creative but doing the same thing or in the same line of work, Csikszentmihalyi (1996) found creative people truly enjoy what they do and will do it regardless of fame or other extrinsic rewards. Furthermore, he speculated that creativity, and the love of discovery, could be an inherited trait. Csikszentmihalyi (1996) believed that creativity and the love of discovery could have the greatest impact on the future of humankind because new discoveries allow for societal growth and change.

Creative people have good decision-making skills. They have good judgement and know when their ideas are relevant to their environment or society. Specifically, successful creative people have the ability to know the difference between good ideas and bad ideas. To do so requires a deep understanding of the domain, a thorough understanding of the expectations of the field, and an ability to know what is relevant to the field. To be successful, creative people must be able to internalize the rules of the domain and the judgment of the field (Csikszentmihalyi, 1996). Additionally, deeply internalizing and understanding their domain may allow creative people to see problems and solutions in other domains that might be helpful in understanding the

problems and solutions in their own domain. This type of inter-disciplinary thinking supports the notion that cultural capital is extremely important to creativity and curiosity, resulting in new discoveries (Csikszentmihalyi, 1996). Self-awareness is another important trait. Those who can provide their own feedback do not need to rely on others for redirection or affirmation. They adjust accordingly and they are able to think metacognitively (Csikszentmihalyi, 1996).

Flow

Describing *flow* as a time of optimal performance and discovery Csikszentmihalyi (1996) defined *flow* through nine elements: (a) define clear goals, (b) provide immediate feedback to one's actions, (c) provide balance between challenges and skills, (d) alignment of actions and awareness (in a state of flow our concentration is focused on our actions), (e) elimination of conscious distractions (focus only on what is relevant), (f) no fear of failure (self-confidence), (g) distorted sense of time (speeds up or slows down), (h) autotelic activity occurs. Similar to intrinsic motivation, autotelic simply means doing something just for the sake of doing it. Exotelic means doing something for a perceived outcome or to get something in return, similar to extrinsic motivation (Csikszentmihalyi, 1996). *Flow* has been described as immense passion combined with intrinsic motivation and complete immersion (Kaufman & Glaveanu, 2019). While this theory establishes the connection between the person, the field, and the domain, and provides insight into how creative individuals reach optimal states of creativity, it does not provide the appropriate foundation to study how instructors cultivate a climate for creative learning and thinking for adult learners.

Four P's Framework

Conducting an extensive analysis of the literature Rhodes (1961) divided creativity data into four categories claiming creativity could be identified by person, process, product, and

press, with *press* meaning environment (Kaufman & Glaveanu, 2019). Questions emerging from this framework: "What type of person is creative? What is considered to be creative? How do we create? How does the environment shape creativity?" are relevant questions still pondered by twenty-first century creativity researchers (Kaufman & Glaveanu, 2019, p. 28). The influence of the four p's framework on more recent creativity research is evident in the studies of socio-cultural creativity in China, Hong Kong, and Taiwan (Kaufman & Lan, 2012; Lubart et al., 2019; Niu, 2019). While the majority of research has been conducted through a Western lens, creativity researchers in Asia attempted to use the four p's framework to understand creativity from an Eastern perspective (Kaufman & Lan, 2012; Lee et al., 2014; Niu, 2019).

Developing a cultural modification of this framework, Glaveanu (2013) developed the five a's framework, expanding on Rhodes' (1961) people, process, product, and press (environment) to actors, audiences, actions, artifacts and affordances. While culture is not clearly identified in this model, the interaction between the five elements supports a more culturally relevant approach to creativity research (Lubart et al., 2019; Niu, 2019; Niu & Zhou, 2017). Questions emerging from this framework: "How do actors relate to their audiences in creativity? How does creative action make use of sociocultural and material affordances? And do creative actors use existing artifacts in producing new ones?" (Kaufman & Glaveanu, 2019, p. 28). While these two frameworks provide important cultural awareness and inform our understanding of creativity, they do not provide the appropriate foundation for this study because studying the process and product are not within the scope of this research.

The Four-C Model of Creativity

The four-c model of creativity provides a framework to support creativity at multiple levels of significance to the individual, their domain, or society as a whole (Beghetto &

Kaufman, 2017; Kaufman & Beghetto, 2009). Originally developed to support P-12 teachers in the classroom and permeating the literature since 2009, this framework emerged as a supportive foundation for organizational creativity within the business domain. Elaborating on their earlier little-c, big-c model, Kaufman and Beghetto (2009) expanded this dichotomous model to provide better support for educators attempting to nurture creativity in their classrooms (Beghetto & Kaufman, 2017). The four levels of creativity defined by this model are the mini-c, the little-c, the pro-c, and the big-c. While all levels of the four-c model begin with novelty of thought, action, or solution, the mini-c level of creativity emerges at a more personal or intimate level. The little-c level is more of an everyday creativity, having local significance. The pro-c level acknowledges professional creative contributions in a field or domain, yet the contributions are relatively unnoticed outside the field or domain. The big-c level is reserved for the most accomplished creative geniuses and most eminent creators throughout history (Beghetto & Kaufman, 2017; Kaufman & Beghetto, 2009).

Several researchers have used this model. Conducting a study with beginning and experienced teachers in Singapore, Tan (2001) posited that teachers' perceptions of creativity, whether positive or negative, informed their classroom climate and pedagogical approach (Esquivel, 1995; Tan, 2001). A study of pre-service teachers in the United States conducted by Lee and Kemple (2014) suggested a connection between participants who self-identified with openness to experience and their willingness to foster a climate for creativity in the classroom. Reiter-Palmon et al. (2019) suggested there are positive benefits of leaders and managers who value and encourage all levels of creative collaboration and individual creativity within their organizations. Ultimately, the four-c model provides a foundation to better understand the significance of a supportive climate conducive to creativity (Cotter et al., 2019; Kaufman &

Beghetto, 2009). However, this model does not provide a good foundational framework for this study because it is limited by its emphasis on creative outcomes rather than how instructors cultivate a climate for creative learning and thinking.

The Componential Model of Creativity

The componential model of creativity (Amabile, 1983, 1996) has been a prolific framework through which creativity research has been conducted since the later part of the twentieth century. The confluence of domain-relevant skills, creativity-relevant processes, and intrinsic and task motivation enmesh to provide a comprehensive model for organizational and educational creativity research (Kaufman & Beghetto, 2009; Kaufman & Glaveanu, 2019; Niu & Zhou, 2017). Domain-relevant skills refer to depth of knowledge within a domain. Creativity-relevant processes refer to components deemed relevant in the field of creativity, such as tolerance for ambiguity, willingness to take task appropriate risks, and openness to experience. Intrinsic motivation refers to passion for the task and an internal desire to engage in a meaningful endeavor (Amabile, 1983, 1996).

Emphasizing creative performance rather than personality traits of creative people, Amabile's (1996) research of creative tasks and the products and outcomes resulting from those tasks, offered a social psychological approach to understanding creativity. The reliability of this model has provided a framework for a significant number of research studies within multiple domains.

The Chinese math study conducted by Niu and Zhou (2017) used the componential model for creativity as a framework for their research. They concluded Chinese math teachers possessing the three components of the model are more able to teach creatively and to cultivate a climate for creative thinking in their classrooms, thereby influencing the desire to learn,

academic achievement, and overall success of their math students. The researchers substantiated

their claim with the results of international math tests where Chinese students consistently

outperformed other countries (Niu & Zhou, 2017). While this model has provided a framework

for research in multiple domains, the emphasis on creative products and outcomes as judged by

experts in the field is not a good fit for this research.

Implicit Theories Study

Studied within the field of creativity, implicit theories explore how personal perceptions

and internal belief systems influence creative decisions and outcomes of individuals and their

ability to identify creativity in others (Niu, 2019; Sternberg, 1985). A seminal study conducted

by Sternberg (1985) attempted to understand whether personal perceptions of intelligence,

creativity, and wisdom could be used to accurately assess an individual's own creativity and the

creativity of others. Conducting four empirical studies, Sternberg (1985) began his research by

piloting a study with 97 professors from universities in the United States and 17 laypersons,

requesting participants list behaviors they perceived as characteristic of intelligence, creativity,

and wisdom. All behaviors identified more than once were included in three of the four studies.

The first study requested participants rate the list of characteristics on a Likert-style scale from

extremely uncharacteristic to extremely characteristic in all three areas. The second study

requested participants sort the top 40 behaviors from the pilot study into the least number of

categories according to similarities. The third study required participants to take four

psychometric tests. The final study requested participants to review the characteristics of

fabricated individuals and rate the characteristics on a Likert-style scale from not at all

intelligent, creative, or wise, to extremely intelligent, creative, or wise. With regard to creativity,

the results of this seminal research supported fairly consistent evidence of implicit theory as a

viable framework for deeper understanding of perceptions of creativity and how those perceptions influence our view of creativity in ourselves and others (Chan & Chan, 1999; Sternberg, 1985, 2018; Sternberg & Lubart, 1991).

Implicit theories have been used to study creativity and perceptions about creativity in other cultures. Creativity researchers such as Niu (2019), Runco and Bahleda (1986), Sen and Sharma (2011), and Sternberg (1985) have used implicit theories to better understand the similarities and differences between and among Eastern and Western cultures, and their perceptions of creativity. Additionally, implicit theories help support our understanding of explicit theories (Chan & Chan, 1999; Niu, 2019; Sternberg, 1985, 2017, 2018; Sternberg & Lubart, 1991). This model alone is not comprehensive enough to support this research.

The Investment Theory of Creativity

Of the many theories developed by Sternberg and colleagues, the investment theory of creativity (Sternberg & Lubart, 1991, 1995) provided a viable framework for the foundation of this research. Using the investment metaphor of buying low and selling high, Sternberg and Lubart (1991, 1992, 1995) described how a creative person identifies a novel idea, solution, or concept that has potential for growth (buying low), and develops, with persistence and oftentimes in the face of resistance, the novel idea, solution, or concept. Once the idea, solution, or concept receives acceptance in a field, the creative person moves onto another novel idea, solution, or concept (selling high) (Sternberg & Lubart, 1991, 1992, 1993, 1995).

Elaborating on Amabile's (1983, 1996) componential model for creativity, Sternberg and Lubart (1991, 1995) identified six constructs or resources relevant to creativity: personality, motivation, knowledge, intellectual abilities, environment, and thinking styles (Sternberg, 1985, 2017; Sternberg & Lubart, 1991, 1995). According to the investment theory, creativity occurs

when these six resources converge. Positing "creativity does not stem from some single, general ability, nor from a totally domain-specific ability, but rather from a confluence of resources, with differential contributions across domains" (p.5), Sternberg and Lubart (1991, 1995) conducted empirical research over more than 20 years to support their theory that creativity emerges from the interaction of the six constructs, not from individual constructs existing in isolation. Additionally, their research suggested that different levels of these constructs may have more of an influence on creativity than others and that the levels of each construct may vary within different domains and contexts (Sternberg & Lubart, 1991, 1995; Sternberg, 2017).

Personality

The personality construct is comprised of these creativity attributes: tolerance for ambiguity, openness to experience and other's perspectives, perseverance, sensible risk-taking, self-efficacy, and a growth mindset.

Motivation

The motivation construct is comprised of intrinsic and extrinsic motivation.

Knowledge

The knowledge construct is comprised of formal knowledge and informal knowledge. Three types of knowledge emerged from this research: domain, content, and creativity knowledge. Domain and content knowledge are aspects of the formal knowledge attribute. Creativity knowledge is an aspect of the informal knowledge attribute.

Intellectual Abilities

The intellectual abilities construct is comprised of the ability to redefine problems, provide insight, and model problem solving.

Environment

The creativity attributes of the environment construct are, student-centered, mutual respect and trust, collaboration, empowerment, and cultural empathy/cultural awareness.

Thinking Styles

The creativity attributes of the thinking styles construct are legislative teaching style, self-awareness/self-reflection, and metacognition.

The Rainbow Project

Believing there was a way to improve the predictability of college performance, Sternberg (2006) conducted a large-scale study to determine whether adding a supplemental assessment of creativity, analytical, and practical skills to existing College Board exams in the United States could provide a broader prediction of college performance. While the Scholastic Aptitude Test (SAT) and the American College Test (ACT) are considered valid predictors of college success, the Rainbow Project evolved out of concern that using one-dimensional psychometric measures to predict college performance produced one-dimensional results, meaning a lack of equity and diversity in college selection processes. Data were collected at 15 four-year and two-year colleges and universities. Sample size was just over 1,000 but final analysis included 793 predominately first-year college students.

The Sternberg Triarchic Abilities Test (STAT) (Sternberg, 1999) was used as a supplemental measure of creative, analytical, and practical skills. Embedded in these three concepts are the six constructs of the investment theory of creativity (Sternberg & Lubart, 1991, 1995). The results revealed that supplemental assessments accounted for an 8.9% increase in predicted college GPA (Sternberg, 2006, 2010). While conventional SAT scores and high school GPA have been reliably successful in measuring college performance for more than a century,

findings indicated that supplemental assessment could provide an opportunity for more equity in the college assessment arena (Sternberg, 2006, 2010).

The Kaleidoscope Project

The Kaleidoscope Project evolved from the Rainbow Project. Sternberg (2010) attempted a more holistic approach to the application process at one four-year university. While the institutional scope was small, the supplemental assessment was included as an optional section on the application for admission, reaching 15,000 applicants every year for five years. Results revealed no reduction in applicant quality, with mean scores increasing for students accepted and enrolled, and an increase in student diversity (Sternberg, 2010). Findings from the Rainbow and Kaleidoscope projects suggest more research is needed to inform our understanding of how components of creativity, such as the six constructs of the investment theory of creativity (Sternberg & Lubart, 1991), can be used to promote social change and equity, not only in alternative and holistic assessments for college admission, but in other contexts, as well.

The Shanghai Study

While creativity research supports and validates the individual constructs of the investment theory of creativity (Feist, 2019; Zhang & Sternberg, 2011) research by Zhang and Sternberg (2011) attempted to validate the comprehensive aspect of the investment theory constructs within a single study. Conducting research with 270 undergraduate students at a Chinese university in Shanghai, their research had two objectives: first, to test the validity of the investment theory using the new assessment instrument, the Multifaceted Assessment of Creativity (MAC) and second, to test the reliability and validity of the MAC (Zhang & Sternberg, 2011).

Participants assessed all six resources of the investment theory of creativity in two parts using a Likert-style scale. In the first part of the assessment, participants were expected to read 30 hypothetical cases and, using their implicit understanding of creativity, rate each statement for perceived creativity. The six constructs were embedded in the statements, but they were not explicit. The internal consistency for both boys and girls was significantly high with Cronbach's alpha coefficients between .84 and .86. In the second part of the assessment each resource was clearly identified, and the participants were expected to rate the level of importance of each construct. The researchers compared results by gender, comparing the mean differences among the six constructs. While intellectual style and personality were the two highest ranked constructs for both genders, 4.90 and 4.69 respectively for girls, and 4.77 and 4.49 respectively for boys, the other four were significantly less important than intellectual style and personality but were less statistically different from one another with mean differences ranging from 3.89 and 4.34 for boys and girls. Comparing mean scores for each creativity construct for both genders revealed the participants placed the same level of importance to each of the six creativity constructs regardless of gender. Results emerging from this research suggested the investment theory is a valid framework for creativity research and the MAC is a reliable and valid assessment instrument to assess all six constructs of the investment theory of creativity comprehensively (Zhang & Sternberg, 2011).

Sternberg's (2018) most recent theory, the triangular theory of creativity, extends the constructs of the investment theory of creativity to include not only a creative individual's ability to elicit novel approaches or ideas that challenge the crowd or challenge the thinking of experts in a field, but this most recent theory includes challenging one's individual beliefs or, according to Sternberg (2018, defying one's own belief system, as well as defying the cultural internal

believe systems of a generation or *Zeitgeist.* While Sternberg (2018) considers this theory a more comprehensive theory of individual creativity than his investment theory of creativity, it has not been empirically validated and is beyond the scope of this study.

The theoretical framework through which this research was conducted is Sternberg and Lubart's (1991) investment theory of creativity. This theory was selected because the six constructs of personality, motivation, knowledge, intellectual abilities, environment, and thinking styles provided a solid foundation for studying instructor's perceptions of creativity, and how instructors cultivate a climate for creative learning and thinking. Implicit theories are embedded within this model, so it was not necessary to include a second framework to address how personal perceptions and internal belief systems influence creative decisions and outcomes of individuals, and their ability to identify creativity in others (Niu, 2019; Sternberg, 1985). The comprehensive framework of the investment theory of creativity, where all constructs are present in varying degrees for creativity to occur, provided a solid foundation for this research (Sternberg, 1985, 2017; Sternberg & Lubart, 1991).

These seminal creativity theories are fundamental to the evolution of creativity as a viable psychological social science. While not an exhaustive list, these theories highlight the foundation upon which twenty-first century creativity research has been conducted and continues to evolve. Continuing to explore creativity in P-12 education, adult and higher education, business and organizational leadership, and military education informs our understanding of creativity and how it is situated in society.

Creativity Research in P-12 Education

Extensive literature and research exist on the topic of creativity in P-12 education (Amabile, 1983; Amabile & Pillemer, 2012; Gardner, 1983; Guilford, 1967; Torrance, 1966).

Creativity research conducted from the 1950s through the 1990s emphasized identifying

creativity and creative potential in children, as well as creative pedagogical training for teachers

(Torrance, 1987; Treffinger, 1986). The space race of the 1950s and 1960s between Russia and

the United States emphasized cultivating the intelligence and cognitive potential of our best and

brightest students. Psychologists urgently searched to find the best ways to identify and measure

intellectual ability and genius potential among America's youth (Esquivel, 1995; Sternberg,

1999; Torrance, 1966, 1980). Giftedness emerged as an area of interest and creativity became

one of the significant characteristics of high intellectual potential and giftedness in youth

(Gardner, 1983; Renzulli,1976; Runco, 1986; Sternberg, 1999; Sternberg, 2005; Sternberg &

O'Hara, 1999; Torrance, 1980).

During the 1980s and 1990s, creativity became almost synonymous with giftedness as

identification of gifted children included intelligence tests and creative thinking assessments

such as Torrance's (1966) TTCT and Amabile's (1982) Consensual Assessment Technique

(CAT) (Beghetto, 2017, 2019). Nurturing creativity emerged in education literature for the gifted

and became a popular subject for teacher professional development programs for the gifted,

emphasizing prescriptive strategies to develop and improve specific creative skills in students

(Torrance, 1977, 1980; Treffinger, 1986). Conclusions drawn from the numerous queries during

this time in creativity history revealed the relationship between the environment and creativity.

Fostering climates for students' creativity to emerge and grow was determined to be an essential

component for all classrooms, not just gifted ones (Beghetto & Kaufman, 2017; Treffinger,

1986). Over the last 60 years, nurturing creativity in the classroom has continued to emerge from

P-12 education literature and research, yet only since 2010 have studies emerged touting the

significance of the teacher's role in nurturing creative thinking in all classrooms (Beghetto &

Kaufman, 2017).

Conducting a study to determine whether teacher professional development could

influence teacher attitudes about creativity, Treffinger et al. (1968) suggested teachers needed

training to identify creative talent. Teachers responded to pre- and post-attitude surveys and the

researchers concluded that teachers' attitudes toward creativity changed (a) after thinking about

teaching for creativity, (b) after learning creative problem-solving techniques, and (c) after they

were made aware of creative theories and how to encourage creative behavior from students

(Treffinger et al., 1968). This research is similar to other early creativity research that focused on

the personality traits of students and the processes required to elicit creative products from

students, rather than the attitudes and perceptions of the instructors themselves (Torrance, 1977).

Creativity studies conducted since 2017 indicated a potential relationship between

teachers' influence on the learning environment and creative thinking in the classroom

(Beghetto, 2019; Beghetto & Kaufman, 2017; Cheung & Mok, 2018; Niu & Zhou, 2017;

Reisman, 2017). Conducting a study to determine whether teacher training influenced the

creative climate and the ability of secondary students to produce creative solutions in a Chinese

math course, Niu and Zhou (2017) applied the components of domain-specific knowledge, strong

use of creative pedagogical processes, and nurturing intrinsic motivation from Amabile's (1996)

componential framework of creativity. They concluded there was a strong relationship between

the teacher training components and students' creative solutions and encouraged future research

on how teachers' beliefs and understandings about creativity could potentially influence class

climate for creative thinking and creative student outcomes (Niu & Zhou, 2017). This study is

interesting because in the twenty-first century, Chinese secondary students regularly outperform Western students on international assessments (Niu & Zhou, 2017).

Building on the work of Beghetto (2017), Esquivel (1995), Horng et al. (2005), Tan (2001), and Zhang (2007), research teams in Taiwan, Mainland China, and Hong Kong conducted several empirical studies to determine whether teachers' perceptions of creativity influenced the learning environments of P-12 classrooms. The results collectively suggested a connection between teachers' personality traits, teachers' perceptions of creativity, and the potential to foster creative thinking in the classroom. (Cheung & Leung, 2013, 2014; Cheung & Mok, 2018; Lee & Kemple, 2014; Lin, 2011, 2012).

These studies add to the discourse in the field and support the need for more creativity research to better understand this phenomenon in different contexts (Cheung & Leung, 2013, 2014; Cheung & Mok, 2018; Lee & Kemple, 2014; Lin, 2011, 2012). While an increasing number of creativity studies emphasizing teacher influence on the learning environment have emerged since 2010, the number of studies focusing on teachers' perceptions and cultivation of creative thinking in learning environments of higher education and adult education remains limited (Karwowski & Lebuda, 2016; Reisman, 2017; Ruscio & Amabile, 1999; Tan, 2001; Tsai, 2012, 2013a, 2013b).

Creativity Research in Adult and Higher Education

Creativity literature in adult and higher education has been far less prolific than P-12 education. Early creativity literature of the 1980s and 1990s emphasized nurturing emerging creativity in children. A review of the limited literature in adult education revealed evidence of creativity within continuing education and arts-based adult learning programs. One study conducted in the Netherlands by Haanstra (1999) attempted to justify community support for

arts-based creativity centers for adults. Implications emerging from the data indicated that creative thinking and focus applied within arts-based activities had the potential for application within non arts-based activities as well, ultimately suggesting the effects of exposure to creativity within adult learning environments reach beyond art-based programs (Haanstra, 1999).

Supporting this notion and recommending adult and higher education must continually adapt to meet societal needs, Edelson (1999) suggested more attention on creative thinking in adult learning and higher education environments is essential to prepare members of society to meet the demands of an ever-changing world.

> As a nation, we have always believed that education, and
>
> especially adult education is a force for both personal and social
>
> improvement – to elevate our character, or to help us be more
>
> informed and skilled, or to enrich society economically or by
>
> enhancing democratic tendencies. (Edelson, 1999, p. 8)

Encouraging creativity within adult learning environments Edelson (1999) recommended 11 areas where adult educators could foster creative thinking, to include motivation, creative self-efficacy, and openness to new ideas, areas that creativity researchers continue to study more than 20 years later. Yet, creativity research that informs our understanding of how to cultivate a climate for creative learning and thinking for adult learners did not emerge until 2010 and remains extremely limited.

Intrinsic motivation and creativity for personal growth were prolific topics of the self-help era of the late twentieth century (Edelson, 1999; Haanstra, 1999; Hennessey & Amabile, 1998). From 1999 through 2019, research conducted in Australia, Singapore, Taiwan, and the United States emphasized specific strategies to increase creative thinking in students through

creative pedagogy within the learning environment (Daly et al., 2014; McWilliam & Dawson, 2008; Simonton, 2012; Tan, 2001; Tighe et al; 2003; Tsai, 2012, 2015).

Instructors' perceptions of creativity and the influence of creative mindsets and creative thinking within the learning environment were mentioned frequently in recommendations for future research. However, none of the studies actually measured how the learning environment cultivated creative learning and thinking in adult or higher education (Daly et al., 2014; Haanstra, 1999; Lin, 2012; McClary, 2009; McWilliam & Dawson, 2008; Tsai, 2013a, 2013b).

In fact, a document search revealed only 13 peer-reviewed publications on the PSYCHINFO database and 14 peer-reviewed articles on the ERIC database, written from 2010-2021, using key words *creative thinking* and *teachers' perceptions*. Adding key words *higher education* without date parameters revealed 3 peer-reviewed publications on ERIC and 0 on PSYCHINFO. Adding key words *adult education* without date parameters revealed 0 publications on both databases confirming the majority of creativity education research is situated in P-12 education and confirming there is a gap in the research as well. A few studies emerged from the 2014-2020 literature encouraging and promoting creative thinking in adult education and higher education environments (Simonton, 2012; Tsai, 2012). None of the studies addressed the creative mindsets of adult educators and how that mindset informed their understanding of how they cultivate climates for creative thinking.

Conducting one of the earliest studies on instructor facilitation or inhibition of creativity in higher education Chambers (1973) studied the teaching attributes and behaviors of 671 college teachers. Results of the study revealed teachers were more likely to be identified as facilitators of creativity if they treated students equally and respectfully, developed positive teacher-student relationships, taught enthusiastically, encouraged student discussion, and were flexible in their

teaching style. Conversely, teachers were more likely to be identified as inhibitors of creativity if they had a more authoritative teaching style, were apathetic about teaching and student relationship building, and were cynical and sarcastic with students.

In 2012, a few creativity studies were conducted in undergraduate engineering courses. Creativity is an important aspect of engineering because creative solutions to complex problems are an important part of the field (Daly et al., 2014; Klawans et al., 2014). Studies were conducted to determine whether instructors who self-reported valuing creativity, fostered climates for creative thinking in undergraduate engineering courses (Daly et al., 2014; Klawans et al., 2014).

In their qualitative case study research on the relationship between student creative growth and university engineering pedagogy, Daly et al. (2014) identified seven engineering courses taught at one university. Instructors participating in the study confirmed they fostered creative thinking in their classrooms. Researchers interviewed students and instructors and analyzed course data for evidence of creative pedagogy and creative thinking skills. Evidence emerging from the data suggested creativity existed in classrooms where instructors self-reported encouraging creative thinking in their classrooms. The researchers recommended future studies to determine how instructors perceive creativity and what instructional support could be provided to encourage creative pedagogies in the classroom (Daly et al., 2014).

Another study conducted by Klawans et al. (2014) attempted to measure 11 components of creativity in undergraduate engineering students using the Reisman Diagnostic Creativity Assessment (RDCA). The RDCA measures originality, fluency, flexibility, elaboration, tolerance for ambiguity, resistance to premature closure, divergent thinking, convergent thinking, risk-taking, intrinsic motivation, and extrinsic motivation, all relevant traits of creativity and

supported by experts (Amabile, 1983; Csikszentmihalyi, 1990; Edelson, 1999; Guilford, 1967; Harding, 2010; Reisman, 2017; Tsai, 2012). This quantitative study compared students' pre- and post-course RDCA scores in engineering courses that were taught by instructors who had completed a creativity seminar, with students whose instructors had not attended the seminar. The data revealed no significant difference in pre- and post-creativity scores between groups or within groups of students exposed to instructors with or without creativity training (Klawans et al., 2014).

Conversely, Zhou et al. (2014) conducted a qualitative study in Denmark to determine how graduate level information technology (IT) students perceived creativity within their learning environment and the potential influence of their perceptions of creativity on their future learning. The data suggested that implicit and explicit creativity instruction by instructors who have deep domain-specific knowledge and who value and nurture creativity in the learning environment are essential to stimulate creative growth and continued creative development in IT students (Zhou et al., 2014). Recommendations for future research included developing better connections between teaching, learning, and creativity.

While limited research has been conducted to determine whether instructors' creative mindsets support a climate for creative learning and thinking for adult learners, it is a recurring recommendation for future research (Batey & Hughes, 2017; Cheung & Leung, 2013, 2014; Cheung & Mok, 2018; Kettler, Lamb, Willerson, & Mullet, 2018; Plucker et al., 2004; Tsai, 2012, 2015). Additionally, existing P-12 literature and research provide scaffolding for parallel implementation in adult education (Daly et al., 2014; Karwowski, 2011; Karwowski et al., 2018; Kettler, Lamb, Willerson, & Mullet, 2018; Plucker et al., 2004). It merits restating that

cultivating creative learning and thinking in adult and higher education deserves attention to meet the ever-changing demands of the high stakes world in which we live.

Organizational Creativity

A review of organizational creativity literature revealed significant research and developments in creativity and economics, environment, leadership, collaboration, innovation, and human capital (Florida, 2019; Glaveanu & Kaufman, 2019; McWilliam & Dawson, 2008; Reiter-Palmon et al., 2019). While early creativity studies focused on identifying traits exhibited by individual employees, other researchers attempted to describe creativity and creative thinking as a composition of specific behaviors or traits of successful business people. One of the seminal research studies conducted by Wilson et al. (1954) was part of a series of early studies attempting to identify specific traits of high functioning successful people. The 53 assessments were administered to 413 Air Force personnel to determine which creativity traits were evident in the science, engineering, and innovation domains. Of the 14 skills emerging from the data, five were identified by the researchers as knowledge-based and eight were identified as creativity traits. The creativity traits emerging from the data were sensitivity to problems, fluency, flexibility, originality, analysis, synthesis, penetration, and redefinition (Wilson et al., 1954). Interestingly, except for the last two traits which have been replaced by originality (Wilson et al., 1954), the remaining six traits emerging from this seminal research are still considered relevant to creativity and creative thinking.

More recent literature on creativity in business and industry emphasized training techniques to stimulate individual creativity, group and collaborative creativity, and leadership creativity. Rapid change, technology, and globalization have increased awareness among researchers of the implications of training to enhance creativity and creative thinking, and how

crucial it is to prepare employees to thrive in a complex, fast-paced, continuously changing world (Harding, 2010; Reiter-Palmon et al., 2019; Rigolizzo & Amabile, 2015). Describing a link between thinking creatively, acting creatively, and change, Harding (2010) stated, "thinking creatively is about imagining answers to an unanswered question and testing them intellectually. Acting, or behaving creatively is about realizing an imagined answer in the real world" (p. 51).

Historically, organizations have relegated creativity and creative employees to marketing, product design, and innovation developing teams of like-minded individuals (Reiter-Palmon et al., 2019; Mumford et al., 2002; Mumford et al., 2019). However, that perspective has become short-sighted. Conducting a study with 1,500 Chief Executive Officers (CEOs) worldwide IBM (2010) compiled leadership data through individual interviews and surveys. Information emerging from the data indicated the CEOs considered creativity to be the most important leadership attribute. "CEOs saw the need to seed creativity across their organizations rather than set apart 'creative types' in siloed departments like product design." (IBM, 2010, p. 30).

Developing climates and environments where creative thinking can thrive is another area that permeates the organizational creativity literature and is essential for businesses to compete globally now, and in the future (Ekvall, 1996; Hunter et al., 2007; Luo et al., 2015; Reiter-Palmon et al., 2019). Studies conducted to identify components of creative organizational climates indicated risk-tolerance, open to others' perspectives, tolerance for ambiguity, openness to new ideas, collegial information sharing, trust, tolerance for failure, confidence in management support, autonomy, creative self-efficacy, and intellectual stimulation are essential for creative thinking to occur. (Hunter et al., 2007; Reiter-Palmon et al., 2019). Agile thinking has become a topic of recent exploration in organizational literature. In 2018, IBM interviewed 2,100 global CEOs about the significance of global partnerships in today's world. The outcome

of the study indicated that for businesses to remain competitive they must innovate globally.

They must be open to new ideas and open to collaborative partnerships to create global

platforms. They must encourage creative solutions and agile thinking to meet the complexities of

today's world (IBM, 2018). To keep up with the demands of a fast-paced world now, more than

any other time in history, global demands necessitate creative solutions to complex problems and

creative thinking to kindle creative action (Reisman, 2014; Reiter-Palmon et al., 2019).

Mentioned previously in the IBM (2018) study, agile thinking is the ability to think

flexibly and adapt quickly across myriad experiences (DeRue et al., 2012). Citing research at

Teachers College, Columbia University and the Center for Creative Leadership that defined

learning agility as the ability to remain open to new ideas, new ways of thinking, and new skills,

Mitchinson and Morris (2011) measured innovating, performing, reflecting, and risk-taking as

four indicators of agile learning behavior. Their research revealed leaders embodying these traits

improved their organizations chances for future success and improved the ability of those

organization to adapt to future challenges. Strong leaders ignite change through a shared vision, a

"coalescence of common vision" (Harding, 2010, p. 51).

While evidence of research and literature on creative leadership was limited in the

twentieth century, the topic emerged in abundance in the twenty-first century (Mumford et al.,

2002). A prolific amount of research has been conducted identifying traits and unique skillsets of

creative leaders and the culture and climate they influence (Harding, 2010; Hunter et al., 2007;

Isaksen, 2017; Mumford et al., 2019; Reisman, 2014; Reiter-Palmon, et al., 2019; Rigolizzo &

Amabile, 2015; Simonton, 1988). Using cluster analysis whereby the researchers identified

themes emerging from large amounts of survey data, the IBM study (2018) researchers classified

three distinct categories corresponding to how CEOs responded to disruption in their

organizations (IBM, 2018). The data revealed 21% of all CEOs interviewed were reinventors, 35% were practitioners, and 44 % were aspirationals. The reinventor group was comprised of CEOs who were agile thinkers, who empowered employees, and created climates for collaboration and collegial exchange. These attributes are supported by creativity research and considered essential to fostering creativity (Reiter-Palmon et al., 2019; Hunter et al., 2007). When asked how they cultivate creativity in their organizations, one CEO from an international company responded, "remain agile, accept failures, empower employees and create a culture of collaboration. Be focused and show perseverance" (IBM, 2018 p. 13).

Conducting a meta-analysis of 42 studies, Hunter et al. (2007) explored whether a relationship existed between organizational climate and creative achievement. Their findings indicated the existence of a relationship between organizational climate and creative achievement was strengthened by the presence of personally meaningful, challenging work, and the opportunity for stimulating collegial exchange (Hunter et al., 2007). Additional information emerging from the data suggested motivation and collaboration could strengthen the relationship between climate and creative achievement. Similarly, Rigolizzo and Amabile (2015) argued the environment affects motivation which can positively or negatively influence creative behaviors throughout the creative process. They posited a creative organizational environment requires a leader who embraces the creative process and models creative behaviors for the whole organization (Rigolizzo & Amabile, 2015).

An extensive review of the research by Mumford et al. (2019) confirmed evidence to support significant relationships between leaders who have technical expertise, deep domain knowledge, limited fear of failure, the ability to identify good ideas over bad ones, and those who are able to foster creative climates within their profession, with their people, and through

their creative work. Ultimately, leaders are needed who can cultivate climates conducive to creative thought and creative action throughout their organizations so they can be prepared to meet the increasing demands of an uncertain world. "In the end, the most significant skills that a leader can possess are the ability to think creatively and inspire creativity in others" (Harding, 2010, p. 53). One area where leadership is at the forefront but where limited creativity research has been conducted is the military.

Creativity in Military Education and Training

> The robustness and thoroughness of Army learning contributes to
> disciplined initiative and the ability to be agile, adaptive, and
> innovative in fielding trained and ready teams, Soldiers and Army
> civilians to fight and win in joint combined arms operations in a
> complex world (Department of the Army, 2017, p. 33).

Military training and education are underrepresented in creativity literature. Culturally, the military is not considered a bastion of creative enterprise. A common societal depiction of the military is one of behavioristic training and education dominated by rote repetition and mindless memorization (Cornell-d'Echert, 2012). While a certain amount of repetition is required for specific types of skill mastery in the military the Department of the Army prides itself on training and education programs that create agile learners who are critical creative thinkers, who are able to solve complex problems in myriad environments amid ambiguity and uncertainty (Brown, 2007; Department of the Army, 2011; 2017; United States Army Combined Arms Center, 2014; United States Army Combined Arms Center, Creativity, 2015). The Army's most recent learning concept, the ALC-TE, sets the stage for training and education of Army soldiers and civilians through 2040. Critical and creative thinking are clearly defined in the ALC-TE.

The key to developing effective critical thinkers is to develop

leaders who are purposeful and reflective. This requires cultivation

of critical thinking and creative thinking skills which are

indispensable requirements for effective training and education.

Critical thinking is the intellectually disciplined process of actively

and skillfully conceptualizing, applying, analyzing, synthesizing,

and/or evaluating information gathered from, or generated by,

observation, experience, reflection, reasoning, or communication,

as a guide to belief and action … Quality critical thinking

demonstrates clarity, accuracy, precision, consistency, relevance,

sound evidence, good reasons, depth, breadth, and fairness.

Creative thinking involves creating something new or original;

thinking in innovative ways while capitalizing on imagination,

insight, and novel ideas. Effective critical and creative thinking are

essential for successful application of all three Army planning

methodologies; troop leading procedures, the military decision-

making process, and the Army design methodology (Department

of the Army, 2017, p. 21).

One important aspect of this long-term strategy for developing critical and creative

thinking skills throughout the Army are providing trainers and instructional educators with the

knowledge and understanding of critical and creative thinking to hone those skills within a

learner-centric environment (Deitz & Schroeder, 2012; Department of the Army, 2017; Persyn &

Polson, 2012; Van Der Werff & Bogdan, 2018; Zacharakis & Van Der Werff, 2012). Similar to

leaders in business, instructors and trainers are expected to have the appropriate subject matter expertise. In military education and training they are oftentimes expected to be role models. As role models they need the tools to be agile and critical creative thinkers themselves and reflectively self-aware. They need to have the confidence and competence to take risks in their learning and teaching, experiencing different levels of ambiguity and intellectual discomfort in the process, and they need to have the confidence and competence to nurture those same concepts in their learning environments (Boyer, 2015; Cornell-d'Echert, 2012; Department of the Army, 2017; Persyn & Polson, 2012; The United States Army Combined Arms Center, Army University, 2015). Unfortunately, the ALC-TE does not address *how* to cultivate critical and creative thinking in the training and educational learning environments so instructor training for critical and creative thinking is lacking.

As part of his dissertation research McClary (2009) conducted one of the few investigations into creativity and military education to determine whether a relationship existed between tolerance for ambiguity and the ability to develop a creative product among military officers in a post-baccalaureate Master's level course (McClary, 2009). The population consisted of 66 participants. The researcher administered the 51-item short version of the 61-item Measure of Ambiguity Tolerance (MAT-50) assessment developed by Norton (1975) to all participants. Participants responded to items using a Likert-style scale. Five judges assessed final products for creativity using Amabile's CAT (1982). Despite theoretical support for a relationship between tolerance for ambiguity and creativity, results emerging from this research indicated there was no significant positive correlational relationship between tolerance for ambiguity and creativity among the participants in this study (McClary, 2009). However, a slight negative relationship existed between the two variables. In his suggestions for future research McClary (2009)

recommended studying instructors' perceptions of creativity and how those perceptions may influence the creative thinking among the officers they interact with directly. "To increase the creativity levels of their commanders and planners, the Army must first understand which factors enhance and which factors inhibit creativity" (McClary, 2009, p. 129).

Summary

Creativity has been scrutinized and researched extensively since the 1950s. It has been quantitatively and qualitatively measured and assessed, collectively and autonomously. While creativity definitions vary and the scope of creativity research is broad, literature and research on how instructors cultivate a climate for creative learning and thinking for adult learners remains sparse. Continuing to explore creativity from different perspectives within P-12 education, organizations and business, adult and higher education, and military education and training will inform our understanding of how creativity is situated in education and society. Understanding how creative thinking, creative problem solving, and creative action promote social change could provide clarity to adult educators to better understand the implications of cultivating learning environments conducive to creative thinking. The implications for leveraging creative capital on a global scale are significant.

This literature review provided an overview of critical creativity literature and research in P-12 education, organizational education and training, adult and higher education, and military education. Seminal literature and research by Amabile (1983), Csikszentmihalyi (1990), Gardner (1983), Guilford (1967), Rhodes (1961), Sternberg and Lubart (1991), Torrance (1966, 1980), and Wallas (1926) inform our understanding of creativity and offer a solid foundation for future creativity research. Information emerging from creativity research and literature provided relevant context and evidence to support an investigation into how instructors cultivate climates

for creative learning and thinking for adult learners. Indeed, more research is needed on this topic (Harding, 2010; Tighe et al., 2003; Tsai, 2012). Cultivating adult learning environments conducive to creative thought and creative action are essential to producing members of society and future leaders prepared to meet the demands of an uncertain world. The unprecedented challenges threatening human existence highlight the significance of this research.

Chapter 3 - Methodology

"It is becoming increasingly clear that nothing can contribute more to mental health and the general welfare of our nation and to the satisfactions of its people than a general raising of the level of creativity" (Torrance, 1977, p. 34).

The purpose of this qualitative case study was to understand how instructors cultivate a climate for creative learning and thinking for adult learners. Motivation for this qualitative case study emerged from my experience and passion for mentoring and coaching teachers to effectively use creative pedagogies in their classrooms. These experiences over nearly 30 years in education fueled my curiosity about how instructor personality traits and instructional strategies support instructors' cultivation of creative learning and thinking for adult learners.

This chapter provides an overview of and support for the research methodology. Included in this chapter are explanations of the research purpose and questions, theoretical and methodological frameworks, sample and setting, and procedures for data collection and analysis.

Theoretical Framework

The theoretical framework for this research was the investment theory of creativity (Sternberg & Lubart, 1991). Review of interview transcripts, observation field notes, and supporting documents were analyzed for evidence of the creativity concepts that comprise the six creativity constructs of the investment theory of creativity: personality, motivation, knowledge, intellectual abilities, environment, and thinking styles. Analyzing the evidence emerging from the data through the six constructs of the investment theory of creativity scaffolded my understanding of the emerging themes and how creativity is situated within the context of this learning environment.

Research Questions

This qualitative case study was guided by the following primary research question and sub-questions:

1. How do Red Team instructors manifest the six constructs of the investment theory of creativity in the learning environment?

    a. How do instructors demonstrate the personality construct?

    b. How do instructors demonstrate the motivation construct?

    c. How do instructors demonstrate the knowledge construct?

    d. How do instructors demonstrate the intellectual abilities construct?

    e. How do instructors demonstrate the environment construct?

    f. How do instructors demonstrate the thinking styles construct?

Research Design

Historically, creativity has been studied using quantitative methods. Scores on creative abilities assessments such as the TTCT, creative process rubrics, or product outcome assessments such as the CAT have been used to inform creativity research (Amabile, 1982; Karwowski, 2011; Rubenstein et al., 2013; Torrance, 1966). For this research, a qualitative research design was selected to allow for depth of understanding rather than breadth of understanding employed by quantitative research methods (Stake, 1995). According to Merriam and Tisdell (2016) basic qualitative research seeks to make meaning out of the lived experiences of the participants.

Qualitative Case Study

Because this research was bounded by one course at one institution, a case study design was selected. Merriam and Tisdell (2016) defined case study as "an in-depth description and analysis of a bounded system" (p. 37). A bounded system has limits. It is restricted and

surrounded by what is studied: a phenomenon, the program, the individual, or a group (Merriam & Tisdell, 2016). This case fits the criteria of a bounded system because it is limited, course length is four weeks, and it is restricted by instructor criteria, all instructors must have completed the course as a student, and they must participate in new facilitator training. Defining case study Yin (2018) stated "a case study is an empirical method that investigates a contemporary phenomenon (the "case") in-depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (p. 15).

Single basic qualitative case study methodology was selected because the case, how instructors cultivate creative learning and thinking, is bound by the context of a unique course, the Red Team Member Course, taught within a unique learning environment, the Red Teaming Education program, which exists within a military framework, the United States Army, occurring over a four-week period, with a small sample size of qualified instructors specifically trained to teach this course. The program's approach to learning provides students with opportunities to think critically, self-reflect, become more self-aware, tolerate ambiguity, and remain open to new ideas and others' perspectives making it a unique military learning environment.

Qualitative research methods were used because they allowed for greater depth of understanding rather than objective cause and effect-type explanation (Stake, 1995). The unit of analysis was the instructor. The unique experiences of the instructors and the contextual explanations expressed by the instructors emerging from the multiple data sources informed my understanding of the case (Stake, 1995; Yin, 2018). Triangulating multiple data sources increases the integrity of the research as the findings from multiple data sources are corroborated (Hays, 2014; Yin, 2018) making case study research the appropriate choice for this research.

Qualitative Lens

The qualitative lens through which this research methodology was conducted is constructivism. According to Merriam and Tisdell (2016) basic qualitative research seeks to make meaning out of the lived experiences of the participants and the participants co-construct meaning with the researcher within a specific context. Crotty (1998) described constructivism as meaning making, unique to each individual and their unique experiences, forging new meanings and fresh perspectives through reflection of their experiences. In this qualitative case study meaning was constructed from the participants' thoughts, perceptions, and reflections about creative learning and thinking as perceived through my lens as the researcher. "The overall interpretation will be the researcher's understanding of the participants' understanding of the phenomenon of interest" (Merriam & Tisdell, 2016, p. 25).

Research Setting

The research was conducted at the Red Teaming Education Program, Fort Leavenworth, Kansas. The course is a graduate level course for DOD mid-career military and civilians. Red Teaming education is built on four main principles. Applied critical and creative thinking (ACT), fostering cultural empathy (FCE), self-awareness and reflection (SAR) and groupthink mitigation and decision support (GTM). The two, four, six, nine, and eighteen-week courses are student-centered and promote critical and creative thinking skills, cultural awareness and empathy, self-reflection, and introspection so that young military leaders can foster innovative and creative solutions to complex problems when they return to their military units (The Red Team Handbook, 2019).

Empowerment, collegial collaboration, creativity, cultural empathy and awareness, and the freedom to fail are elements of the instructional team climate of the Red Teaming Education

program. Identifying a need for the military to be able to thrive in times of ambiguity and uncertainty, the Department of the Army approved this program in 2004 whereby individuals could learn to systematically review a decision or plan, assess the decision or plan from multiple perspectives, and present alternate options or solutions using contrarian or devil's advocate-type methods (Hoffman, 2017). The Red Teaming Education program was selected as the setting for this research because of the unique instructional climate and an instructional approach that values critical and creative thinking and creative solutions to complex problems (Hoffman, 2017).

Conducting an interview with the former director of the program, I asked how the instructors created adult learning environments conducive to innovation, creativity, and divergent thought. He stated that the instructors are encouraged to try new and different approaches without risk of failure (S. Rotkoff, personal communication, March 7, 2016). Guiding students through the learning process instructors challenge themselves to think differently while challenging students to do the same. Supporting instructors to take instructional risks without fear of failure encourages collegial collaboration and free exchange of ideas, inspiring creative thought and innovative action (Harding, 2010).

Sample

Only instructors qualified to teach in the Red Teaming Education program were eligible to participate in this research. Qualified Red Teaming Education course instructors must meet the following criteria: they must be graduates of a Red Teaming Education course and they must participate in new facilitator training. All Red Team course instructors were either active duty or retired military personnel. Due to the unique and specific instructor qualifications the pool of qualified instructors was very small, only 12 at the time of the research. Using convenient

sampling, three instructors volunteered for this research. According to Merriam and Tisdell (2016) convenient sampling is used when the objective of the researcher is to reflect a typical population. Participants were conveniently selected based upon their willingness to participate and their availability to teach the RTMC in Spring 2021. A three-instructor sample provided ample data for analysis of concepts and themes emerging from multiple data sources (Merriam & Tisdell, 2016). While a lack of credibility is a disadvantage of this sampling strategy (Creswell & Poth, 2018) convenient sampling provided the appropriate selection potential to reflect this distinct group of instructors (Lapan, 2014; Merriam & Tisdell, 2016). The unique and specific instructor qualifications support convenient sampling as an appropriate strategy for this research.

Protection of Human Subjects

Protecting human subjects is of utmost importance. Prior to conducting any research for this study, I obtained Institutional Review Board (IRB) approval from Kansas State University and Army University. I complied with all IRB requirements set forth by the primary research institution and the participating institution. Copies of IRB approval were provided to the Red Teaming Education director and the curriculum director.

To protect the anonymity of all qualified instructors, initial contact was made through the Red Teaming Education curriculum director. I provided the Red Teaming Education curriculum director a brief explanation of the study, an invitation to participate in the study, an informed consent form, and instructions for emailing the signed consent form directly to me (Appendix C). The curriculum director emailed all qualified instructors. Participants volunteering to participate in the study emailed their signed consent forms directly to me. Participants were informed that they would be anonymous, and each selected a pseudonym that was used for all documents and reports. Interviews were conducted over a password protected Zoom link. Video files were

deleted and audio-recorded interviews were downloaded to a password protected computer for transcription purposes and deleted from Zoom cloud recording. Transcription occurred using the downloaded Zoom transcription feature.

Observations occurred over the password protected DOD version of Microsoft Teams. This version required instructor permission to observe the class. Access to virtual folders with course content was limited to instructors and students.

All electronic documents are maintained in a password protected electronic file on a password protected computer for five years after publication of the dissertation. I am the sole manager of all passwords. Hard copies of interviews, observation field notes, and documents are kept in a locked cabinet in the researcher's home office and will be shredded five years after completion of the dissertation. Participants had the opportunity to review all transcripts and provide feedback.

Pilot Studies

I conducted two pilot studies to inform my understanding of the context of the proposed research and to practice data collection procedures. Pilot studies provide valuable information about the research design and help researchers, especially novice researchers, understand the research process (Yin, 2018). The first pilot study was a document analysis whereby I practiced analyzing data from documents supported by NVivo and triangulating data from two interviews. I conducted a second pilot study of the initial interview questions for this research. This study helped me practice semi-structured interview techniques and practice qualitative data collection.

Pilot Study One: Document Analysis

The first pilot study was a qualitative document analysis conducted to review and analyze Red Teaming Education documents to determine whether there was evidence of creativity in the

documents and to deepen my understanding of the RTMC and how instructors cultivate creative learning and thinking for their adult learners. I requested documents from the Red Teaming Education director and curriculum director. The curriculum director emailed 25 documents to me. Using iterative coding, I reviewed all 25 documents, 21 RTMC lesson plans and four Red Teaming Education program documents. Documents were uploaded to NVivo to assist with the interpretation of emerging concepts and themes (Merriam & Tisdell, 2016; Saldaña, 2016). Data were initially coded using concept coding (Saldaña, 2016). Data were analyzed two more times using the codes and queries generated using NVivo to assist with the interpretation of emerging concepts and themes (Merriam & Tisdell, 2016; Saldaña, 2016). I reviewed coded documents three times for evidence of creativity and evidence of emerging patterns and themes. Data were analyzed by triangulating emerging patterns and themes from the document data with transcriptions from two interviews conducted previously with a former Red Teaming Education director and a former student of the course. This pilot study provided an opportunity for me to practice the process of analyzing and interpreting themes emerging from multiple data sources. Additionally, it provided an opportunity to use NVivo to support data analysis. The visual representation of the data provided a clear illustration and helped me understand the interconnectedness of the themes among the data sources (Brown, 2019).

Pilot Study Two: Interview Questions

The second pilot study was conducted to provide insight into the interview process, to practice interviewing techniques, and to provide feedback from the pilot study participant on the interview questions selected for initial interviews. Using Zoom video conferencing software I conducted one 90-minute interview with a former Red Teaming Education instructor. The

participant was selected because of their extensive Red Teaming Education background and their reputation as a critical and creative thinker.

Using proposed interview questions, the interview began with rapport-building conversation. After several minutes I transitioned to the first interview question. The interview continued with interview questions interspersed with clarifying questions and additional comments from the participant. The participant responded to all questions. After the interview I emailed a copy of the interview questions to the participant for further review and reflection. The participant did not recommend any changes to the interview questions but suggested I use more probing follow-up questions in subsequent interviews to dig a little deeper into the thoughts and perspectives of the research participants.

I transcribed the interview using Zoom transcription software. After the pilot study, I revised the interview questions. Additionally, notes taken during transcription and manual coding provided valuable insight into my thoughts and perspective during the analysis process. (Brown, 2018)

To practice member checking I emailed the interview transcription to the participant for review and feedback. The participant reviewed the transcript and confirmed accurate representation in the document. I learned how important participant feedback is to the interpretation of the findings (Hays, 2014; Merriam & Tisdell, 2016; Stake, 1995).

Conducting pilot studies helped me refine my interview questions, modify my interview techniques, and revise my data collection plan. Managing data in the document analysis pilot study and practicing transcription using the Zoom software in the interview pilot study informed my understanding of the techniques and realistic timelines needed to complete these tasks with

larger amounts of data. Both pilot studies provided valuable insight into qualitative research techniques.

Data Collection

Data were collected through instructor interviews, virtual class observations, and document analysis. Collecting data from multiple sources provided a more comprehensive understanding, which helped corroborate the evidence emerging from the data, providing a more accurate representation of how instructors cultivate climates for creative learning and thinking (Kim, 2016; Lapan, 2014; Stake, 1995; Yin, 2018). The interview questions, the observation protocol, and the document review were aligned to the research questions to assure coverage of all questions. (Appendix D). Data were collected from the interview transcriptions, observation field notes, and program, course, and instructor documents (Table 1). Initially, the research was to be conducted on location and in-person. However, due to COVID-19 restrictions interviews and class observations occurred virtually. Logistical modifications included instructor interviews using Zoom and in-class observations using Microsoft Teams. The RTMC is a four-week course. Research and data collection began during the first week of course instruction and ended immediately following the last interview. There were four weeks of instructor contact with students.

Table 1.

Data Inventory

Data Source	Number per Participant/Total	Duration	Average Pages per Participant	Total Pages
Initial Interviews	1/participant = 3 total	60-90 min	80	240
Observations	3/participant = 9 total	4 hours per observation	8	72
Post Observation Interviews	3/participant = 9 total	60-90 min	47	423
Documents				515
Total Pages				1250

Interviews

Four semi-structured interviews were conducted with each instructor using Zoom video conferencing software. The initial interview with each instructor lasted between 60 and 90 minutes and were conducted prior to the first observation. Subsequent interviews occurred with each instructor following each of the three observations conducted during week one, week two, and week three of the course. Interviews lasted between 60 and 90 minutes.

The first part of the initial interview provided an opportunity for clarification of the overall study and rapport building with each instructor (Hays, 2014; Yin, 2018). I asked the first 15 interview questions during the second part of the initial interview (Appendix A). The interview question order was dictated by the conversation and instructors' responses to the questions. Interviews two, three, and four occurred after each weekly observation. Additional interview questions were generated from responses to questions in previous interviews and from observation field notes, therefore these questions varied with each participant. Interview questions generated from responses to previous interview questions provided more depth and understanding of the participants' responses. Interview questions generated from observation

field notes provided another resource, clarified responses, and added meaning to instructional

strategies observed during class observations.

Interviews provided opportunities to gain insight into participants' thoughts, providing

opportunities for responses to the guiding questions emerging from the research questions and

opportunities for elaboration (Stake, 1995). I administered open-ended questions in a semi-

structured interview format (Appendix A). The conversational structure of this interview style

was selected for this research because it allowed for a more natural give and take interaction

between the researcher and the instructor. Open-ended questioning encouraged more depth and

elaboration of participant responses (Kim, 2016; Yin, 2018). Responses to interview questions

were compared and corroborated with data collected from the analysis of program, course, and

instructor documents and class observations (Hays, 2014; Stake, 1995).

Observations

Naturally occurring observations were selected as a data source to provide contextual

reference to information revealed by instructors during interviews, and to gain first-hand

knowledge of the learning environment, resulting in a more comprehensive understanding of the

case (Merriam & Tisdell, 2016; Stake, 1995; Yin, 2018). Observations were conducted in the

virtual learning environment and were focused on the instructors rather than the students. Three

naturally occurring observations were conducted with each instructor during weeks one, two, and

three of the four-week course. I coordinated observation dates and times with the instructors

during the first interview. Due to COVID-19 restrictions, the learning environment was virtual,

with all observations occurring in the virtual learning environment using Microsoft Teams. Due

to the sensitive nature of the military learning environment Red Teaming Education used the

DOD version of Microsoft Teams. This version of Teams required instructor permission to

observe the course which I received from all three instructors. The focus of each observation was the instructor. Prior to the first observation, I discussed my classroom presence with each instructor. Instructors announced my presence in the virtual learning space before each observation. During the first observation, I introduced myself to the students with my camera on, then remained in class with my camera off for the remainder of the observation, identified by an off-camera icon on the screen. The observation protocol focused on the instructors, their instructional strategies, and their interactions with students.

I took the observational stance of *observer as participant* because the observation was my primary focus (Merriam & Tisdell, 2016). Observations occurred overtly; all instructors and students were aware of my presence as an observer and the purpose of the observations. I did not observe any activity without the instructor present, nor did I have access to any student documents or break-out groups. I did not participate in any class discussions, virtual side chats, or activities (Merriam & Tisdell, 2016; Yin, 2018). Only video links and instructional slides generated by the instructor and shared on the instructors' screens were accessible to me.

Instructors met with students 20 times over a four-week period. All three instructors taught the same content with only slight variations in instructional order. The course calendar was set by the Red Teaming Education curriculum director. The first 17 classes during weeks one, two, and three were instructional, dedicated to course content. The final three classes, during week four, were project-based operational exercises with groups of students working together employing Red Team tools and course information to solve real-world problems. I observed nine of the 17 instructional classes during weeks one, two, and three of the course. I did not conduct any observations during the last three days of the course due to the lack of instruction during the operational exercises. All observed classes were virtual. Class size was 14

students, with 12-14 students in attendance for each classroom observation. All three instructors were on camera throughout the duration of their classes. The number of students on camera varied. Most students remained off camera and turned on their cameras when interacting with instructors or in small groups. Side comments and conversations occurred in the written chat on the side of the screen. I observed instructors monitoring the chat and addressing any questions or comments that required their attention.

Classroom observations were captured using the observation protocol (Appendix B) and detailed field notes. Observation protocols and field notes focused on the instructors, their in-class facilitation, their selection of instructional strategies, and instructor-student interactions. Field notes were reviewed immediately after the observations. According to Stake (1995), reviewing field notes while the information is still fresh in the researcher's mind increases the accuracy of recorded events. I used clarifying information, comments, and reflections from the observation field notes to generate questions for the post-observation interviews.

Documents

Program and course documents were requested and emailed directly to me from the Red Teaming Education curriculum director. I received lesson plans, course schedules, the RTMC Student Advance Book, which is the course syllabus, and The Red Team Handbook (2019). During interviews instructors were encouraged to share any documents or artifacts. Instructors emailed class activity slides and personal documents directly to me. I reviewed 21 lesson plans, five Red Teaming education course documents, and 16 instructor documents. All documents were reviewed for evidence of the six creativity constructs. According to Merriam and Tisdell (2016) document analysis is used less often as a data source than interviews and observations in qualitative research because the information they provide, especially from personal documents,

may be inaccurate or irrelevant to the research. However, reviewing documents at multiple levels for this case study research provided additional support for the interpretation and corroboration of data emerging from interviews and observations (Merriam & Tisdell, 2016; Yin, 2018).

This research design aligns with similar qualitative research protocols conducted by Bramwell et al. (2011), Daly et al. (2014), Horng et al. (2005), and Reilly et al. (2011) where data were collected using interviews, observations, and document analysis (Figure 2). Evidence of the same concepts and themes emerging from different data sources substantiates the viability of the research (Merriam & Tisdell, 2016).

Figure 2.

Data Collection Sequence
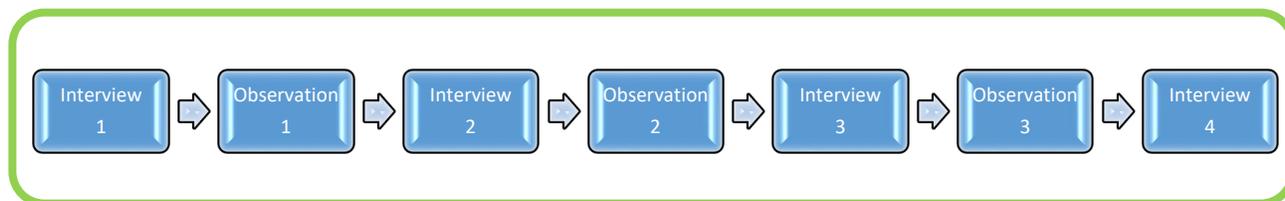
Data Analysis

Data analysis is the process of taking many pieces of data, identifying which pieces of data are relevant to the research questions, recognizing patterns, and determining themes from relevant data (Merriam & Tisdell, 2016; Saldaña, 2016). In qualitative research evidence is corroborated through triangulation (Stake, 1995) whereby multiple sources of data are used to substantiate the findings of the study (Yin, 2018). For this qualitative case study, I used data source triangulation to determine whether data found in interviews, observations and documents were evident in the other sources. Data were analyzed with the support of NVivo. Data from interview transcriptions, observation field notes, and program, course, and instructor documents were analyzed using iterative coding, initially coding for concepts, then coding for themes.

Iterative coding supported identification of patterns and emerging themes using codes and queries generated from my interpretation of the data. Analyzing data emerging from multiple sources, I looked for evidence of "converging lines of inquiry" (Yin, 2018, p. 127). Finding evidence of codes and themes in other data sources reinforced the dependability of the research (Merriam & Tisdell, 2016).

Data Analysis Procedures

Data from interview transcriptions, observation field notes, and document analyses, were analyzed using iterative coding. Interview transcriptions and observation field notes were organized in electronic folders by instructor pseudonym and labeled by week of collection. Documents were saved in electronic folders organized by program, course, and instructor. Additionally, all data were uploaded and saved in files organized by instructors and data source on NVivo. The systematic organization of data throughout the data collection and analysis processes kept data accessible and manageable (Merriam & Tisdell, 2016; Stake, 1995; Yin, 2018).

Interview Transcription

I transcribed all 12 interview transcriptions using the Zoom transcription feature. This feature used voice recognition software to audio record the transcript. While the transcription feature was helpful, all 12 transcriptions required extensive revisions. I revised all transcriptions manually and saved them as word documents in instructor folders on my computer. Revising 12 transcriptions up to 90 minutes in length was tedious but resulted in a deeper connection with the interview content that proved invaluable during data analysis (Merriam & Tisdell, 2016). Completed transcriptions were uploaded into NVivo and saved in participant interview folders. Interviews were analyzed for emerging concepts and themes using iterative coding. I conducted

initial concept coding with all interviews before coding observation field notes and documents (Figure 3).

Figure 3.

Section of Interview Transcription with Coding Stripes
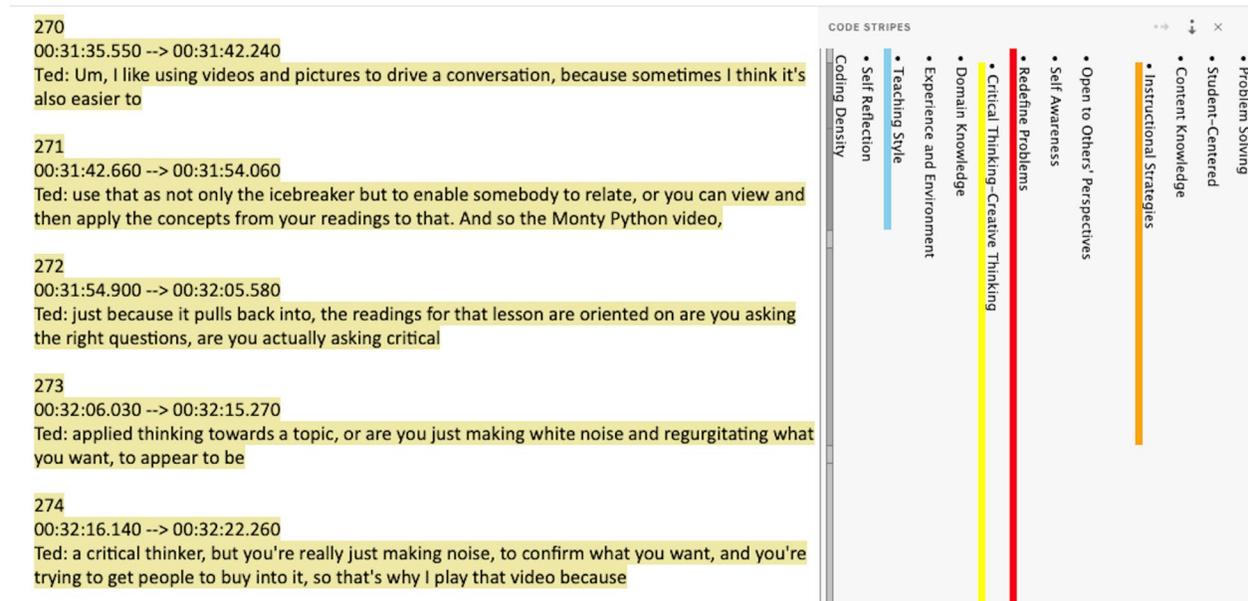
Observation Protocol and Field Notes

I reviewed the observation protocol and field notes following each observation. Information obtained from field notes were used to formulate questions and seek clarification during post-observation interviews. Hard copies of field notes, reflections, and questions were typed into observation protocol word documents and saved in participant folders on my computer. Observation protocols with embedded field notes were uploaded into NVivo and saved in participant observation folders (Figure 4). Observation field notes were analyzed for emerging concepts and themes using iterative coding and compared to evidence emerging from the interview transcriptions and documents. Initial coding of observation field notes occurred after initial coding for interviews.

Figure 4.

Section of Observation Protocol with Embedded Field Notes

Motivation	Motivation
☑ Facilitates learning by using multiple instructional strategies ☑ Demonstrates full engagement with the course content ☑ Encourages students to share opinions without retribution	Question in the round, think/write/share. Another way to get participation without doing a whole circle of voices. Checks for understanding, making sure students grasped the concepts from the previous lesson then begins today's lesson with "what is a sociocultural system?" Explains SEE-I tool state, elaborate, exemplify, illustrate. Gallery walk of student work. Anonymous way to view each other's work. Ted manages the gallery walk by asking students which one resonated most with them. Uses Native American origin stories with the SEE-I tool. Students works in 4 small groups to reframe problem for about an hour. Checks in on the groups in their breakout rooms. Groups begin thinking about their operational exercise. Ted asked small groups how easy it was to come to consensus. Allowed students to reject the frame as long as they could explain why.
Knowledge	**Knowledge**
☑ Provides relevant examples ☑ Demonstrates foundational understanding of course material ☑ References various resources and materials	Historical perspective and connects the previous lesson about East-West thought with SME. Implications as students go back into the force. Uses Native American origin stories with the SEE-I tool. Ted breaks down the purpose of the tool. SEEI-take something complex and simplify it Gallery Walk – provides relevant use of tool in a military setting Uses real like example from his career to reinforce the point.

Document Analysis

Electronic documents were saved in their original format and placed in folders organized by program, course, or instructor on my computer. Program and course documents were uploaded into NVivo and saved in program and course document folders. Documents were analyzed for concepts and themes using iterative coding and compared to data emerging from the from the other data sources. Initial coding of documents occurred after initial coding of interviews and observations. Additionally, analyzing and comparing data emerging from interview transcriptions, observation field notes, and documents added to the interpretation, corroboration, and triangulation of evidence to support the findings for this research (Merriam & Tisdell, 2016; Yin, 2018).

Coding

Data were analyzed using iterative coding. I initially coded the data using concept coding followed by thematic coding (Saldaña, 2016). While other coding methods such as descriptive coding, which uses frequency distributions of recurring nouns, may be useful for initial coding reviews, Saldaña (2016) recommended concept coding for case study research because it encourages the researcher to look beyond the initial words and develop a deeper understanding of the concepts emerging from the data. I chose concept coding for this qualitative case study research because it was important to me to avoid quantifying the emerging qualitative data into frequency distributions.

Data were analyzed with the support of NVivo. First, I conducted an initial review of all interview transcriptions. Initial coding revealed 20 concepts emerging from the interview transcriptions. Next, I conducted a second review of all observation field notes and course documents. One additional concept emerged from this review. Examples emerging from the

observation field notes and documents were added to the codes. Initial coding revealed 21

concepts (Figure 5).

Figure 5.

NVivo Codebook. Initial Concept Codes Emerging During Data Analysis

Name	Description	Files	References
Content Knowledge		15	35
Creativity and the Army		6	13
Creativity Knowledge		4	6
Critical Thinking		9	24
Cultural Empathy		13	54
Defining Creativity		3	4
Diversity		5	15
Experience and Environment		12	84
Instructional Strategies		6	15
Open to Others' Perspectives		17	41
Openness to New Experiences		6	10
Problem Identification and Appropriate Solution Selection		4	5
Relevant Risk-Taking		4	4
Self-Awareness		12	36
Self-Reflection		14	100
Student-Centered Instruction		6	12
Teaching Style		14	79
Tolerance for Ambiguity		11	31
Trust		13	27
Mutual Respect		5	10
Understanding the Culture		11	37

It was evident after the second review that some of the coded concepts were creativity concepts that defined the creativity constructs of the investment theory of creativity. For example, I merged *defining creativity* and *creativity and the Army,* recategorizing them under *creativity knowledge.* I clustered *experience and environment* and *instructional strategies* under teaching styles (Figure 6).

Figure 6.

Section of NVivo Codebook. Clustered and Recategorized Concept Codes

Name	Description	Files	References
Teaching Style		14	81
Experience and Environment		12	84
Instructional Strategies		5	12

I conducted another review of the data sources creating themes using the six creativity constructs of the investment theory of creativity, merging the re-categorized and re-clustered concepts under the six themes, except for the category *teaching virtually,* which did not align with the six creativity constructs (Figure 7).

Figure 7.

Section of NVivo Codebook. Resulting Themes and Concepts from Data Analysis

Name	Description	Files	References
Critical Thinking-Creative Thinking		12	309
Environment		0	0
Cultural Empathy		26	63
Cultural Awareness		3	5
Empowerment		1	3
Mutual Respect		4	13

Name	Description	Files	References
Trust		15	51
Student-Centered		15	15
Intellectual Abilities		0	0
Insight		2	11
Problem Solving		10	28
Redefine Problems		1	1
Knowledge		0	0
Content Knowledge		16	39
Creativity Knowledge		4	6
Defining Creativity		3	4

I continued analyzing the data from all three sources using NVivo to create visual representations from coding queries to further understand themes and concepts emerging from the data. Each layer of analysis provided more depth of understanding. My data analysis was complete when no additional data emerged from the data sources.

Trustworthiness

According to Merriam and Tisdell (2016) trustworthiness is essential to the integrity of qualitative research. Trustworthiness refers to whether data analysis and research findings can be trusted (Merriam & Tisdell, 2016; Saldaña, 2016). Defining trustworthiness, Lincoln and Guba (1985) used concepts of credibility, transferability, dependability, and confirmability in qualitative research. Credibility refers to finding consistent evidence in multiple sources. To ensure credibility I used triangulation of data sources and member checks. Transferability refers to a reader's ability to extrapolate meaning from and find applicability in the outcome of the study for their own purpose and context (Merriam & Tisdell, 2016). It is my responsibility as the researcher to provide adequate detailed analyses for transferability to occur. Dependability refers

to a logical trail of evidence that can be followed through detailed research methodology. Thorough data collection methods and evidence emerging from extensive data analysis informed the findings of the study. Confirmability refers to the alignment of the findings with the interpretations of the evidence emerging from data analysis. Both dependability and confirmability rely on the researcher's credibility to manage and interpret data. It was my responsibility to conduct a rigorous study using strategies that ensured the authenticity and trustworthiness of the research so that the study withstands replication of the findings emerging from the data, not from predetermined researcher expectations (Merriam & Tisdell, 2016).

Triangulation

Triangulation is the corroboration of data from multiple sources, multiple methods, or multiple investigators to confirm emerging findings of a study (Merriam & Tisdell, 2016; Yin, 2018). I triangulated data from multiple sources to determine whether data found in one source were evident in other sources (Stake, 1995). Data were collected from interview transcriptions, observation field notes, and document analysis. Collecting data from multiple sources provided a more comprehensive understanding and helped me provide a more accurate representation of evidence emerging from the data (Stake, 1995; Lapan, 2004; Kim, 2016; Yin, 2018). Analyzing data from multiple sources corroborates the evidence and findings emerging from the data, enhancing the credibility and trustworthiness of the research (Saldaña, 2016).

Member Checks

To further corroborate the findings, member checks were conducted. Member checks provide research participants the opportunity to review transcripts and to confirm or question how their participant information was represented in transcripts and drafts (Merriam & Tisdell, 2016). Providing participant feedback establishes credibility reinforcing trustworthiness of the

findings (Merriam & Tisdell, 2016). The instructors reviewed emailed copies of their interview transcriptions and provided confirmation of their representation to me prior to finalization of this document. Member checks occurred after data collection.

Summary

There is a need for adult learning to occur in environments conducive to creative learning and thinking. We know that instructors influence the learning environment, but we do not know how their thoughts and perceptions of creativity might inform their cultivation of creative learning and thinking for adult learners. The purpose of this qualitative case study research was to understand how instructors cultivate a climate for creative learning and thinking for adult learners.

This chapter described the qualitative case study methodology used for this research. By analyzing data emerging from semi-structured interviews, classroom observations, and document analysis, I attempted to understand how instructors cultivate a climate for creative learning and thinking for adult learners. We know that instructors have a significant influence on the learning environment, but how instructors' mindsets, teaching methods, and instructional strategies support their cultivation of creativity for adult learners is unclear. The phenomenon of a small group of uniquely qualified instructors trained to teach within the context of a unique course, supported case study as an appropriate methodology for this qualitative research.

Chapter 4 - Findings

"In the end, the most significant skills that a leader can possess are the ability to think creatively and inspire creativity in others" (Harding, 2010, p. 53).

The purpose of this qualitative case study was to understand how instructors cultivate a climate for creative learning and thinking for adult learners through the six theoretical constructs of the investment theory of creativity (Sternberg & Lubart, 1991). This chapter provides an explanation of how data collected from interviews, observations, and documents were analyzed and how that same data informed the findings of this research. Included in this chapter are an overview of the research, participant demographic information, and research findings.

Research Overview

The theoretical framework for this study was Sternberg and Lubart's (1991) investment theory of creativity. The purpose of this research was to understand how instructors cultivate a climate for creative learning and thinking for adult learners. The study was conducted with three instructors of the Red Teaming Education program at the UFMCS, Fort Leavenworth, Kansas. The Red Teaming Education courses teach mid-career military leaders how to become critical creative thinkers, how to become more self-reflective and self-aware, how to be more culturally aware and empathetic, how to mitigate group think, and how to find novel solutions to complex problems within a student-centered environment (Hoffman, 2017; Red Team Member Course Student Advance Book, 2021; The Red Team Handbook, 2019). Red Teaming Education instructors are graduates of a Red Teaming Education course who have participated in Red Teaming Education facilitator training. The six constructs of the investment theory of creativity (Sternberg & Lubart, 1991) provided scaffolding for this research.

Participant Demographics

Three instructors of the RTMC participated in the study. Each participant is identified by a pseudonym. All three have master's degrees in fields other than education and more than 15 years of active-duty military service. All three participants had previous teaching experience at other institutions participating in new instructor training during their first year of instruction at that institution. A brief description of each participant provides some background and context. Due to the small pool of instructors, the amount of personal information shared about each instructor is limited. This is a necessary step to protect the identity of each participant and ensure their anonymity.

Participant One: Sanford

Sanford is a 15-year Red Team Education instructor. He has over 20 years of active-duty military service deploying numerous times throughout the world. He taught the RTMC independently without support from another instructor. He shared he truly enjoys the subject matter of the course and uses stories to relate his past military deployments and experience to the subject matter of the course. He dislikes the virtual classroom and feels limited by his inability to interact face to face in a physical classroom. He is aware of his positional power and used it to take control of the class, sometimes overriding course content with personal examples.

Participant Two: Ted

Ted has been a RTMC instructor for nearly two years. He is an active-duty military officer of more than 15 years and has multiple combat deployments. He co-taught with Bruce, a new RTMC instructor who was going through new facilitator training. Ted and Bruce split instruction for their section of the course. Ted was the lead instructor and prepared the lesson for half the course while providing background support when Bruce was lead instructor. Ted is

aware of the lenses through which he views the world, takes his teaching seriously and challenges students to think using military as well as non-military examples. He expressed frustration with the virtual learning space but adapted and made changes to his mode of delivery and student interaction. He has a strong depth of understanding about the subject matter he presented and provided relevant examples, admitting he likes to challenge students' opinions.

Participant Three: Bruce

Bruce was a new RTMC instructor going through new facilitator training with Ted as his mentor. He is an active-duty military officer of more than 20 years with multiple combat deployments. He was frustrated with the virtual classroom experience but appeared more comfortable within the virtual environment having navigated that space with his own virtual education and as an instructor at another institution. He enjoyed interacting with students and provided explicit relevant examples of course material. He created a fast-paced, engaging learning experience using various instructional strategies.

Classroom Dynamics

Due to Covid-19 restrictions all classes were conducted in the virtual learning space of Microsoft Teams (DOD). The DOD version of Teams required an invitation by the administrator, in this case the primary instructor, for permission to observe each class. Sanford provided an invitation for the entire course while Ted and Bruce provided daily invitations. Classes were conducted for four hours each day with instructors on camera throughout the class period. Lunch breaks were discussed with students during class to gauge whether students preferred a break or to work through the break and end class early for that day. Approximately 14 students were enrolled in each course with class size fluctuating between 12-14 students each day. About half of the students attended class with their cameras on while half remained off

camera unless they were interacting in response to a question or making a comment. Group collaborative assignments and activities occurred in break-out rooms that were only accessible by the primary instructor, thus group assignments in break-out rooms were not observed. Additionally, I did not have access to individual student assignments which were uploaded to instructor files. Chat boxes remained open for student discussion and questions during class. I observed instructors monitoring the chat boxes and responding to questions or comments verbally.

Instructors opened class each day with a review of current events or rapport building questions. Sanford opened his classes with a review of current events, requesting students share something newsworthy. Sanford used this time to encourage students to share their perspectives and engage in discussions with classmates. Sanford summarized the discussions bringing awareness of Red Teaming tools or concepts that had been used or could have been used during the discussion. During week three, one student brought up Army Covid-19 testing and vaccination requirements which sparked a very heated discussion among students. Sanford facilitated the discussion reinforcing the ambiguity and discomfort of the topic and remaining open to others' perspectives. Sanford shared, "…if there's a current event that ties directly to class, I'll bring it up. If they bring the subject up and I can make the connection to something that's in the lesson, that's even more powerful."

Ted and Bruce used rapport building strategies at the beginning of each class. "How was your weekend?" or "who received their moving orders?" or some other catalyst to get the class discussion going. Bruce often used similar rapport building questions but would then transition to a word cloud created from themes emerging from student journal entries for that week.

Findings

The findings of this case study are an amalgam of the experiences of the three participants. The concepts emerging from the data comprised the attributes of the creativity constructs of the investment theory of creativity. The six constructs of the investment theory of creativity, personality, motivation, knowledge, intellectual abilities, environment, and thinking styles emerged from the data as themes.

To begin to understand instructors' creative mindsets and how they cultivate climates for creative learning and thinking, each instructor shared their definition of creativity during the initial interview.

> Bruce: So, creativity is an individualistic kind of characteristic. No one can judge whether someone's creative or not creative just on the merits, because what I think may be super creative in somebody else's perspective may not be so for me. My individual definition of creativity is, where can I push the boundaries, to think and approach concepts in a way that normally would not, is probably the best way I could describe it, knowing that my version [of] creativity may be somebody else's normal, but that's a separate part of the definition, I guess.

> Sanford: That's interesting um, I believe creativity is the ability to look at a situation and come up with a solution that sometimes is not the obvious solution. And what I find in creativity is that you can come up with solutions that are not obvious solutions, and I've done this in a number of different venues in different places.

Ted: Creativity is willing to try new ideas and new approaches to

the same end state. So for me it's that belief of, you look at who

your audience is, you look at what the problem is you're given, and

then you take an established norm of what's successful and then

you put your own personal touch to it. So, what are you

comfortable with in terms of, I understand the delivery

requirements when it comes to like mental models associated with

teaching, but at the same time, how do I figure out how to solve

that problem within my own abilities and means.

While each instructor provided their own interpretation, a common theme emerging from all three definitions was finding a new or different approach to a solution. Bruce shared "to think and approach concepts in a way I normally would not", Sanford shared "come up with a solution that is not the obvious solution" and Ted shared, "try new ideas and new approaches to the same end state". Instructor responses to this question provided some initial insight into their understandings of creative thinking.

Concepts and themes emerging during data analysis were organized by research sub-question. The primary research question will be addressed at the end of the chapter. One theme emerging from data analysis that did not align with any research questions is addressed at the end of the chapter.

Sub-question 1: How do instructors demonstrate the personality construct?

Embedded within the personality construct are the creativity attributes of tolerance for ambiguity, openness to experience and others' perspectives, perseverance, sensible risk-taking,

self-efficacy, and a growth mindset. Emerging as a theme, evidence of the personality construct

is revealed through the emergence of these attributes from the data.

Tolerance for Ambiguity

Defined as the ability to withstand uncertainty and tolerate discomfort and ill-defined

problems (Sternberg & Lubart, 1995), this creativity attribute emerged from the data sources. I

asked instructors how they modeled tolerance for ambiguity for their adult learners. Bruce shared

his thoughts on how he encouraged students to be comfortable with their discomfort. "I like to

think I helped to foster that one [tolerance for ambiguity], but again, I think the curriculum helps

to foster that at the get go because we're talking things that these students have not talked about."

He makes a point of connecting learning in the classroom to the military environment.

> And I think now with the senior leaders' visions about hey 2030,
>
> 2035 what the Army is going to look like in the future, you know
>
> … senior leaders have said hey, we're working through this one, so
>
> the future operating environment is already ambiguous, so this
>
> group of [Red Team] students, I think, gets that and now it's just
>
> how to be comfortable working through it.

Bruce used the term *variability* to describe his personal tolerance level for ambiguity.

> I'm okay with the variability. So, I don't necessarily know how the
>
> conversations are going to go, but I just go where they're going and
>
> steer it whichever direction, and it may not be the learning point
>
> that I had in mind, but it's close enough and they own it and they
>
> got us there. Some students may not like that variability, and I'm
>
> like hey, let's free flow and go where we go. They may prefer the

kind of answer up front, where academically you know, this is kind

of the frame that we're using and now let's talk about it. But I

mean, some stuff that may resonate with some folks that want

more concrete answers, that are not comfortable with some of the

ambiguity, but I tend to be more comfortable with the ambiguity

and let's just roll the dice.

Ted explained how he addressed intellectual discomfort during the first class.

I told them in the introduction, I'm gonna say some things that are

going to make some of you uncomfortable. I'm gonna introduce

some concepts and I'm going to ask you questions you're going to

disagree with because it may go against your core values, but what

you have to identify is how do I control that and how do I make it

so that I can still have a respectful conversation with another

person even if it's not something I'm comfortable with or if it's

something that I disagree with. And then I, of course, caveat that

with you know I'm not going to come at you and make fun of your

ethnicity, your religion, your sex, your gender, any of those

protected elements because that's just not who I am. And I think it's

just that constant reinforcement of not being negative when they

come up with an idea, encourages that. That's my belief, of what

I've seen.

Class observations reinforced how instructors used Red Team tools to model tolerance

for ambiguity. During Ted's lesson on critical thinking students were divided into two groups to

solve separate Fermi problems such has, how many professional piano tuners are there in Chicago or is the average freight train more or less than 50 railroad cars? Without the support of outside references students worked together to solve the problems. At the end of the exercise, Ted had each group report out, explaining their processes to find a viable solution. Ultimately the exercise was not about finding the correct answer to the ambiguous questions rather, it was about the thinking processes involved, working together, remaining open-minded, challenging assumptions, asking the right questions, and being comfortable in the discomfort of working through obscure problems. Ted guided them through the exercise asking students to share the critical thinking characteristics they used in the exercise. He ended the exercise reinforcing how important it is to employ critical thinking processes in ambiguous situations.

Openness to Experience and to Others' Perspectives

Curiosity and a willingness to try new things define the attribute of openness to experience (Sternberg & Lubart, 1995). Ted shared his thoughts and an example of how he provided opportunities for students to remain open to new ideas, acknowledging the unique approach to learning of Red Teaming Education that most students have not experienced in the military.

> Part of it is demonstrating concepts and models, but breaking it
> down, not military fashion, but rather presenting something that
> might be unique to them or trying to find their backgrounds so I
> can find something that can relate to them. A lot of the Red
> Teaming tools and concepts we'll introduce, I like to use
> geographic, cultural, and environmental type examples. Like we go
> through a tool and we'll talk about conservation efforts of a creek.

Who might be a factor in this? And then it just kind of shows them

hey, by the way, we're all different so don't be afraid to ask each

other, who has experience with this? How do you bring it together?

And then, once we've kind of reached the point where the students

start to grasp it, I present the question back into the military frame

of, how do you apply this in the military setting? But I think part of

it is trying to get them to think outside of what they're used to,

particularly like … anything outside of Army, Army, Army.

The ability to remain open to others' thoughts and ideas even if you disagree with them, defines openness to others' perspectives. All participants expressed this attribute in their interviews and class activities. Ted reflected on creating a learning environment where sharing different experiences and perspectives are valued.

And it's all about that face value of showing up, being in a group,

and so it's okay to go down the rabbit holes if you don't get on the

full point because, I know we have our pillars of UFMCS and Red

Teaming, but the most value is the ability to talk to different

people who have seen and experienced different things versus

sitting down and listening to an instructor and acknowledging

everything that they say from their positional or epistemic

authority-type place. Rather it's hey, I'm given a guide and I'm

given some questions and I know that … has the ability to question

it, has some background, but now I can turn and pivot and I can

have a conversation with [someone else].

Ted shared a request from one of his students for opportunities to work with a more diverse group of students.

>One of my students, he wants more interaction with females and
>
>people of minority or color because he's a [Combat Arms] guy and
>
>he doesn't have that experience so I'll put him in some small
>
>groups where he has to engage with our female officers or our
>
>foreign exchange officers just so he can get that experience while
>
>we're doing it. That way he can see their lens and their descriptions
>
>but really it's reinforcing the trust of the Who Am I and that the
>
>application is in the military, as we keep talking about mentorship
>
>and development of the junior ranks and the subordinates.

The Who Am I (WAI) lesson occurs within the first two days of the course. It is a three-part story telling lesson where all students share watershed moments that define their lives and describe who they are during a 15–20-minute presentation. Instructors share their own WAI and model the process for students. Students are expected to be active respectful listeners and reflect in their journals about the process. The trust building aspect builds group cohesion (The Red Team Handbook, 2019).

Ted shared his thoughts on Red Teaming and how the WAI and challenging conversations early in the course opens apertures to others' perspectives.

>And you know, it just kind of drives that conversation, because
>
>then it just reinforces that red teaming changes how you think,
>
>understand that people are different, and without trust, and I know
>
>I focus on trust, but I just, without trust you truly don't know your

team. And if you're not willing to have open conversations then it's

going to be hard to have hard conversations later.

Sanford shared his thoughts on the importance of being open to others' perspectives.

I'll talk about perspectives, that's one of my goals is to have them

look at alternate perspectives, that's one of my goals in the class. If

they don't learn anything else, all I ask them to think about is how

is that other person viewing this problem and, if they can do that,

that is a huge step for them.

During the Cultural Meanings class, Ted selected excerpts from the movie Demolition Man, suggesting students try to watch the clip from different perspectives. He encouraged students to see what others see, acknowledge what you see, know your biases and blind spots, and suspend judgement. During a discussion on American Values Ted illustrated regional differences in American culture using different names for soft drinks - soda, Coke, or pop - or whether insects are called lighting bugs or fireflies, cockroaches or palmetto bugs. He encouraged international students to share their thoughts from an outsider's perspective. Ted stated, "it's acknowledging yourself and acknowledging the other ... it's getting back to can I put myself in that person's shoes."

Ted shared some additional thoughts on how he weaves other's perspectives and cultural awareness into his lessons.

I always fall back to stories of growing up in Florida or, in some of

my later lessons I incorporate the socio-cultural differences within

the United States, you know, like we have different societies

within our states that some people don't realize and it's important to

think about, especially when you meet somebody whose last name

is ManyGoats or B'Gaye or BlackSide, or something like that. You

realize hey, not only is their psyche and worldview a little different

than ours, that it's a little different than mine. And in one of our

culture classes I'll have them read The Origin Stories for Devil's

Tower, Wyoming, also known as Bear's Lodge and kind of tie it

back to our classes on memory and tie it back to our classes on

perception and worldviews because it's eight different tribes that

all have a different story with similar threads and themes to this

one place.

To reinforce different perspectives and the lenses through which we view the world, Bruce conducted an activity called Zoom In, Zoom Out for his Mental Models and Frames class. Bruce selected six students to receive six different photos. Photos were emailed to the students with specific instructions not to share them with anyone. Bruce instructed the six students to use words to describe their photo to the other five students and determine, based on descriptions, the sequence of the photos. The rest of the class observed the activity. One of the international students described his photo as a "shooting". The American students perceived he was talking about a gun, but he was describing a movie shoot. One of the zoomed in photos was of a red liquid spilled on a surface that looked like blood on concrete. It was actually a zoomed in photo of a watch face. Bruce facilitated the activity, responding to observing students in the chat box but remaining silent on the sidelines letting the six students work through the activity. After students shared the photo sequence, he debriefed the activity and discussed how remaining open to others' perspectives and actively listening helped students complete the activity rather than

derailing the activity over one word. Observing students shared their outsider perspective as well.

Perseverance, Sensible Risk-taking, Self-efficacy, and a Growth Mindset

Perseverance is defined as the ability to persist when faced with obstacles (Sternberg & Lubart, 1995). Sensible risk-taking is the willingness to accept a potential adverse outcome and a growth mindset is a willingness to grow or freedom to fail (Sternberg and Lubart, 1995). Self-efficacy is believing in one's own capacity and abilities (Bandura, 1997).

During interviews, instructors shared some of the modifications they made to the virtual learning environment providing an example of these attributes. Bruce shared that when students are in break-out groups instructors cannot pop in and out of the groups to check on progress.

> Okay, so it's a live document, it's in Teams, [Ted] and I kind of
>
> built the template out, so I can see that little box, I can see what
>
> they're writing. So instead of being in the room with them I can see
>
> what they're talking about. I don't have the context but it's like, this
>
> is one of their key points based on what they're writing on the
>
> slide.

Evidence of these attributes occurred often but in smaller examples so they are embedded within the examples of other attributes of the personality construct, and other constructs as well. The constructs and attributes of the investment theory of creativity recur in varying degrees throughout the data sources.

Sub-question 2: How do instructors demonstrate the motivation construct?

The motivation construct includes creative attributes of intrinsic and extrinsic motivation. External rewards for accomplishments are an example of extrinsic motivation while the internal

drive or internal feeling of accomplishment is an example of intrinsic motivation. Evidence of

motivation recurred in the data and in other creativity attributes such as teaching style and

student-centered instruction. When instructors were asked how they created learning

environments where students were intrinsically motivated to think creatively Sanford responded,

"in the classroom you have to create a form of electricity, intellectual electricity in the

classroom, where the students are actively thinking, and you can almost feel the energy in the

classroom." Bruce mentioned the importance of empowering students.

> To be true to that word of hey, this is your show. You're in charge.
>
> Here's kind of what I expect in three days, questions you have for
>
> me, and here's your initial guidance and go, and if you can stick to
>
> that, you're good. But if you micromanage and like hey, what
>
> about this, what about that, as some of my colleagues do, then you
>
> take away from that creativity, creative atmosphere.

Ted shared that creating an environment where students are intrinsically motivated to

think creatively requires a facilitator who guides the learning and thinking process and cultivates

trust rather than an instructor who tells students what and how to think.

> It's more centered on breaking the idea of the instructor because
>
> they're so used to, a question is presented and they reply back to
>
> the instructor. Versus small group discussions and forcing them to
>
> talk to each other and then reinforcing that concept throughout to
>
> encourage dialogue amongst each other, I think is the more
>
> important factor. Trying to get that discussion going on hey, here's
>
> my experience, I'm sharing it, this is my lesson learned, and then

someone can provide feedback to that in a trusting environment

where they know it's, you know, laying those groundworks. So

again, if it's not a moral, ethical issue, speak your mind, and then

don't be negative toward each other, be positive. And then have the

discussion with each other, and then get away from talking to me

as that epistemic authority or positional authority, depending on

what it is we're talking about.

Sub-question 3: How do instructors demonstrate the knowledge construct?

Domain, content, and creativity knowledge are attributes embedded within this construct.

Domain knowledge in the context of this research is demonstrated by instructors' depth of

understanding of military culture illustrated by their own military experiences. Content

knowledge is instructors' depth of understanding of Red Team Member Course content.

Creativity knowledge is instructors' depth of understanding of creativity, and creative thinking

and how creative thinking is situated within the military. Evidence of domain and content

knowledge emerged within examples of other constructs. Again, the constructs do not emerge in

isolation so examples of domain and content knowledge are revealed in examples supporting

other constructs.

Content Knowledge

As the instructor with the least amount of Red Teaming Education instructor experience,

Bruce reflected on the course content. "The lesson plans for someone new, the lesson plans are

vital. Because they give you other ideas and a way to kind of structure things." He added, "as a

newer instructor for this content, having more than just what the students have, that extra layer is

useful. He mentioned having Ted there as a mentor provided an additional layer of support for

some of the more specific course information emerging from the readings. "That's why [Ted] is there, as the backstop, to do those things." He shared Ted provided feedback after the lesson as well.

Creativity Knowledge

Sanford explained the challenges of creativity in the military based on his own experience.

> The problem with creativity is like, being creative in the Army is, it's somewhat harder because it's so structured. Creativity is, you know, the more structure there is the less creativity you have, especially when it comes to resources. If you're really structured by resources by regulations and laws and things like that, like you just can't throw money around. Like, businesses can do that, but you can't do that and so creativity is kind of, organizations effect creativity and if there's structure, more structure has less creativity so that's something I've noticed over a number of years.

Bruce described where his creativity knowledge is situated in the military.

> I would say its average. Every time I learn more I learn there's more I don't know. So you know, I have a good working knowledge of creative concepts and the Red Team tools help to promote that, different engagement techniques in the classroom helps promote that, but there's probably, you know, without getting to the science of creativity, there's tons out there that I do not know. But, I have a good working knowledge and I would say,

from a military population, I'm probably above average in terms of

creativity, but I may not, I may be well below average if you take

the whole population together, based upon a military construct, so

that's kind of my take on that.

Ted shared his experience with creativity in the military.

From a military perspective very limited. The only time like, you

always have people say hey, speak up, provide input, and if that,

going back to the trust factor, is not established, or how the

reactions of the people who say that are towards those who come

up with a different idea, I think kind of blocks it. I've been in

[military] briefings before they say hey, speak your mind, give us

what you think. Someone does it and then all of a sudden you

realize it's a trap and then part of that is like okay, it's the military.

I think even the few exceptions I've seen for that as a Captain, I

went through a faculty development program and they had a small

block on creativity.

Ted provided another example of creativity from his military experience.

I wouldn't say there's been a lot of that in my military career,

because I think a lot of people will say they encourage it, but then

they will hammer it if it's against what they believe. And in that set

of conditions no one's gonna come up with their ideas again. I had

a Brigade Commander who was very open. He was all about hey

be creative. Think of something, think about how we can improve

the organization and at no point was he ever negative. At large, I

haven't seen it in the military.

Sub-question 4: How do instructors demonstrate the intellectual abilities construct?

The ability to redefine problems, provide insight, and use problem solving strategies are attributes embedded within the intellectual abilities creativity construct. Evidence of specific instructional methods and strategies are provided in the teaching styles construct as well. Redefining problems is the ability to process information and think unconventionally (Sternberg & Lubart, 1995). Insight is the ability to activate prior knowledge or make unique connections to see something in a new or different way (Sternberg & Lubart, 1995). Problem solving is the ability to find appropriate solutions to complex problems (Sternberg &Lubart, 1995).

Sanford provided an example of problem solving.

Well, one of the things is even if they get it wrong you say hey,

like if you go to your organization and you have to solve a

problem, a Red Team problem or just a problem, and say you used

tool X, Y and Z. Did that really get to where you could solve a

problem? And if they said no, looking back on it we should have

done this, this, and this instead of this and this, that's a success

story. That's a success story, because they understood, they got to

the learning objective on their own, thinking about it, and now,

how could you have done this better? It worked, but it didn't really

achieve what we wanted to achieve.

Bruce shared an example he used in class to model problem solving.

So there's an acronym here FACDS [feasible, acceptable,

complete, distinguishable, suitable] is what I went through, but

those are when you have courses of action [in the military], those

are your grading criteria [in the military]. If you meet all those

criteria your course of action is valid. So that is a good tool that

they can use as they go through it. So back when I was in school, I

thought about doing my thesis on design thinking and military

planning, and I opted not to because all that came out of this is

these are all great ideas but I'm resource constrained. So, of the 30

ideas that you gave me that were great, four I can actually move

forward with because of the resources available. And then I match

resources and tasks and I can do that one. So, from a systematic

mapping a resource to a task, this is where I think doctrine actually

helps that process, because again, what I talked about before, we're

diverging and we've got to converge. Once you start converging it

gets to that, well how do we converge? Well, now we're getting rid

of the things that we can't actually do, and then you kind of use

that checklist if you will, and that helps narrow it down.

Sub-question 5: How do instructors demonstrate the environment construct?

Incorporated into the environment construct are creativity attributes of student-centered,

mutual respect/trust, collaboration, empowerment, and cultural empathy/cultural awareness. A

student-centered environment is one that puts students' needs first, where instructors provide

engaging, relevant instruction, facilitate learning with meaningful assignments, and develop

positive -student relationships from a learner-centric perspective (Kettler, Lamb, & Mullet, 2018; Sternberg & Lubart, 1995). Mutual respect and trust are defined in terms of appreciation, credibility, authenticity, competence, and confidence (Brookfield, 2006; Sternberg & Lubart, 1995). Collaboration is defined by working interactively and collectively with others (Sternberg, 2017). Empowerment in a student-centered environment is one where instructors and students share power (Tan, 2001). Cultural empathy is an appreciation of similarities and differences of other cultures. Cultural awareness is recognition that there are similarities and differences between and among cultures.

Cultural awareness/cultural empathy and student-centered instruction emerged prominently from all three data sources with evidence of trust and mutual respect recurring throughout the data as an important aspect of student-centered instruction. Evidence of trust emerged within other creativity attributes as well. Examples of how instructors empower students and neutralize the power differential emerged from the data as an aspect of student-centered instruction. Collaboration was evident in examples for other constructs.

Student-centered Instruction

Ted illustrated how he used student examples to help students understand different perspectives and cultural empathy.

> So it's just constantly taking the notes of where the students are
>
> from and then circling back to reinforce that look, even if you were
>
> both from the same town in Texas, you grew up on a different side
>
> of the road, you went to different high schools, have different
>
> experiences. You go to [military] units, you have different
>
> experiences in the same units.

110

Ted explained his strategy for adjusting the student-teacher power differential during class. "In the first week it's 100% at me and I have to do the cold shoulder. I just don't respond and I'll just sit there and wait for someone else to talk. People get uncomfortable in the silence, right?"

Bruce shared how he manages his limited Red Team experience expressing his vulnerabilities to his students.

I'm comfortable and I'm transparent with them. It's just like hey,

let's have this conversation. You guys know I'm one year in. So

yeah, I think that's probably the only [thing] content and

accessibility. I guess I do have accessibility to [Ted] and [Sanford],

but I was never immersed in that environment minus my own

experience.

During his Mental Models and Framing class, Bruce showed a video of Plato's Allegory of the Cave. After whole group discussion, he explained his thought process behind his selection of students for the small group activity, reinforcing the significance of knowing your students. "I think we have some dominant personalities that are prevalent on day three … so, to mix it up a little bit."

The essence of facilitator-student interaction is described in the UFMCS Philosophy.

First and foremost, UFMCS (in conjunction with the Army

Learning Concept, 2017) promotes facilitators who are "guides on

the side" *not* "sages on the stage". UFMCS facilitators are the

architect, pilot and guide in the classroom and demonstrate the art

of matching the right method, case study, field trip, SME [subject

matter expert], critical thinking tool and groupthink mitigation

structure to the specific class and the student experience.

Reflecting on his teaching style, Bruce shared an excerpt from an essay he wrote about how he creates a student-centered learning environment.

Upon first meeting my students, I explicitly explain my teaching

philosophy, that I am a co-facilitator and each of them is also a co-

facilitator. This is a pivotal step in our adult learning journey

because this is the moment where I choose to distribute the

perceived power in the classroom vice retain it.

Mutual Respect/Trust

The Red Team lesson plan for the WAI states, "a genuine conviction in the foundational importance of this experience is significant in order for students to build trust with each other in the seminar and to establish a genesis of self-awareness for the remainder of the course." Ted shared the trust building aspect of the WAI using classroom examples.

The first thing we start off with is everyone does their

introductions. Hey hi, this is who I am, this is where my hometown

is, where I think I'm from, this is the next [military] unit I'm going

to, and here's a fun fact. And then everyone shares that. It sounds

like your standard white noise introduction that everyone does

during a course. At the end of that first day I then say, okay, now

that we've done our introductions, we've all confirmed that we're

all in the military we've probably said all the same things like, I've

been to Afghanistan, I'm light [Infantry], I'm Armor, or whatever.

112

We execute the Who Am I and it's, I had [Bruce] go first and then I went but normally I will go first just because hey, as the instructor it's um, here's the example to set the conditions of what it is. And I always say remember, I'm not your priest, this is your opportunity. Some people do divulge a lot, and, when we did our Who Am Is, and a lot of people did, they shared things. Others were like straight up, they're like, I don't know you guys enough to feel comfortable sharing all this, and then in back conversations it kind of comes out, I wish I would have said a little bit more. But really, it's just establishing the tone of trust, and being willing to take that first step forward to put myself out there, which is something unique in the Army. Because the Army is very preserved to maintain that image, I mean you heard in the discussion today everyone's like, Ranger Tab! What's your flair? What patches do you have? Have you been to the right assignments? We do care about that so sometimes it's hard to get to that trust. So to me, the Who Am I is important because part of it is how do you establish a baseline of trust and part of it's willing to tell a story about you that you normally wouldn't tell anybody, you know. And it doesn't have to go full in depth and sometimes I'm amazed that some of our students will actually tell things. Like one of our students in the class did tell a story … and we had to take a break because he started to cry. Part of it comes into hey, this is trust, this is respect,

we don't talk about this outside. If the person who gives the Who

Am I wants to engage with it they can because that's their right, but

if they don't, you just use that to understand how someone is who

they are, some of the key themes.

Ted added that the choice of what to share in their WAI is up to the student.

They [the students] can decide I'm just going to go with the

military route and two of my students did that in this block because

they told watershed learning moments of being military officers

and how that shaped them in their career, but others they go down

that route because it's all about that establishing trust at the

beginning.

Ted shared how he had to modify the WAI. "With the compressed schedule of the four

weeks I know [Sanford] kind of draws it out, I execute it in one day, and then I just break the

class into two small groups. That way it's a little more intimate."

Cultural Empathy/Cultural Awareness

Cultural empathy/cultural awareness is also a foundational Red Team concept. Sanford

described how his military experiences around the world shaped his cultural awareness.

I bring the expertise that no one else probably can bring is the

cultural empathy. All the places I've been in the world, which is

much more than the normal military career. So, I had a very unique

military career that went kind of in two halves and I ended up

being overseas outside of Big Army a number of times in really

114

obscure places, and so I got to understand cultural empathy a lot

better.

From his time in the Middle East, Sanford shared a specific experience with a Middle Eastern leader, having the cultural awareness to pull him aside to provide feedback, avoiding public criticism. "It's a cultural thing. It's about face and it's about all kinds of other things, and so if you take the American approach to it, you will not achieve what you want to." Sanford described how cultural diversity improves the overall course experience. "If you have more diversity, you get different perspectives and that's really the key to the problem." Sanford provided an example.

> That's the aha moment, I think. When you get people to start
>
> thinking well, how is the Chinese guy viewing this and they'll go
>
> well, we don't know, and then say, okay, let's go find out about the
>
> Chinese and how they view things, and that's really a lot of what
>
> the culture block is built on, that premise … and so that's part of
>
> the transformation.

Ted explained that he sets the groundwork for cultural empathy from the very first class. After students shared their basic introductory information, Ted highlighted similarities amongst the class, then addressed the subtle differences.

> But when you start talking about how we're different, where we
>
> come from, the uniqueness, drive that home with, we have a
>
> similar core value and the belief of service to the nation, and we
>
> joined the same profession. But within that, our own unique
>
> backgrounds make it so that we have different perspectives. We

can view problems in a different manner because we have different world experiences. You know, if someone's from Texas, I'm going to talk about Texas things and get that as a discussion point to get someone to start talking. Or in the case of foreign officers I'll employ that because at the end of the day, some of their concepts are completely different, especially when we talk about the ability for creative or critical thinking at all because culturally, perspective, it may not be accepted in their society and you have to take into account that there's a different way to do something than what you've been raised as an individual. But it's about coming together and sharing and listening and being willing to change.

Ted continued his reflection on cultural empathy.

It's kind of tough, especially when we look at cultural empathy because you do have to suspend your own biases and you have to suspend your own values to think in a manner of either a friend or an adversary, right? I always like to use the example of Afghanistan. In all of our military planning for operations, how many times did we include Afghan representatives from their military or government in the planning? The answer is, we haven't really done it. Or we start drawing up these plans of how we're going to defeat the Russians from our foxhole in Kentucky. How many Polish officers do you have with you to facilitate that discussion who might say hey, that's a great idea, but this isn't

going to work and I'll tell you why. And part of it's just kind of

getting over our own, you know, headstrong, we're Americans.

Like, we think we will do this great plan and then you start to step

back and you realize well, hold on, I don't know if the American

way of war is going to work in Colombia to defeat the FARC

[Revolutionary Armed Forces of Columbia] but then the

Columbians figured it out. It took them 40 years but they did it.

And that's tough because it's putting aside, I'm an American and

I'm a field grade officer. It's having to listen to others.

Ted shared a personal story that had a lasting impact on his empathy toward other cultures.

I was a team leader in Saladin Province just outside the city of

Balad. This Sunni old man comes up to me and said Salaam

alaikum and I'm like, Alaikum salam. And then he starts talking to

me in English and I was like yeah, I'm good, are you good? Nice to

meet you and all that stuff. And he goes, do you speak Arabic and I

was like well no, I don't. I can say like five things and he's like oh,

so you come to my country but you don't speak my language. But

I'm in my country and I speak your language. I learned, how come

you didn't learn? And it kind of hit me. I was like, man, that's a

great point! Thanks for putting me in my place.

In the Cultural Meanings class Ted conducted a small group activity using the Onion

Model Red Teaming tool to help students understand the concepts of ethnocentrism and cultural

relativism. Using three branches of military service each group examined cultural values, rituals, and influential people unique to that branch of service. Students worked in groups for 20 minutes then reported out to the rest of the group. Ted reinforced how the Onion Model is useful to understand cultures that are not your own and to understand insider and outsider perspectives, in other words, how we see ourselves and how others see us. Ted facilitated the student discussion, challenged assumptions, and reinforced key points along the way. He shared his reflection on this activity.

> And we can talk about our experiences on the same topic, and now
>
> I get to hear from somebody else, and I think that enables like the
>
> relativism view, the ability to suspend judgment because it's
>
> understanding and it's just having that small dialogue where even
>
> though it's in a four-week period, people will leave here, and even
>
> if they don't remember all the material and all the readings they'll
>
> remember hey, suspend my beliefs, listen to what they're saying,
>
> engage critically and logically, have a discussion with somebody
>
> because sometimes you'll find out more just by a simple
>
> discussion, than you will listening to a lecture.

Ted shared another example of cultural awareness and remaining open to others' perspectives.

> And when we talked about the empathy jolt in the Argument
>
> Deconstruction class on Wednesday, it's easy because you're
>
> talking to somebody who's like you, another American. But now
>
> the cultural part is, it's different because if they're not American,

it's somebody else, and that's where it kind of gets into the

willingness to suspend your own cultural preferences, which is

hard, because that's who you are, it's your identity, but it's listening

to something else, trying something else. I really do think that's

hard for us.

Sub-question 6: How do instructors demonstrate the thinking styles construct?

A legislative teaching style, self-awareness/self-reflection, and metacognition are creativity attributes embedded within the thinking styles construct. Teaching style encompasses teacher personality, instructor-student interactions, and instructor selected methods and strategies (Sternberg & Lubart, 1995). Self-awareness is consciously understanding one's own beliefs, values, and opinions. Self-reflection is introspectively assessing oneself and adjusting accordingly (Daly et al., 2014). Metacognition is defined as thinking about your own thinking. Nickerson (1999) described metacognition as "a matter of paying attention to one's own thought processes and taking responsibility for one's thinking" (p. 417).

Teaching Style

Teaching style encompasses how instructors interact with students in the classroom as well as the instructional strategies they select for a particular lesson. I observed Bruce's Mental Models and Framing class. His pace was very quick and he used multiple strategies to keep students engaged, especially in the virtual learning space. Bruce shared his thoughts about his teaching tempo. "So I try to keep up the tempo and that goes back to keeping attention because the longer lulls in the process things go slower and then that's an opportunity to drift away so tempo is another piece of things." He used a word cloud in the shape of an hourglass to anonymously share the key points emerging from student journals (Figure 8). One of the students

119

suggested the image depicted their most limited resource, time. Bruce grasped the teachable

moment and facilitated a discussion on time and the military. Bruce shared the thoughts of one of

his students who said this is the first time in his military career that he's had time to think.

Figure 8.

Week One Word Cloud Anonymous Sharing of Student Journal Entries

Students watched a video and conducted a gallery walk. A gallery walk is a teaching

strategy whereby groups observe and comment or build upon the work of other groups by

rotating around a physical classroom. In the virtual learning space students either screen shared their group slides or sent them to the instructor to share in a slide deck. Bruce used anonymous polling, a technique where students can upload comments to a link, to provide an outlet for students to share anonymously. He explicitly explained to the students the relevance of each strategy and how they can be used within the military context. He was transparent with his instructional strategies explaining to students how he spiraled learning, describing how all concepts are not hierarchical but build on one another, with tools and concepts resurfacing throughout the course. Bruce ended his classes by having students share their takeaways for the day in six words or less, which he learned as a Red Team student, or a haiku, providing a more creative outlet. Bruce told students "if you have time and you're creative, knock out a haiku." He shared his thoughts about providing this outlet for students. "So again, just kind of something you would never expect in a military school, to start, you know, rocking out haikus to sum up your thoughts." Bruce teaches another military course outside of Red Teaming. He shared how taking the Red Team Leader Course influenced his teaching style.

> I think, Red Teaming taught me new tools for my teaching style,
>
> and I was already going down that kind of road anyway. Now, I
>
> just have a little better toolbox, I guess, and more experience, so
>
> I'm just gonna continue what I do, so I guess that goes down to
>
> how do you develop your faculty and how flexible, adaptable, and
>
> agile are they?

When asked whether there would be any differences in the way he would teach RTMC and his previous course, Bruce responded,

I offer not! I think it goes back to, you know, my own pedagogy or

andragogy kind of style. So, for me, no. I don't foresee, really, any

major difference on how I'm going to go about doing class. And it

also could be because they're also … students and I think, maybe

going back earlier in the game in our conversation, I went to the

Red Team Leader Course, and I applied those concepts in the [non-

Red Team] classroom so I've already bought in so I don't foresee,

for me personally, switching how I do business.

After teaching for two weeks Bruce was confident about how he facilitated learning but less so about his content knowledge. "Video, word cloud, breakout groups, polls, anonymous stuff, and again, what we talked about last time tempo, changing the pace of things just to keep engagement. Content wise, it's a mixed bag. I don't have the depth of the curriculum." Bruce explained how he encouraged students to think in new and different ways. "Oh, this is an easy question! I don't [do anything]. They figure it out themselves. I just let them go." He shared an example from class where students were debating a planning problem.

I could have easily jumped in and short-circuited a 20-minute

conversation debating. But I let it go and they came to their own

answer after 20 minutes, which is what I would have told them in

two minutes, but there's no point in me jumping in, so I let them

go. They'll figure it out.

He described his teaching style using an analogy. "If you think bowling bumper lanes, like maybe I'm the bumper lanes, I mean, they have a wide lane." Bruce elaborated on his teaching style.

So the biggest thing for me is it has to be an engaging environment. So, especially in an [virtual] environment because I've got email up here, I've got, you know, people are doing other things, it's essentially from like a sales perspective, I'm like a salesman competing for your interest and time. So that's how I kind of view kind of facilitation it's like, as adult learners you have lots of things going on but I'm not behind your screen watching what you're doing. You know, there's text messages that pop up, all those things, we multitask. So as a facilitator without going to Draconian everyone put your computers down or put your phones away, it never needs to take that tone. I'm competing for time and interest. So that's one way I kind of do it, it's that kind of sales thing. I'm competing for your attention. So that's one thing and then I despise the generalized view of instruction to lecture, and from my own [teaching] background, seeing the classes I had to facilitate that are written by somebody else, I'm like, I'm not doing it this way. And I try to steer away from slides when I don't need slides. If it's a slide to help explain what we're doing next, great, but if a slide is just to regurgitate what's in the reading from last night, well that's pointless.

Bruce shared another excerpt from his personal essay providing more insight into the instructional methods he employs, and his overall teaching style.

I employ a variety of learning techniques and seek out ways to integrate technology. I found that variety is critical to gaining and maintaining classroom engagement. My most successful techniques are adapted from Red Teaming concepts that value anonymity. Allowing the opportunity for all views to be heard enables deeper conversation using the Socratic method. My ultimate goal is for the discussion to take on a life of its own where students repeatedly engage and build off each other's comments in a loosely guided discussion aligned to the learning objectives.

During a lesson on Cultural Meaning and Frameworks Ted used student examples to reinforce a point and reflected on his instructional decision.

I think I put more of a personal touch to their understanding. It's not just some academic or a professional reading that says it, it's an engaged discussion and it's challenging held views of an individual, and I think that's the beauty of small groups, that interaction. If we go down a rabbit hole it's okay, because that rabbit hole is triggered by an experience of what the material gets at.

Sanford used the analogy of a grocery store to explain his teaching style.

The guy who used to drive me to work ran all the commissaries [military grocery stores] …and he used to tell me the commissary theories. Like, where they put everything in a commissary, low, high, everything has a reason why it's there. And so, what you

want the students to get is like, on the surface everyone is saying,

oh yeah, that's obvious. And then you start [thinking] well why do

they exactly do it that way? Because one of the big things about

Red Teaming is I try to get them into some sense of curiosity and

get people to look at things.

Sanford explained how he spirals Red Team concepts to reinforce learning.

One of my philosophies is, I'm sort of like, this is old school Army

stuff, but normally I'll explain a tool, I'll show it to them, we'll do

an example. On another day we'll do it again in an exercise, and

our third day we will do it, probably as part of the final exercise.

So, they'll see the tool three times at least. And I've always

followed that philosophy on all the tools, and because of this

crammed time space and because this is much harder to teach tools

without a whiteboard, without the spontaneity of it, they'll see it at

least twice. So the tools, I'm a big proponent of the tools and that

they take something tangibly away from here, whether they Red

Team or not, it's really unimportant. They take these tools away

and use them in their organizations.

Sanford shared some additional thoughts on teaching. "The more you teach the more you start to think about all the context of the classroom and the environment of the classroom and every piece of it, how it all fits together in the classroom. Sanford shared his thoughts on instructor personalities and the learning environment.

I think one of the key things is, I've thought about teaching. And,

you know, I really thought about it. I said hey, what is the best

methodology here, given my personality too because that's a key

element. If you had …and me you would see two vastly different

personalities. And the way he presents information to the students

and student interaction is vastly different and that has a huge

effect. So, if you have … and me we're more similar to each other

[and] … and I are very opposite to each other. So that's really

important. The instructors' personality is really important.

Self-Awareness/Self-Reflection

Emerging from all three data sources self-awareness/self-reflection are foundational

concepts of Red Teaming education. The WAI lesson occurs within the first two days of the

course. All students share three to four watershed moments that define their lives and describe

who they are during a 15–20 minute presentation. Instructors share their own WAI and model the

process for students. A description from the WAI lesson plan provided some insight into the

expectations of instructors for this lesson.

The belief of facilitators in the value of this event, the example of

their own WAI, and the method in which they convey this lesson

to students all set the stage for meaningful outcomes from the WAI

exercise. The facilitator's attitude toward the WAI lesson

contributes to determining if it will result in true introspection and

sharing of self for students, or if it will merely become an exercise

in sharing oral resumés.

Due to the trust building component and the sensitive nature of the WAI, I only observed Sandford modeling his WAI. However, all three instructors shared their WAI experiences during interviews. Sanford described how he facilitated the student WAIs and the rationale behind it. First, he shared his WAI, modeling the process, sharing his watershed moments, and managing the 15-20 minute time limit. He made the decision to modify the WAI and have one or two students share their WAI daily throughout the course rather than having all students share their WAIs during the first two days of the course.

> What I do is, I model it and I tell them hey, this is what I want, this is how I want it, I'll give them a framework and they're going to go ahead and do it in a narrative format. So, they solo talk, and so I talk about my background and that sets the framework for them to open up into talking about their values and things. I think that's really important. Who Am Is are really an important thing. It's supposed to be 15 minutes, but I let it go up until 25, and the other thing is that it's really important for, not only for the person giving it for self-awareness, it's really important for the students to hear it, because what it does is, this exercise creates a bond in the classroom. It creates a bond that's really strong. If it's done correctly it's really strong and it lends itself to other elements of the of the course.

Ted shared his thoughts about engaging students in self-awareness.

> We expand that and we use the Who Am Is. And of course, we model that demonstration, I'm sure you've heard this from

[Sanford]. But we demonstrate hey, this is the basic building

blocks and it's the willingness to open up and tell somebody who

you are, what's important to you.

Ted described how he modeled his WAI and the points he is trying to convey to the

students.

And when I go through mine, I speak on my connection with, I

always start off talking about my religious beliefs, but I start with

you know, I'm a big believer. My religious beliefs are, not a really

big believer in organized churches, what we really believe in are

associated with teachings. We believe in a God, we believe that we

start from one point and we have a desired end state, but because

of sins of man, we can change. And I speak to that as within an

organization that we as leaders will make mistakes, and that, it's

how you make the mistake and how you learn from it. If it's

something like an ethical or moral mistake then I will crush you,

then you're done. But if it's something like you made a mistake, but

you learned from it and you move forward, then that's great. And

then I transition to tell a story about the importance of family,

because I am very family oriented. And really how um, I tell the

story of my grandfather and how he passed and how I ended up

flipping the family home that they lived in for 20 years, and I tell

the story about a little tree frog that was always around and then

the tree frog would always be at whatever site I was working on

during the day, and then on the last day when I was getting ready to put it on the market I didn't see the tree frog, didn't see it again. Fast forward, my roommate in college, best friend, best man at my wedding, is Native American. His dad dies, same kind of sorrow, heartbreak, he goes through what I had with my grandfather. Helped him out a lot. The tribe ends up adopting me, I become a family member of the [tribe]. With that it's very ceremonial just intimate and close, its nothing written or anything like that but they give me an amulet and on that is the symbol of the bear clan, which is the one they adopted me into, and the other one is the horny toad or the horny frog. And I just ask well what's this about, they're like oh, that's your grandpa. When your grandpa's around he'll appear as a toad or he'll appear as a frog and it'll be a moment of clarity to you that you can know your grandpa was there and he'll help you make a decision. It was like a rush of emotions and I always share that with people because of its importance of understanding family belief, other cultures, other worldviews, and I use that to shape that I will always take care of family and move forward. And I expand upon that a little bit more in the story and then I'll tell the story of the UCMJ [Uniformed Code of Military Justice], of how I didn't do the right thing, I should have crushed the soldier and kicked him out, but I ended up endangering lives later and that kind of shapes me to be a person who's very much

129

letter of the law, black and white. I'll give you some latitude if its

mission oriented and it's not something that's actually a UCMJ

offense. And I set that tone, so it ties into something personal and

family related, but then also military psyche and I think what that

does is it kind of sets the tone with all the other students so that

some of them are willing to talk about those personal stories, and

others, they can have that freedom of choice that they can decide

I'm just going to go with the military route, and two of my students

did that in this block.

Bruce explained how the WAI lesson is conducted with his students.

So for tomorrow, on Thursday, I'm doing my Who Am I to model

it for the students. That night they'll prep theirs and they'll present

theirs Friday. Friday's going to be a longer day for us, we'll do

Friday instruction, we'll break up into two groups and then do

Who am Is in two groups.

Bruce described how he modeled his WAI in a more direct way, acknowledging that

everyone does it differently.

Mine was more of a chronological aspect, like hey, I was born

here, this and this happened, camaraderie, fast forward ten years,

now I'm in the [military], fast forward ten years now I'm married,

fast forward ten years now I'm here. So mine was situated in those

time increments but I pick a point in my childhood, my formative

years and how that thread kind of carried through, and that's what

I'm trying to show, and then at the very end kind of wrapped up

like hey, my biggest three takeaways from my Who Am I are

these. It took like 11 minutes to kind of run through, you know, my

life in 11 minutes so things I think are relevant, that helped

articulate how I may approach things the way I do.

Bruce reflected on his time as a student and what he considered the most important aspects of the course. "From the personal perspective, I mean, all of the classes, frames, biases, self-awareness, I think it all comes down to self-awareness. Understanding where you are and where you're not." Describing himself as a *systems guy* who scores low on empathy but understands it intellectually he elaborated on his previous response.

So, self-awareness was the piece that I was getting to like, what

was my big takeaway from that course individually? All things that

tie into self-awareness and the sidebar was the counterintuitive

nature that, less developed areas, be aware of them, but you don't

necessarily need to invest in them, if you have a choice to invest in

them or double down on a strength.

Ted shared another self-awareness tool he used in class and his discussion with students.

I do have the students conduct a SWOT of, be honest with

yourself, what are your strengths as an individual, what are your

weaknesses, what are the opportunities, what are the threats, and

then review that. We had a pretty lengthy conversation on … today

associated with Red Teaming and the discussion with the students

focused on, while the Army is going to tell us to do all this, but

where's my feedback mechanism? And what I pushed back to the

students is, I say well, have any of you actually been honest with

yourselves on what your weaknesses are and what have *you* done

to improve it.

After observing his class on Group Dynamics, Sanford shared his thoughts on

metacognition.

You know, in a way, before you start thinking about thinking you

have to figure out how you think about things. And so, you know,

that's really like when self-awareness comes. Before you can start

figuring out other pieces of how other people think about things,

you have to start with yourself.

Primary Research Question: How might the Red Team instructors manifest the six constructs of the investment theory of creativity in the learning environment?

Creativity attributes from each of the six constructs of the investment theory of creativity were evident in instructor interviews, observations, course documents, and instructor documents, emerging from the data in varying degrees. Connections between emerging themes, research questions, and creativity attributes are presented in Table 2.

Table 2.

Alignment of Emerging Concepts to Research Sub-Questions and Themes

SQ 1 Personality	SQ 2 Motivation	SQ 3 Knowledge	SQ 4 Intellectual Abilities	SQ 5 Environment	SQ 6 Thinking Styles
Tolerance for Ambiguity	Intrinsic	Formal/ Domain	Redefine Problems	Student-Centered	Legislative Teaching Style
Openness to Experiences	Extrinsic	Formal/ Content	Insight	Mutual Respect/ Trust	Metacognition
Open to Others' Perspectives		Informal/ Creativity	Problem Solving	Cultural Empathy/ Cultural Awareness	Self-Awareness/ Self-Reflection
Perseverance Sensible Risk-Taking Self-Efficacy Growth Mindset					

The findings from the six research questions form an amalgam of the instructors' experiences providing evidence of the manifestations of the six creativity constructs within the learning environment.

Critical Thinking/Creative Thinking

Critical thinking/creative thinking recurred throughout the data as manifestations of the six creativity constructs. Applied critical and creative thinking is another foundational Red Team concept. Sanford explained how he uses daily current events discussions to encourage students to think critically.

> I'll ask for one current event that's going on, to start class with a
> concrete experience. And my thought process is that, number one,
> military officers should be aware of what's going on in the world.

They should be aware of how things affect them, and the second

thing is, it forces them to critically think about a problem. Because

it's a critical thinking exercise that, if you talk to my students, they

will tell you that was one of the more beneficial things they had in

class.

Sanford reflected on critical and creative thinking. "What this course did for me [as a student] was, it gave me time to think, read and think. And so, as I've read and thought about things, my ideas about critical thinking and creative thinking are much different than when I started." He shared his reflection with students.

I talk to the students about wisdom. The sense of like wisdom

comes from your experiences on a matter. You're learning about

that matter, you know, your research and things like that, and then

experiencing it and then coming back and then, the most important

thing is to think about it, and think about what you learned from

that experience, and did that experience jive with what you thought

before, and look at it from a bigger philosophical perspective. And

so, I think that's really important, to really think about things in a

broader manner.

Ted shared his thought process behind selecting different instructional strategies.

I like using videos and pictures to drive a conversation, because

sometimes I think it's also easier to use that as not only the

icebreaker but to enable somebody to relate, or you can view and

then apply the concepts from your readings to that. And so the

Monty Python video, just because it pulls back into the readings

for that lesson, are oriented on are you asking the right questions,

are you actually applying critical thinking towards a topic, or are

you just making white noise and regurgitating what you want, to

appear to be a critical thinker, but you're really just making noise

to confirm what you want and you're trying to get people to buy

into it. So that's why I play that video because you see them, they

go to the knight, they're ready for it, they're going to burn her, but

hey, we would like some authority to support this. And then the

authority starts asking the questions but he's asking all the wrong

questions so he's asking questions that confirms to the crowd what

they want to hear and then he gets that reinforcing from the King.

And then that way I can tie in the discussions on epistemic

authority, positional authority, just continuing to say hey, these are

controlling forces and this eventually builds up into a discussion of

group think.

Bruce described the Perception and Interpretation class at the Nelson-Adkins Museum located in Kansas City, Missouri. The location provided the first in-person class for students. Students were divided into two groups and viewed the same three pieces of art. Students were instructed to view the art without reading the description. Bruce used the teaching technique Circle of Voices to provide an opportunity for all students to share their thoughts and perceptions. Bruce began the next virtual class on Groupthink reviewing and reflecting on the museum experience. He intentionally selected a lion sculpture from the museum as his virtual

135

background sparking a discussion about perception, remaining open to others' perspectives, and thinking critically. He challenged students to suspend judgment, actively listen to others, and remain open to new ideas which are components used in groupthink mitigation. Anonymously sharing student reflections, Bruce created a lion head word cloud to illustrate the most frequent themes emerging from students' weekly journals, reinforcing the connection between the two classes (Figure 9).

Figure 9.

Week Two Lion Head Word Cloud Representation of between Red Team Concepts
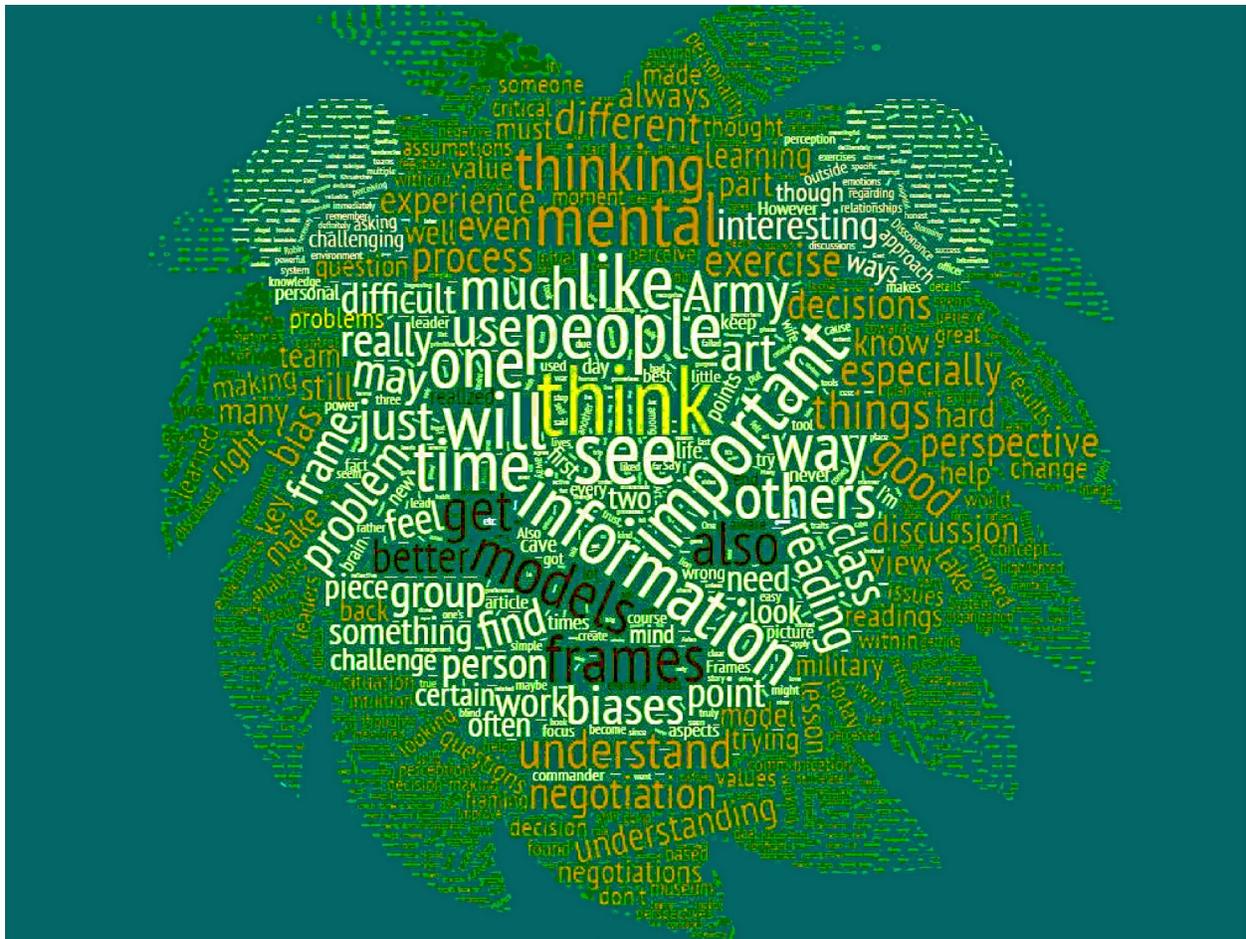
 Other Theme: Challenges of Teaching Virtually

All concepts and themes emerging from the data aligned with at least one of the research questions and creativity constructs of the investment theory of creativity. However, one area that

recurred in the data but did not align with the research questions was the challenge of teaching this course in the virtual environment. During interviews, instructors shared some of the modifications they made to the virtual learning environment. Bruce shared that when students are in break-out groups instructors cannot pop in and out of the groups to check on progress.

> Okay, so it's a live document, it's in Teams, [Ted] and I kind of
>
> built the template out, so I can see that little box, I can see what
>
> they're writing. So instead of being in the room with them I can see
>
> what they're talking about. I don't have the context but it's like, this
>
> is one of their key points based on what they're writing on the
>
> slide.

Ted explained his frustration during his facilitation of class with a subject matter expert where all students were off camera, something that would not happen in a physical classroom. Sanford shared his frustration with changes to reading material in the virtual learning space.

> For most of my time with UFMCS we have always leaned towards
>
> reading from the original source. One of the problems we've had is
>
> because of having to go virtual, it becomes harder, and so we've
>
> gone to some digital stuff, which I'm not really satisfied with. I
>
> think, academically, the effect is a lot less great, so I'll do some
>
> changes during the course. That's the key element.

Sanford explained how the virtual environment stifles student-to-student conversation and thoughtful interactions in response to questions.

> Oftentimes what I've noticed on the virtual side is it's really hard to
>
> get the interaction. That's really the point of Socratic learning and

this medium does not lend itself to it so there's a lot of one-on-one

participation. That is a detriment to people in a conversation

because they're so used to like putting their hand up, you know,

that little virtual hand that they put up or muting their microphone

and then having to unmute it so there's not this free-flowing

conversation that you would have in a classroom.

Sanford provided more insight into the challenges of conducting this course in a virtual environment. He shared how some of the Red Teaming tools cannot be used virtually. "Like, there's things I can't physically do. We thought about it, we figured out ways to do some like, groupthink mitigation processes, and some things we can't figure out a way to do it." He provided another example. "Like, you can't do five will get you 25, which is a groupthink mitigation process. There's no way you can do it here. You have to have personal interaction." He suggested how the context and learning process are affected by conducting classes virtually. "So we've had to adjust, and I think, my own personal opinion is that we're at about a 70% solution. When the pandemic started, we adapted to the virtual environment. We modified it a little bit, some good, some bad." He indicated percentages for this class might be higher because they provided in-person on location student opportunities to the Nelson-Adkins Museum and the World War I Museum.

Summary

Creative learning and thinking occurs when the six creativity constructs of the investment theory of creativity, personality, motivation, knowledge, intellectual abilities, environment, and thinking styles, converge (Sternberg & Lubart, 1991, 1995). The experiences of how three Red Teaming Education instructors cultivate a climate for creative learning and thinking for adult

learners were captured through interviews, observations, and program, course, and instructor documents. Themes emerging from the data revealed evidence of creativity attributes embedded within the six creativity constructs of the investment theory of creativity (Sternberg & Lubart, 1991, 1995) that support the cultivation of creative learning and thinking. Although evident in varying degrees, the creativity attributes emerging within each creativity construct provided support for understanding how instructors cultivate a climate for creative learning and thinking.

Chapter 5 - Discussion and Conclusion

"Creative people are ones who defy themselves, the crowd … in ways that are novel and useful. More important, though, are transformationally creative people who deploy their creativity to make the world a better place" (R.J. Sternberg, personal communication, March 29, 2022).

Chapter Introduction

The purpose of this research was to understand how instructors cultivate a climate for creative learning and thinking for adult learners. This chapter provides a discussion of the findings, implications for practice, recommendations for future research and a conclusion.

Discussion of Findings

The findings of this research were analyzed using Sternberg and Lubart's (1991) investment theory of creativity. The six research sub-questions aligned with the six theoretical constructs of the investment theory to answer the primary research question, *how do Red Team instructors manifest the six constructs of the investment theory of creativity in the learning environment*, providing a strong foundation through which to analyze this research. Sternberg and Lubart (1995) suggested creative thinking occurs when evidence of the six creativity constructs personality, motivation, knowledge, intellectual abilities, environment, and thinking skills converge. Convergence of the six constructs occurs in varying degrees and, while not domain-specific, they are domain-dependent, meaning different constructs emerge more dominant or less dominant depending on the context of the domain. The findings revealed all six creativity constructs were present in the learning environments of these instructors corroborating evidence of instructors' cultivations of creative learning thinking for adult learners in this unique learning environment.

This research design aligns with similar qualitative research protocols conducted by Bramwell et al. (2011), Daly et al. (2014), Horng et al. (2005), and Reilly et. Al (2011) where data were collected using interviews, observations, and document analysis. A challenge of the research design was some of the classes occurred concurrently, so I was unable to observe all instructors teaching the same classes. To mitigate the challenge of concurrent classes, I used interviews to capture the experiences of all instructors teaching those classes. For example, the WAI lesson is one of the foundational lessons of the course. All instructors conducted their WAI on the first day of class. I observed Sanford modeling his WAI. During interviews, Ted and Bruce explicitly explained their process for modeling their WAIs which added additional depth to the data for that lesson. While I did not observe instructors teaching the same classes, this design provided the opportunity to observe nine different classes out the four-week block of classes.

Personality Construct

The personality construct is comprised of these creativity attributes; tolerance for ambiguity, openness to experience and other's perspectives, perseverance, sensible risk-taking, self-efficacy, and a growth mindset. These attributes emerged in varying degrees from the data sources suggesting the personality construct is evident in the learning environment created by these instructors.

Tolerance for Ambiguity

Tolerance for ambiguity is the ability to withstand uncertainty and tolerate discomfort and ill-defined problems (Sternberg & Lubart, 1991, 1995). Considered a salient attribute of creative personality and creative thinking, tolerance for ambiguity has been used in creative assessments such as the Short Scale of Creative Self (Karwowski et al., 201), the Reisman

Diagnostic Creativity Assessment (Reisman, 2017), and the TTCT (Torrance, 1966), the

emergence of this attribute from the research is not surprising. Interviews and class observations

revealed how instructors created opportunities for students to be exposed to varying levels of

cognitive discomfort throughout the course. During interviews one instructor stated once

students were comfortable with a course concept, he would change things up and "make you a

little uncomfortable because it has to open the aperture." Case study research on teaching

creativity in engineering classes conducted by Daly et al. (2014) suggested "methods to

encourage students to embrace ambiguity, avoid premature closure, and increase reflection may

greatly improve their creativity skills" (p. 437). During a lesson on critical thinking, an instructor

facilitated a small group activity using ambiguous Fermi problems, such as how many

professional piano tuners are there in Chicago. He encouraged students to avoid rushing to find

the *right* answer, to dig deeper and rely on their collective knowledge rather than outside

resources. He created an opportunity for students to work through the ambiguity to develop a

solution to this obscure problem. Piirto's (2017) definition of tolerance for ambiguity as

deferring a rush to judgement or focusing on a single solution too quickly provides justification

for this example in the learning environment.

Openness to Experiences and to Others' Perspectives

Open-mindedness comprises both attributes. Openness to experiences is the curiosity and

willingness to try new things. Rigolizzo and Amabile (2015) suggested "an atmosphere of

openness" (p. 71) promotes creative learning and thinking. Instructors used non-military

examples to maintain a level of discomfort but also to encourage students to try new things. For

example, one instructor described how he used creek conservation efforts rather than military

examples to reinforce course concepts and Red Team tools. "It is trying to get them to think

outside of what they're used to". Providing opportunities for students to use course concepts in a different context outside the military then reconnecting back to the military to reinforce the concept.

Openness to others' perspectives is the ability to consider others' thoughts and ideas even if you disagree with them. Openness is one of 11 areas Edelson (1999) suggested where adult educators could foster creative thinking in their learning environments. Observing an instructor facilitating a student discussion about the COVID-19 pandemic using the Socratic method provided an example of openness to others' perspectives. He challenged students' thinking but provided an opportunity for the discussion to continue among students, interjecting with questions from time to time. Then he debriefed the discussion explicitly explaining the ambiguity of the topic and remaining open to others' perspectives and reframing questions in a military context. Studies conducted to identify components of creative organizational climates indicated risk-tolerance, open to others' perspectives, tolerance for ambiguity, openness to new ideas, collegial information sharing, trust, tolerance for failure, confidence in management support, autonomy, creative self-efficacy, and intellectual stimulation are essential for creative thinking to occur. (Hunter et al., 2007; Reiter-Palmon et al., 2019).

Perseverance, Sensible Risk-taking, Self-efficacy, and a Growth Mindset

Instructors provided examples of these attributes during interviews and modeled them during class activities. Fan and Cai (2020) suggested these attributes are embedded within strong facilitation skills which, along with a positive instructor attitude support a creative learning environment. Perseverance is a personality trait of creative people used by creativity researchers such as Guilford (1967) and Amabile (1983). Defined as the ability to persist when faced with obstacles (Sternberg & Lubart, 1995) persistence was evident in instructors' descriptions of

modifications required to continue teaching the course virtually. For example, unable to observe small group activities and processes in the virtual learning space instructors developed a template to monitor students' idea generation while in small groups. Sensible risk-taking is defined as a willingness to accept a potential adverse outcome and a growth mindset is a willingness to grow or freedom to fail (Sternberg and Lubart, 1995). Both attributes were evident in instructors' selections of supplemental course materials to reinforce course concepts. One instructor used a Native American origin story with eight different points of view to reinforce worldviews and perceptions and challenge student thinking. Teaching in an environment where instructors are encouraged to try new things without retribution stimulates creative learning and thinking (Hunter et al., 2007; Reiter-Palmon et al., 2019). Self-efficacy is believing in one's own capacity and abilities (Bandura, 1997). Instructors' self-efficacy was evident in the confidence and competence they portrayed in interviews and displayed during class observations. During interviews instructors shared previously attending the course as students provided an additional depth of understanding of the concepts. Instructors shared their extensive military experience gave them confidence to use relevant examples to support course content. Instructors confirmed their belief and support for the course content stating they used Red Teaming tools in other educational settings "providing new tools for my teaching style. Now I have a little better toolbox". Bandura's (1997) definition, believing in one's own capacity and ability provides support for evidence of this attribute in the research.

Motivation

The motivation construct is comprised of intrinsic and extrinsic motivation. Intrinsic motivation is the internal drive or desire to do something just for the sake of doing it, while extrinsic motivation is driven by reward or acknowledgment (Amabile, 1983, 1996). The

motivation construct was revealed within teaching styles and instructional strategies the instructors used in the learning environment. During observations instructors facilitated discussions, encouraged Socratic discourse, inserted significant wait time providing students time to think before responding to questions. They used a of variety of instructional strategies, video clips, small group activities, gallery walks, and anonymous polling, to maintain student interest. They provided opportunities for students to think and reflect, during class, at the end of class, and through weekly journals. According to Kettler, Lamb, & Mullet (2018) student motivation is influenced by the climate created by the instructor. The facilitated learning environment, instructional strategies, and trust-building activities cultivated by the instructors is justified by their claim. Intrinsic motivation emerged from the data sources suggesting the motivation construct is evident in the learning environment created by these instructors.

Intrinsic Motivation

According to Tighe et al. (2003) intrinsic motivation often emerges subtly so it can be difficult to identify supporting the claim by one instructor who described motivation for students to think creatively as creating a form of "intellectual electricity in the classroom where the students are actively thinking, and you can almost feel the energy in the classroom." Suggesting ways in which adult educators could foster creative thinking in their classrooms, Edelson (1999) recommended motivation and openness to new ideas providing additional support for the findings of this research.

In their research on classroom climate and motivation in P-12 education, Amabile (1996) and Tighe, et al (2003) suggested students were more intrinsically motivated when instructors were knowledgeable of the subject area, provided time for them to think and reflect, and created

a mutually respectful, trusting environment, supporting attributes revealed in other creativity constructs by instructors in interviews and observations.

Extrinsic Motivation

While creativity researchers predominately suggest that extrinsic motivation inhibits creativity (Amabile, 1983; Tighe, et al., 2003), Hennessey and Amabile (2010) and Sternberg and Lubart (1995) provided evidence to the contrary. External rewards can provide positive support when a person is already intrinsically motivated. The instructors facilitated learning so that students could successfully complete the course. However, there are no extrinsic rewards or incentives for instructors of the Red Team course. One of the former Red Team directors confirmed this claim stating there are no extrinsic rewards or incentives just an educational climate that values creative instruction. Instructors are encouraged to be creative in their educational approaches and instructional strategies cultivating a climate for creativity and motivation among their adult learners (Brown, 2016).

Knowledge

The knowledge construct is comprised of formal knowledge and informal knowledge. Three types of knowledge emerged from this research, domain, content, and creativity knowledge. Domain and content knowledge are aspects of the formal knowledge attribute. Creativity knowledge is an aspect of the informal knowledge attribute. Examples of the knowledge construct were revealed through instructors' military, course content, and creativity knowledge. While the level of knowledge needed is not specifically identified, Sternberg and Lubart (1995) asserted it is necessary to have *enough* knowledge to know the difference between a novel concept and one that is not. They argue that a person with limited experience would be

unable to do so. These attributes emerged in varying degrees from the data sources suggesting the knowledge construct is evident in the learning environment created by these instructors.

Domain Knowledge

The findings of this research suggest instructors possessed deep domain knowledge. Evidence of more than 15 years of active-duty military experience emerged from instructors' examples shared during class observations and interviews and embedded throughout the other creativity constructs. In his class discussion of stakeholder analysis and how to use the stakeholder mapping tool, one instructor shared how his extensive experience in the Middle East provided valuable insight and helped him avoid an embarrassing situation with a foreign military leader. "It's a cultural thing. It's about face and it's about all kinds of other things, and so if you take the American approach to it, you will not achieve what you want to." Niu & Zhou (2017) suggested creativity-rich learning environments require instructors to have subject matter expertise and pedagogical content knowledge, supporting the notion that instructor examples such as this provided relevant context for students to connect course content to real world application.

Content Knowledge

All instructors were graduates of a Red Teaming Education course so they had intimate knowledge of the course content. In addition they had access to the same lesson plans and course tools. Instructors provided scaffolded instructional support to one another. More experienced instructors filled content knowledge gaps for new instructors so content knowledge was not an issue in those classes. For example, one of the instructors shared "the lesson plans are vital for someone new [to the content] because they give you other ideas and a way to kind of structure things." This depth of content knowledge is supported by Niu and Zhou's (2017) previous claim

and Csikszentmihalyi (1996) who proposed deep domain and content knowledge are necessary attributes that inform a person's understanding of what is relevant and what is irrelevant in a particular context.

Creativity Knowledge

Instructors' definitions of creativity provided initial examples of their creative mindsets. One instructor shared, "where can I push the boundaries, to think and approach concepts in a way that [I] normally would not". Another instructor shared, "creativity is the ability to look at a situation and come up with a solution that sometimes is not the obvious solution." A third instructor shared, "creativity is willing to try new ideas and new approaches to the same end state." According to Plucker et al. (2019) theses definitions provide some insight into their understandings, mindsets, or attitudes about creativity. While it does not provide insight into creative personal identity, it is "reflective of how much someone values creativity" (p. 53), which informed their selection of instructional methods and strategies. Instructors provided candid examples to describe their own creativity knowledge. One instructor described his as average then added, however, "compared to others in the military it may be more than average, or below average." Another instructor shared that his experience with creativity in the military was "very limited" adding, "at large, I haven't seen it in the military." Another instructor's response revealed "I have a good working knowledge of creative concepts and the Red Team tools help to promote that, different engagement techniques in the classroom helps to promote that." The findings revealed a disconnect between the expectations of the ALC-TE and instructor knowledge of creativity and creative thinking in the Army. One of the significant components of the ALC-TE is developing leaders who are critical creative thinkers who can thrive in ambiguous and uncertain environments, (Department of the Army, 2017). Unfortunately, the ALC-TE does

not explain how to accomplish this or provide any instructional guidance. This claim is supported by Hoffman (2017), who shared a quote from General Brown on creativity in the military. "We need red teaming, but we also need critical and creative thinking all the way across our ranks, from Specialist Brown to General Brown" (p. 142). Other senior military leaders from the Chairman of the Joint Chiefs of Staff to the Chief of Staff of the Army have endorsed instruction and training that support critical creative thinking in military education (Hoffman, 2017; The Red Team Handbook, 2019). However, the examples provided by the instructors revealed limited exposure to creative thinking in their military experiences and instructor training outside of Red Teaming Education does not address how to cultivate climates for creative learning and thinking.

Intellectual Abilities

The intellectual abilities construct is comprised of the ability to redefine problems, provide insight, and model problem solving. Instructors demonstrated these three attributes in their selection and implementation of instructional strategies in the learning environment revealing evidence of the intellectual abilities construct. The constructs of the investment theory of creativity do not emerge in isolation (Sternberg & Lubart, 1991), therefore additional evidence of the attributes comprised within the intellectual abilities construct is revealed in the discussion of other creativity constructs. These attributes emerged in varying degrees from the data sources suggesting the intellectual abilities construct is evident in the learning environment created by these instructors.

Redefine Problems

The creativity attribute of redefining problems is the ability to process information and think unconventionally (Sternberg & Lubart, 1995). Instructors demonstrated evidence of this

attribute during observations of class activities. An example of challenging assumptions and redefining problems was modeled by one of the instructors during his lesson on Critical Thinking and Cognitive Biases. Redefining problems is not only supported by Sternberg (2019) who stated, "redefining problems requires a shift in perspective" (p. 91). Redefining problems is an aspect of flexible thinking, one of four foundational components of creativity, along with fluency, originality, and elaboration defined by Guilford (1967) and included in creativity assessments such as Torrance's TTCT (1966). Using a Monty Python video, the instructor challenged students' initial assumptions, encouraging them to think about what they saw, and to look at all sides of the problem. "The readings for that lesson are oriented on are you asking the right questions". He added, "are you actually applying critical thinking toward a topic or are you just making white noise and regurgitating what you want … to confirm what you want, and you're trying to get people to buy into it." After watching the video clip the instructor facilitated a student discussion. Finally, he used a student example to make the concepts relevant and connected it to a military example that they could potentially encounter.

Insight

The creativity attribute of insight is the ability to activate prior knowledge or make unique connections to see something in a new or different way (Sternberg & Lubart, 1995). Instructors used their military experience as well as personal expertise to provide insight during class activities. During the same Critical Thinking and Cognitive Biases class, several students shared they had not seen the Monty Python movie. The instructor provided some insight using his own background knowledge of the movie and using military examples for relevance, encouraging them to think beyond what they observed on the screen. He modeled how to ask relevant questions, rethink solutions and redefine questions. Supporting this example, Piirto

(2017) defined insight as "restructuring the problem so that it can be seen in a different way" (p. 150).

Problem Solving

The creativity attribute of problem solving is the ability to find appropriate solutions to complex problems (Sternberg &Lubart, 1995). Identifying the relevant problems from the irrelevant ones is an important aspect of this attribute. Csikszentmihalyi (1996) stated creative people have the ability to know the difference between good ideas and bad ideas. Doing so requires a deep understanding of the domain, a thorough understanding of the expectations of the field, and an ability to know what is relevant to the field. An example of problem solving emerged during the Complexity and Systems Thinking class. Describing stakeholder mapping the instructor shared, "the first step to problem solving [in a real-world context] is know the obvious and abstract players. Who [they are], relationships, purpose, support, and influence." Another instructor shared how he encouraged students to solve problems from their own perspectives. "I've reinforced to them hey, look at your SWOT [strengths, weaknesses, opportunities, threats] look back to, is my system of problem solving strong, is my mental model strong." Providing support for problem solving in this research Daly et al. (2014) suggested instructors using creative processes to cultivate creativity in their engineering courses included appropriate problem and solution selection. "Developing students' ability to determine which aspects of problems were important and their ability to compare ideas they had generated to existing products in the marketplace" (p. 429).

Environment

The creativity attributes of the environment construct, student-centered, mutual respect and trust, collaboration, empowerment, and cultural empathy/cultural awareness are supported

by a review of creativity literature conducted by Tsai (2012) that revealed the significance of environmental factors on the learning environment. "The research on organizational climate provided some useful points for stimulating creativity and innovation" (p. 87) as well as fostering creative environments through trust and support (Tsai, 2012). These attributes emerged in varying degrees from the data sources suggesting the environment construct was evident in the learning environment created by these instructors.

Student-Centered

A student-centered environment is one that puts students' needs first, where instructors provide engaging, relevant instruction, facilitate learning with meaningful assignments, and develop positive teacher-student relationships from a learner-centric perspective (Kettler, Lamb, & Mullet, 2018; Sternberg & Lubart, 1995). Instructors provided student-centered instruction using relevant student examples to reinforce Red Teaming Education concepts, building a learning environment of mutual respect and trust and neutralizing the power differential between instructor and student. In a study of 671 college professors identified as either facilitating or inhibiting creativity (Chambers, 1973) determined instructors were more likely to be identified as facilitators of creativity if they treated students equally and respectfully, developed positive teacher-student relationships, taught enthusiastically, encouraged student discussion, and were flexible in their teaching style. One instructor's example of being comfortable with ambiguity, letting students take the lead, provided an example of student-centered learning supported by Chambers' (1973) claim. "I don't necessarily know how the conversations are going to go … I just go where they're going and steer it whichever direction, and it may not be the learning point I had in mind, but it's close enough and they own it." An extensive review of the research by Mumford et al. (2019) confirmed evidence to support significant relationships between leaders

who have technical expertise, deep domain knowledge, limited fear of failure, the ability to identify good ideas over bad ones, and who foster creative climates within their profession, with their people, and through their creative work. An excerpt from one of the Red Teaming documents supports instructor facilitation. "Facilitators are the architect, pilot and guide in the classroom and demonstrate the art of matching the right method … to the specific class and student experience."

Instructors took the time to build relationships and make connections with students. During interviews instructors acknowledged how they remained flexible to the needs of their students, adjusting class schedules accordingly. One instructor mentioned how important it is to the teacher-student relationship to recognize the challenges adult learners experience as they juggle family responsibilities with military demands and time constraints for relocations to new duty stations. This example is supported in creativity literature by Esquivel (1995) who stated "one of the most important characteristics of effective teachers is their attitude toward creativity and their ability to be accepting, open, and flexible in relating to students" (p. 189).

Mutual Respect and Trust. Mutual respect and trust are defined in terms of appreciation, credibility, authenticity, competence, and confidence (Brookfield, 2006; Sternberg & Lubart, 1995). Instructors nurtured mutual respect and trust from the first day of the course, beginning with modeling their WAIs. The WAI is a foundational lesson of Red Teaming education that cultivates mutual respect, trust, and self-awareness. Instructors shared watershed moments in their life during 15-20 presentations to the class. Students shared their watershed moments, actively listening while other students shared their WAI, then reflecting on the whole experience in their journals. The course builds off the vulnerability of the instructor establishing a learning environment where students feel safe and their opinions have value. Brookfield (2006)

stated trust emerges in a learning environment where instructors are credible and authentic. He defined credibility as "a breadth of knowledge, depth of insight, a sophistication of understanding, and length of expertise that far exceeds the students own" (Brookfield, 2006, p. 56). Authenticity is "the perception that that teacher is being open and honest in her attempts to help students learn" (Brookfield, 2006, p. 56). Another instructor shared why the WAI lesson is so important. "So to me, the Who Am I is important because part of it is how do you establish a baseline of trust and part of it is willing to tell a story about you that you normally wouldn't tell anybody". These examples provide support for evidence of this construct emerging from the findings of this research.

Collaboration. Collaboration is defined by working interactively and collectively with others (Sternberg, 2017). Not only did instructors collaborate and support each other, they provided opportunities for collaborative learning during class activities. For example, one instructor facilitated a collaborative activity called Zoom In, Zoom Out. Half of the class observed the activity while the other half worked together to determine a photo sequence using only words. Each student had access to one photo and each student had a different photo. The observing students remained engaged in the activity by commenting with each other and the instructor in the chat box. The rich discussion that followed provided evidence of the relevance of this collaborative activity, especially in a virtual setting. A meta-analysis study conducted by Hunter et al. (2007) revealed a relationship between organizational climate and creative achievement was strengthened by the presence of personally meaningful, challenging work, and the opportunity for stimulating collegial exchange. Their study provides support for collaboration in the findings. Another example of collaboration was observed during a class activity using the Onion Model Red Teaming tool. The instructor facilitated a small group activity providing ample

time for students to share knowledge and discuss ideas and opinions with one another. His reflection of the activity is supported by Hunter's et al. (2007) study as well. Students may not remember all the readings and course material "but they'll remember hey, suspend my beliefs, listen to what they're saying, engage critically and logically, have a discussion with somebody because sometimes you'll find out more just by a simple discussion, than you will listening to a lecture." Reiter-Palmon et al. (2019) confirmed this statement suggesting there are positive benefits of leaders and managers who value and encourage all levels of creative collaboration and individual creativity within their organizations.

Empowerment. Empowerment in a student-centered environment is one where instructors and students share power (Tan, 2001). One instructor described himself as a co-facilitator of instruction with his students. "This is a pivotal step in our adult learning journey because this is the moment where I choose to distribute the perceived power in the classroom vice retain it." Another example of an instructor's awareness of his positional power was revealed during interviews. He explains how he transitioned students toward a more learner-centric and neutral power position. "The first week [their questions] are directed at me because they're so used to that traditional model, [they] have to talk to the position of power." He described how he used wait time to neutralize the power differential and eventually students understood. Tan's (2001) study of teachers' perceptions of useful creativity activities revealed student-centered learning environments enhanced empowerment which enhanced creativity.

Cultural Empathy/Cultural Awareness

Cultural empathy is an appreciation of similarities and differences of other cultures. Cultural awareness is recognition that there are similarities and differences between and among cultures. The findings revealed evidence of cultural empathy/cultural awareness prominently

emerging from all three data sources. Using real-world relevant examples in interviews and observations, instructors reinforced course content with examples from their military experiences around the world. One instructor described facilitating a transformational moment for students when they become more aware of the perspectives of other cultures. During a Cultural Meanings class students realized "hey, how are the Chinese viewing this? We don't know, let's go find out about the Chinese and how they view things." Implicit theories of creativity support examples of cultural awareness and cultural empathy in the findings. Niu (2019) conducted a literature review of implicit theories of creativity to understand cultural similarities and differences between and among Eastern and Western cultures. His findings suggested creativity concepts deemed important are influenced by the worldviews of that culture and more specifically "along the lines of individualism and collectivism" (p. 455). Niu's (2019) study supported another example of an instructor facilitating a class discussion on cultural awareness. "In all of our military planning for operations, how many times did we include Afghan representatives from their military or government in the planning? The answer is, we haven't really done it." The cultural aspect of creativity and how different cultures value creativity and creative thinking is supported by the creativity research of Lubart et al. (2019). Examining creativity in a cultural context they reviewed a sociocultural and a cross-cultural approach within multiple creativity contexts. Their research suggested culture had a positive impact on creativity. "Exposure to multiple cultures and/or multiple languages is beneficial for creativity (p. 436). During interviews one instructor shared that attempting to understand another culture from another perspective can be challenging. "It's kind of tough, especially when we look at cultural empathy because you do have to suspend your own biases and you have to suspend your own values to think in a manner of either a friend or an adversary." He added,

we start drawing up these plans of how we're going to defeat the

Russians from our foxhole in Kentucky. How many Polish officers

do you have with you to facilitate that discussion who might say

hey, that's a great idea, but this isn't going to work and I'll tell you

why.

These examples suggest cultural empathy and cultural awareness are present in the learning environments cultivated by these instructors.

Thinking Styles

The creativity attributes of the thinking styles construct, legislative teaching style, self-awareness/self-reflection and metacognition emerged from the data analysis for this research. These attributes emerged in varying degrees from the data sources suggesting the thinking styles construct is evident in the learning environment created by these instructors.

Teaching Style

Teaching style encompasses teacher personality, instructor-student interactions and instructor selected methods and strategies (Sternberg and Lubart, 1995). One of the instructors shared an example of the learning environment he created. "I employ a variety of learning techniques and seek out ways to integrate technology. I found that variety is critical to gaining and maintaining classroom engagement." Tsai (2012) supported this example stating "most important teachers as facilitators should provide opportunities for active engagement by learners (p. 87). Additionally, Tsai's (2012) review of creativity research revealed, from the student's perspective, teaching styles and methods were important factors in cultivating creative thinking, specifically teaching styles that are friendly, confident, encouraging, competent, and enthusiastic. Specific examples of instructor selected strategies to maintain student engagement are supported

by Tsai's (2012) claim. "Video, word cloud, breakout groups, polls, anonymous stuff, and …

changing the pace of things just to keep engagement." Another instructor shared how he used

student examples to personalize instruction making connections with students during class

discussions, private conversations, or in written journal exchanges.

> I think I put more of a personal touch to their understanding. It's
>
> not just some academic or a professional reading that says it, it's an
>
> engaged discussion and it's challenging held views of an
>
> individual, and I think that's the beauty of small groups, that
>
> interaction. If we go down a rabbit hole it's okay, because that
>
> rabbit hole is triggered by an experience of what the material gets
>
> at.

 Fan and Cai (2020) stated, "there is reasonable evidence from a number of studies indicating

that creativity can be stimulated by teachers' positive behaviors and attitudes … and strong

facilitation skills" (p.2) providing additional support for this attribute.

Self-Awareness/Self-Reflection

Self-awareness is consciously understanding one's own beliefs, values, and opinions.

Self-reflection is introspectively assessing oneself and adjusting accordingly. Brookfield (2006)

refers to these attributes as "mindful teaching" (p. 28). In the context of creativity, Karwowski et

al. (2019) identified self-awareness and self-reflection in the context of ones' understanding of

their own creativity. Reflecting on their own creativity instructors did not identify having

anything more than average creativity and having very limited exposure to creativity in the

military. Therefore Karwowski's et al. (2019) explanation of creative self-awareness, creative

self-confidence, creative-self-belief are not supported by these examples but should be

considered for future research. Instructors modeled self-reflection and self-awareness throughout the entire course, beginning on the first day when they conducted their WAI. Reviewing student journal entries on a weekly basis provided instructors opportunities to interact with students on a personal level while gathering collective knowledge from the journal entries to inform their instruction.

Instructors were candid during interviews openly reflecting on their instruction and teaching style, explaining what they did well and what they could improve. Instructor self-reflections and self-awareness are supported in the literature of Brookfield (2006), who's second assumption of skillful teaching is critical reflection, which extends beyond self-reflection and recommends instructors reflect through the lens of the students, colleagues, and literature resulting in a more critical or comprehensive reflective process. One instructor shared his reflection on class activities he conducted with students during his Mental Models and Framing class. He explained he wanted to provide an engaging environment, especially in a virtual classroom. He shared his dislike for authoritative teaching styles explaining he avoids using slides whenever possible and attempts to "keep up the tempo" to manage student attention and focus. He compared his facilitation of instruction to a salesman. "I'm like a salesman competing for your interest and time." Consensus among instructors was that the curriculum is merely the vehicle driven by the students and guided by the facilitator to experience the RTMC journey. Daly et al. (2014) described self-reflection as "the ability to reflect on the course of one's efforts and make corrections or consider new steps." (p. 432). Their research revealed engineering instructors who were self-reflective and self-aware were more apt to teach creatively and encourage creative thinking in their learning environments. One of the instructors shared his reflection on teaching. "The more you teach the more you start to think about all the context of

the classroom and the environment of the classroom and every piece of it, how it all fits together in the classroom." Another instructor shared how he took the time to self-reflect and how his self- awareness guided his reflection. "I think one of the key things is, I've thought about teaching. And, you know, I've really thought about it. I said hey, what is the best methodology here, given my personality, because that's a key element." Daly's et al. (2014) research supports this claim. Their research suggested instructors who are more self-aware and take the time to reflect on their teaching are more flexible and willing to adjust to meet the needs of their students.

Metacognition

Examples of metacognition or thinking about your own thinking were shared by instructors during interviews and observations. Nickerson (1999) described metacognition as "a matter of paying attention to one's own thought processes and taking responsibility for one's thinking" (p. 417). Reflecting on how he teaches and models metacognition, one instructor shared, "before you start thinking about thinking, you have to figure out how you think about things." Another instructor explained metacognition to the class as "one person's truth is not necessarily someone else's truth, and you must be aware of that." Csikszentmihalyi (1996) provided support for these examples stating, those who can provide their own feedback do not need to rely on others for redirection or affirmation; they adjust accordingly, and they are able to think metacognitively. While Karwowski et al. (2019) consider metacognition a subcategory of self-awareness the findings revealed evidence of metacognition in the thoughts, reflections, and learning environments of these instructors.

Critical/Creative Thinking

The findings suggest the six constructs of the investment theory of creativity are evident in the learning environments of these instructors. Csikszentmihalyi (1996) suggested creativity is the result of multiple factors coming together at the right place and the right time. Instructors cultivated creative learning and thinking through their facilitative style, their willingness to share personal experiences, their ability to suspend judgement so students' opinions were valued, and their use of a variety of instructional strategies to sustain student engagement. Chambers (1973) identified similar traits of higher education instructors perceived as facilitators of creativity in their learning environments to support this claim. His study of 671 instructors revealed instructors were more likely to be identified as facilitators of creativity if they treated students equally and respectfully, developed positive teacher-student relationships, taught enthusiastically, encouraged student discussion, and were flexible in their teaching style (Chambers, 1973).

The ALC-TE provides documentation for creative learning and thinking in Army education and training. "Creative thinking involves creating something new or original; thinking in innovative ways while capitalizing on imagination, insight, and novel ideas." (Department of the Army, 2017, p. 21). One instructor provided a creative option to students for an end of day activity. Students could either sum up their thoughts in six words or less or write a haiku. The instructor was introduced to haikus as a Red Teaming Education student. He decided to use it because "it's just something you would never expect in a military school."

The Red Teaming Education instructors in this study cultivated creative learning and thinking through their intentional facilitation of learning, their intentional selection of instructional methods and strategies supporting course content, their cultivation of mutual respect

and trust in the learning environment and fostering climates where students were empowered. Their cultivations of creative learning and thinking occurred implicitly through the six creativity constructs of the investment theory that emerged from the findings. Examples of the six constructs of the investment theory support their existence.

Evidence of the creativity attributes embedded within the six creativity constructs of the investment theory of creativity emerged through the findings of this research. "Creativity does not stem from some single, general ability, nor from a totally domain-specific ability, but rather from a confluence of resources, with differential contributions across domains" (Sternberg & Lubart, 1991, p. 5). It is important to restate that it is the confluence of all six constructs, evident in varying degrees, that is needed for creative thinking to emerge. "When we consider the different elements of the investment theory of creativity, we can build supportive environments that help students to build their knowledge, use their abilities, and take risks (Kettler, Lamb, & Mullet, p. 42).

Challenges of Teaching Virtually

One theme that recurred from the findings was the challenges of the virtual learning space. Previously explained, under normal conditions, this course is taught in-person with significant student interaction and collaboration. However, due to COVID-19 restrictions the course was taught virtually. Instructors were frustrated by the challenges of teaching this course virtually and mentioned their concerns repeatedly. One instructor shared there were tools he could not demonstrate in the virtual learning space. He mentioned the virtual space is a detriment to "free-flowing conversation that you would have in the classroom." Another instructor shared the virtual environment stifled student discussion and thoughtful interactions in response to questions. "Oftentimes on the virtual side it's really hard to get the interaction. That's really the

point of Socratic learning and this medium does not lend itself to it so there's a lot of one-on-one participation." Due to the uncertain nature of the COVID-19 pandemic many of the virtual learning options were created as "emergency remote teaching options" (Adedoyin & Soykan, 2020) and considered temporary solutions. Another challenge was attempting to conduct discussions when students' cameras were turned off. One of the instructors shared a creative modification they made to *observe* students processing a small group activity. Due to the security constraints associated with Microsoft Teams DOD instructors were unable to virtually move in and out of small group activities conducted in break-out rooms. To mitigate this challenge instructors worked collaboratively to develop a live template to view students' idea generation while in small groups. While teaching virtually emerged as an additional theme in the findings it is interesting to consider the emergence of creativity attributes of tolerance for ambiguity, perseverance, collaboration, openness to ideas, sensible risk-taking, growth mindset, intrinsic motivation, redefining problems, insight, and problem-solving in this context.

Challenges of the Theoretical Framework in a Military Context

While the investment theory of creativity provided a viable framework to study how instructors cultivate a climate for creative learning and thinking, the military context provided some unexpected challenges. Instructors were uncomfortable and unable to discuss their perceptions of creativity. In fact, discussing their thoughts on creativity and creative thinking was difficult for them, often deferring to more comfortable topics like critical thinking. I did not anticipate this and it did not emerge as an issue during my pilot study or in any previous discussions with former students, instructors, or program directors. One reason may be that while creative thinking is part of the ALC-TE shaping military education through 2040, and military

leaders at the highest levels have stated we need leaders who think creatively, it has not trickled down or been clearly defined or operationalized for lower-level leadership.

In a military context, which is hierarchical and masculine dominant, critical thinking is more systematic, logical, and analytical, while creative thinking is considered softer and more abstract. In military education literature critical thinking is far more prolific, while any mention of creative thinking in the limited literature written on this topic merely emerges within the context of critical thinking (Cornell-d'Echert, 2012, Dietz & Shroeder, 2012; Hoffman, 2017; Persyn & Polson, 2012; Van Der Werff & Bogdan, 2018; Zacharakis & Van Der Werff, 2012).

This finding does not imply that instructors were not cultivating creative thinking. They were merely doing so implicitly through their facilitation of learning, their selection of instructional strategies to support course content, their cultivation of trust and mutual respect in the learning environment and fostering a climate where students' ideas and opinions were valued. To move forward with the creative thinking objective set forth by the ALC-TE, military education could benefit from operationalizing creative thinking and replicating the instructional practices of the Red Teaming Education program.

Implications for Practice

This study sought to understand how instructors cultivate a climate for creative learning and thinking in an adult learning environment. Using the creativity constructs of the investment theory of creativity (Sternberg & Lubart, 1991) the findings suggest evidence of all six creativity constructs. Creative thinking is explicitly identified in Red Teaming Education course documents suggesting support for instructor professional development programs that explicitly address cultivating creative thinking in adult and higher education programs.

There are three implications for practice. First, most of the research on creativity has been conducted in P-12 education. This research could inform instructor education and training programs at all levels, while informing the current discourse on how to leverage creative capital by retaining the most innovative and creative members across all domains (Florida, 2019; McWilliam & Dawson, 2008; Sternberg & Kaufman, 2018). Second, instructor development programs in adult and higher education need to train instructors how to teach for creative learning and thinking (Sternberg, 2019). Allowing instructors the freedom to delve into creativity and implement instructional strategies that support creative learning and thinking will help them understand the value of cultivating creative learning and thinking in their learning environments. Providing more creativity training and awareness for instructors could help prepare students to meet societal demands for creativity and innovation.

Third, creative thinking needs to be operationalized for military education and training. While the military emphasizes critical thinking, there is an expectation set forth by the ALC-TE to cultivate creative thinking. Professional development and training programs for military instructors and trainers are needed to increase creativity knowledge and develop skills so creative learning and thinking are understood and can be cultivated in military learning environments. Learning how to cultivate creative learning and thinking and how creativity scaffolds the concepts of critical, creative, and agile thinking complements the demand for more agile and adaptive military learners and leaders outlined in the ALC-TE.

This research could have social, political, economic, educational, and military implications. Instructor education programs at civilian institutions of higher education and across the entire realm of Army training and education, a total of 85 institutions within the Army exclusively, could benefit from understanding how instructors cultivate climates for creative

learning and thinking and how creative thinking scaffolds the attributes of agile learning and teaching to complement the need for more agile and adaptive learners and leaders, not only in the military but in all aspects of life (United States Army Combined Arms Center, Army University, 2015). As organizations, education, and the military form partnerships to navigate, innovate, and thrive in a complex world, the implications for understanding how to cultivate climates for creative learning and thinking are vast.

Recommendation for Future Research

This qualitative case study was conducted with three instructors of the Red Teaming Education Program to understand how instructors cultivate a climate for creative learning and thinking for adult learners using the six creativity constructs of the investment theory of creativity (Sternberg & Lubart). While the findings of this research suggest creative thinking was cultivated in this context, the study was limited by the military context as well as by the interviews, observations, and documents of a small sample of instructors. Due to the limited amount of research in this domain, there are several suggestions for future research.

- The sample of instructors was homogenous. Conducting a similar study with a heterogenous group of instructors could provide insight into any similarities or differences about how creativity is cultivated by comparing instructor attributes.

- Conduct research with other military education instructors. Administer a creative self-assessment (CSA) survey at the beginning of the study to provide more insight into instructors' perceptions of creativity. Karwowski's (2011) Short Scale of Creative Self (SSCS) would be appropriate for a military context.

- Conduct similar qualitative research and include student pre-and post-course CSA surveys using the SSCS (Karwowski, 2011) to understand more about how climates conducive to creative learning and thinking influence student learning.

- Conduct additional qualitative creativity research to support a deeper understanding of instructors' perceptions of creativity and how those perceptions influence how they cultivate creative thinking for adult learners.

- Conduct a similar study with adult learners and/or adult educators in a different context using the six creativity constructs of the investment theory of creativity.

Conclusion

This research was conducted to understand how instructors of the Red Team Member Course cultivate a climate for creative learning and thinking for adult learners. The investment theory of creativity (Sternberg & Lubart, 1991) provided the theoretical framework for this study. Creative thinking occurs when the six creativity constructs of the investment theory of creativity converge (Sternberg & Lubart, 1991, 1995). The findings revealed all six creativity constructs of the investment theory of creativity were present, in varying degrees, in the learning environments of instructors of the Red Team Member Course. The convergence of the six creativity constructs from multiple data sources provided further evidence of how instructors cultivated climates for creative learning and thinking for adult learners in a military learning environment.

This research attempts to fill the gap in creativity literature and research to understand how instructors cultivate a climate for creative learning and thinking for adult learners, adding to the body of knowledge that the study of creative thinking is less about *what* creative thinking is and more about *how* we cultivate it. It is less about the instructional strategies for creativity and

167

more about understanding how those instructional strategies enhance creative thinking so that instructors can model creative thinking and cultivate a climate for creative learning and thinking for adult learners. Cultivating adult learning environments conducive to creative thought and creative action are essential to producing members of society and future leaders prepared to meet the demands of an uncertain world.

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Appendix A - Interview Questions

1. How do you define creativity?

2. How do you describe your values, belief, and understandings about creativity?

3. How do you describe your knowledge of creativity and creative concepts?

4. As a subject matter expert, how do you avoid a narrow focus and remain open to new ideas?

5. How do you motivate students to think creatively?

6. How do you create a learning environment that encourages students to be open to new experiences and ideas?

7. How do you create a culturally empathetic learning environment?

8. How do you model problem recognition and selection of appropriate solutions?

9. How do you cultivate a learning environment where students have the freedom to fail?

10. How do you model tolerance for ambiguity in the learning environment?

11. How do you model self-awareness in your learning environment?

12. How do you nurture cultural empathy in your learning environment?

13. How do you model metacognition in your learning environment?

14. How do you create an environment where students are intrinsically motivated?

15. How do you model perseverance and the ability to overcome obstacles and challenges?

Appendix B - Observation Protocol

Evidence of the six constructs of the Investment Theory of Creativity
(Sternberg & Lubart, 1991)

The instructor:	Field Notes
Personality	**Personality**
☐ Demonstrates relevant risk-taking ☐ Facilitates tolerance for ambiguity during class discussions and projects ☐ Demonstrates how to remain open to new ideas and others' perspectives during class discussions and activities	
Motivation	**Motivation**
☐ Facilitates learning by using multiple instructional strategies ☐ Demonstrates full engagement with the course content ☐ Encourages students to share opinions without retribution	
Knowledge	**Knowledge**
☐ Provides relevant examples ☐ Demonstrates foundational understanding of course material ☐ References various resources and materials	
Intellectual Abilities	**Intellectual Abilities**
☐ Synthesizes and explicitly explains course material ☐ Demonstrates how to identify a problem, generate solutions, and distinguish good solutions from bad solutions	
Environment-Student Centered	**Environment**
☐ Uses student knowledge and skill levels to drive instruction ☐ Modifies or changes instruction based on student needs ☐ Includes students in the development of class expectations and protocols ☐ Demonstrates cultural empathy and awareness	
Thinking Styles	**Thinking Styles**
☐ Models self-reflection and self-awareness using examples	

☐ Facilitates learning by using multiple instructional strategies to promote critical and creative thinking	

Appendix C - Informed Consent

A case study of instructors' cultivation of creativity in an adult learning environment

PROJECT APPROVAL DATE/ EXPIRATION DATE: Pending Approval

LENGTH OF STUDY: Six weeks.

PRINCIPAL INVESTIGATOR: Royce Ann Collins, Ph.D., Associate Professor, Adult Learning and Leadership, Educational Leadership Department

CO-INVESTIGATOR(S): Patricia Brown, doctoral candidate

CONTACT NAME AND PHONE FOR ANY PROBLEMS/QUESTIONS: Dr. Royce Ann Collins, (913) 307-7353

IRB CHAIR CONTACT INFORMATION: If you have any questions regarding consent to participate in this research feel free to contact one of the following Kansas State University Institutional Review Board Members:
Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, (785) 532-3224; Cheryl Doerr, Associate Vice President for Research Compliance, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, (785) 532-3224

PURPOSE OF THE RESEARCH: The purpose of this research is to understand instructors' perceptions of creativity while cultivating a climate for creative learning and creative thinking in an adult learning environment. Studying instructors' perceptions of creativity has the potential to provide a better understanding of the implicit and/or explicit effects instructors have on the learning environment. This research will focus on how instructors think about creativity and how they determine what methods to employ to foster creative thinking among students within their learning environments. This research has the potential to inform our understanding of how instructors' perceptions of creativity is situated within adult education, leader development, organizations and business, and military education.

PROCEDURES OR METHODS TO BE USED:
Data collection methods for this research include interviews, observations, and review of documents.

If you agree to participate in this research, you will be asked to participate in five semi-structured interviews ranging from 60 to 90 minutes, allow three virtual observations of your teaching using Microsoft Teams, and provide documents pertaining to your classroom instruction or professional development to this study. The interviews will be conducted using a password protected Zoom. Video files will be deleted, and the audio-recorded interview will be retained for transcription purposes. Audio files will be stored in a password protected file managed by the researcher. For the virtual observations the researcher will only collect observation notes. You will be allowed to review all transcripts and field notes for accuracy.

RISKS OR DISCOMFORTS ANTICIPATED: There are no expected risks or discomfort anticipated with this study. You may voluntarily withdraw from the study at any time.

BENEFITS ANTICIPATED: You may gain a better understanding of your perceptions of creativity and the influence of those perceptions on the learning environment. You could benefit from knowing your creative strengths as well areas you may want to improve. Becoming more self-aware of one's own creativity is a potential benefit of participation.

EXTENT OF CONFIDENTIALITY:
You will select a pseudonym that will be used for all documents and reports. Your name will not be used on any information or reports. You may withdraw from the research at any time. Interviews will be conducted over a password-protected Zoom. The researcher will screen-share the interview transcripts with you and will discuss and clarify information in the document during the interview transcript review. Only the researcher will have access to the information gathered for this research. All electronic documents will be maintained in a password protected electronic format for five years after publication of the dissertation. Passwords will be managed by the researcher exclusively. Hard copies of surveys, interviews, observation field notes, or documents will be kept in a locked cabinet in the researcher's home office and shredded three years after completion of the dissertation.

The information or biospecimens that will be collected as part of this research will not be shared with any other investigators.

Terms of participation: I understand this project is research, and that my participation is voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation, penalty, or loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form.

PARTICIPANT NAME: _____
(Please Print)

PARTICIPANT SIGNATURE: _____

Date: _____

WITNESS TO SIGNATURE: _____

Date: _____

Appendix D - Research Sub-Questions Alignment Table

Research Sub-questions	Interview Questions	Observation Protocol	Document Review
SQ 1. How do instructors demonstrate the personality construct?	4, 6, 9, 10, 15	Personality	Personality
SQ 2. How do instructors demonstrate the motivation construct?	5, 14	Motivation	Motivation
SQ 3. How do instructors demonstrate the knowledge construct?	1, 3	Knowledge	Knowledge
SQ 4. How do instructors demonstrate the intellectual abilities construct?	5, 8	Intellectual Abilities	Intellectual Abilities
SQ 5. How do instructors demonstrate the environment construct?	7, 9, 12	Environment	Environment
SQ 6. How do instructors demonstrate the thinking styles construct?	2, 11, 13	Thinking Styles	Thinking Styles