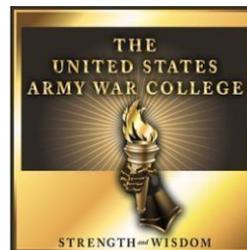# Strategy Research Project

Adaptive Training Model: Building the Critical and Creative Leader

by

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USAWC STRATEGY RESEARCH PROJECT

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Adaptive Training Model: Building the Critical and Creative Leader

> The goal is not to create students who can demonstrate the capacity to learn what is already known, but to develop students with creative and innovative minds, capable of solving complex and unfamiliar problems.
>
> —Unknown

Adaptive, critical, and creative thinking attributes in today's environment are essential components for solving complex, ambiguous, and rapidly evolving problems. However, friction between Generation X (GEN X) and Y hinders the military's ability to fully inculcate a training program that embraces the core foundations for building critical and creative thinking leaders. In order to solve this problem, the Army needs to change the culture of thinking in its senior leadership to understand the fundamentals of learning and their impacts on adaptive training, and to understand the nuances of the rising generation of leaders and consequences of the "old method" of training.

The complexities of the world create a demand for individuals who are capable of applying critical and creative thinking in the development of solutions to problems that challenge productivity, growth and dominance. "[Creative thinking] masters a process of making or producing, [critical thinking masters] a process of assessing and judging. When engaged in high-quality thought, the mind must simultaneously produce and assess . . . the product it fabricates."[1] Building adaptive, critical, and creative leaders starts in the early stages of their development. As they mature in knowledge and experience, these attributes become the cornerstones of their abilities to identify and solve complex problems in a volatile, uncertain, complex, and ambiguous environment.

Selecting, developing, and retaining critical and creative thinking leaders is not only a military objective. These leaders are critical assets in the civilian sector as well. Much like their military counterparts, who are constantly challenged in leading large and

complex institutions to maintain a competitive edge over their adversaries, critical and creative thinking skills in the civilian sector are high-priced commodity items to corporate executive officers and business managers who also compete for dominance in an environment of fierce and aggressive competition. To anticipate future requirements, and adapt accordingly, both organizations depend on the critical and creative ingenuity of their leaders. However, concurrent with the demands of the environment, cultural differences between the current and rising generation of leaders contribute to the challenges with developing critical and creative thinkers.

Cultural differences between the senior military generation (Xers) and the rising newcomers (Net Gens) present challenges with implementing adaptive training programs. Gen Xers are more comfortable using methods employed during their development as junior leaders (the instructor-centric, step-by-step checklist and rote memorization learning environments) and these methods are arguably valid when compared to the accomplishments attributed to these leaders over the past 30 years. Hence, the need to revise training and incorporate a more adaptive approach does not merit urgency for change based on what has worked in the past.

However, this instructor-centric method of learning is contradictory to the learning culture of Net Gen leaders whose preferences are opposite of the methodology employed on their predecessors. Net Gens prefer experiential learning versus regurgitation, interactive discussions versus lectures, and multimedia versus books. Without recognizing the cultural learning challenges of the Net Gens, Gen Xers will find difficulties in developing the critical and creative thinking attributes required to maintain our nation's competitive edge over its adversaries.

Relevance of Critical and Creative Leaders

The Army's directive on leader development emphasizes building leaders capable of leading Soldiers in an environment filled with unfamiliarity, vast information, evolving technology, dissolving traditional organizational boundaries, and ambiguity.[2] From a military perspective, a descriptive term for this environment is Volatile, Uncertain, Complex and Ambiguous (VUCA)--and today's leaders must be able to demonstrate the critical and creative thinking skills that enable them to understand and successfully overcome the dilemmas that a VUCA environment presents.[3] This is relevant not only to the military, but to the corporate world as well.

Both organizations constantly strive to maintain a powerful and dominant lead over their adversaries or competitors. Although major differences exist between their end goals--defense of the nation versus profitmaking--military and corporate leaders both agree on the requirement for subordinates who are capable of assessing, judging and, ultimately, producing innovative results that drive their organizations to a dominant position over their competitors.

In 2010, International Business Machines Corporation (IBM) conducted a Global Chief Executive Officer (CEO) Study of over 1,500 CEOs, general managers, and other various private sector senior leaders who represented different sizes of organizations in 60 countries and 33 industries.[4] In its conclusion, the study highlights three issues that challenge today's CEOs. First, the "rapid escalation of the complexity of the world" and, second, the unpreparedness of their ability to cope with the complexity of the global environment.[5] "Events, threats, and opportunities aren't just coming at us faster or with less predictability; they are converging and influencing each other to create entirely unique situations."[6] Finally, the study concludes that the majority of the CEOs identify

"creativity" as the key leadership competency to overcome the complexities of the enterprise market.[7] "These first-of-their-kind [unique situations] developments require unprecedented degrees of creativity--which has become a more important leadership quality than attributes like management discipline, rigor, or operational acumen."[8]

In addition to IBM's CEO Study, the American Management Association released a 2010 Critical Skills Survey asking Executives where they invested their training and mentoring programs in order to build successful, effective leaders capable of leading their companies in a complex global environment. Over 2,100 executives identified four "C" skills that were imperative for leading their companies in the 21st Century. Creativity was one of the top four, along with critical thinking (identified by 68% of the executives as the most important skill), collaboration, and communication. The study identified the rising pace of change as the leading problem.[9] According to the survey:

> The challenges companies face today are enormous: increasing global competition, emerging markets, rising energy costs, burgeoning healthcare costs, technology, the political and economic landscape. Employees need to be able to think fast and act smart--often in situations that are complex, uncertain, and [with] no effective policy or procedure. That makes critical and creative thinking a real necessity.[10]

Critical thinking, the study noted, is a necessary skill to help leaders come to a better understanding of the pros and cons of their intended actions in order to avoid costly mistakes.

Military and civilian leaders in today's VUCA environment require more than a mere ability to "react to contact." In a complex world, learned skills are required and they manifest themselves as innovation, strategic thinking, collaboration, comfort with ambiguity, analysis, and synthesis. With such demands, senior leaders should not rely solely on on-the-job experience to create critical and creative thinking leaders. Instead,

deliberate training must be implemented to force the practice of critical and creative thinking skills.

A Theory of Learning

To develop adaptive leaders with the capacity for critical and creative thinking, it is important to understand the science behind learning using two particular methods: behavioral and cognitive learning.

<u>Behavioral Learning</u>

Behavioral learning focuses on the application of positive or negative modifiers--reinforcement, punishment, and extinction--to shape an individual's behavioral response.[11]

Reinforcement strengthens and maintains a behavior.

With positive reinforcement the [instructor] helps the [student] identify indigenous and pleasurable reinforcers to be introduced as productive behaviors ensue. With negative reinforcement the practitioner helps the client identify and enact a negative stimulus that is removed only when productive behavior ensues.[12]

For example, an elementary school grading system assesses a child's performance in academics using a numerical grading program ranging from 0 to 100. The grade that the student receives determines the consequences of his/her behavior in future testing. In this particular example, a child receiving a low grade requires remedial training in lieu of a pleasurable activity such as recess, whereas a child who receives a high grade receives praise and recognition. The higher the grade, the greater the reward. In behavioral learning, the child learns that a higher grade equates to a better reward based on the effect of positive reinforcement and, therefore, seeks to achieve higher grades in future tests in order to embrace the positive reinforcing consequences.

In contrast to reinforcement, which emphasizes strengthening a particular behavior, punishment focuses on the cessation of an undesirable behavior. This particular modification involves positive and negative reinforcers. Positive punishment applies a reinforcer in response to an undesirable behavior. For example, the severity of the pain associated with a child touching a hot stove eliminates the behavior. In contrast, negative reinforcement restricts a behavior in order to eliminate or modify it. One example is the loss of video game privileges until the child's academic grades meet a specified standard. The major difference between the two modifiers is the timeliness of their application; positive occurring as a response, negative occurring to prevent.

Finally, extinction withholds reinforcement in order to modify a behavior.[13] "This comes up in practice when clients are rewarded in their social environment for unproductive or destructive behavior."[14] Extinction removes the stimulus that is causing the undesirable behavior. For example, a student's poor academic performance in class might be attributable to his social group. To modify his behavior (i.e., improve his academic performance), the instructor removes him from the social group in order to eliminate the group's positive reinforcement of his poor behavior.

<u>Cognitive Learning</u>

Cognitive learning is the "mental process of creating recognizable patterns in order to understand the environment."[15] Unlike behavioral learning, cognitive learning is not the result of consequences, but rather, the result of observation and synthesis.[16] "Children construct an understanding of the world around them, then experience discrepancies between what they already know and what they discover in their environment."[17] Although cognitive learning starts at an early age, there are two

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components of the theory that are applicable towards the development of critical and creative thinking leaders: schemata (mental maps) and the adaptation process.

Mental maps create an understanding of the environment and these maps, or schemata, define "a way of organizing knowledge . . . as 'units' of knowledge, each relating to one aspect of the world, including objects, actions and abstract concepts."[18] Dr. Jean Piaget, a Swiss psychologist and the first to conduct a systematic study of cognitive development, describes schemata as "a set of linked mental representations of the world, which we use both to understand and to respond to situations."[19] The environment fluctuates between states of equilibrium and disequilibrium depending on the stimuli and the depth of the individual's knowledge. When schemata exist to comprehend or resolve the stimuli, a state of cognitive equilibrium ensues until it is disrupted with the introduction of another stimuli (catalyzing disequilibrium).[20] From a scientific perspective, human nature seeks to resolve disequilibrium. This is when learning occurs.

The adaptation process consists of three phases: equilibration, accommodation, and assimilation. Equilibration is the primer for the adaptation process and occurs when no schema exists to understand and resolve a stimulus. In this circumstance, the unknown stimulus now forces the student into disequilibrium or the accommodation phase where s/he attempts to restore equilibrium by creating a schema. This critical and creative thinking event entails modifying an existing schema, combining schemata to create a hybrid or creating a new schema altogether. With success, the student eventually creates a schema and responds to the stimulus; assimilation occurs. The

resultant schema resolves the stimulus initiating the adaptation process and restores equilibrium.

| Equilibration (New Situation) | → | Accommodation (Schema Application) | → | Assimilation (Equilibrium) |

Figure 1. Graphic view of the adaptation process (author)

For example, through learned behavior a child recognizes a cat based on its characteristics--walks on four legs, small in stature, furry, has whiskers, a snub nose, and says, "meow." When confronted by a dog (a pug, for example), the child's initial response is "cat" because his/her cat schema recognizes features on the dog that are similar to a cat. However, when the dog barks, the child expresses confusion because his/her schema does not associate barking with cats. Therefore, equilibration occurs forcing the child from equilibrium to a state of disequilibrium with the introduction of the new stimulus. The child now faces a new problem, "What is this animal?" To facilitate learning, the child's mentor corrects the response by telling him/her that the cat is actually a dog. In turn, the child adapts his cat schema and creates a new one (a dog schema) which now associates the similar characteristics of the cat with the exception of how the animal communicates. Hence, the child is now capable of differentiating cats from dogs.

These two theories of learning are the basis for the development of critical and creative thinking leaders. The behavioral theory builds its foundation on the idea that learning occurs from three reinforcing consequences--reinforcement, extinction, or punishment--and the desire to embrace the action that yields the most positive results.[21] Cognitive theory, on the other hand, associates learning through observation and synthesis to achieve equilibrium between the presented situation and the individual's

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understanding of it. The resulting outcome produces a schema. In adaptive training, a hybrid of the two theories results in the deliberate introduction of a stimulus compelling students to apply critical and creative ingenuity in the application of a behavior to make sense of the environment or, in this case, to solve the existing problem. The consequence of the resultant action, and the associated reinforcement mechanism, modifies the student's behavior. In the end, the consequence of the student's action either produces a new schema (or behavior) or solidifies an existing one.

Developing the Critical and Creative Thinking Leader

These two learning theories are key components in the development of adaptive, critical, and creative thinking leaders. From one perspective, learning occurs in states of disequilibrium, forcing the student to apply a known behavior, a hybrid, or a new one in order to return to equilibrium. From another perspective, learning occurs as the student embraces or modifies a behavior depending on its associated reinforcing consequence. Combining the two theories, developing a behavior essentially resembles learning a skill (or logic map) through observation, synthesis and application to understand the environment or to solve a problem. During application, shaping the behavior using positive and negative forces continues until equilibrium occurs. The resulting success yields a new schema, further expanding the student's depth of knowledge. With the expansion of knowledge, the student becomes more astute in defining and understanding the environment. This approach defines the fundamental concept for the Adaptive Training Model.

Adaptive Training Model

This model exposes students to unfamiliar problems forcing them to develop schemata. Its premise assumes that the students will not recognize a problem if they do

not have the mental map, or do not possess a previously learned skill set, to do so (i.e., a pug is a cat unless learned otherwise). Hence, to create the behavior, training occurs in a simulated VUCA environment forcing the deliberate application of critical and creative thinking. To facilitate learning, an instructor assumes the role of coach, teacher, and mentor to guide the students in discovery learning and provide behavior modifiers where appropriate. The outcome of the training model creates leaders with the schemata and adaptive traits to discover and solve complex problems similar to the way a doctor uses his medical skills to recognize and fix medical problems.

Three basic fundamentals form the foundation for adaptive training and development:

- Self-development. The student must have a desire for self-development through independent research, self-study, and experiential learning.

- Facilitator. The instructor facilitates learning by creating a climate that fosters self-study, research, group discussion, idea sharing, and active participation.

- Adaptive training environment. Disequilibrium dominates the adaptive training environment, compelling the student to seek equilibrium with the application of critically and creatively developed solutions.

Research, self-study, and experiential learning

Students must have access to a library of knowledge and must be capable of applying it to new challenges and situations. "Being an independent, lifelong learner and knowing how to access and analyze information is far more important than rote learning of specific academic content."[22] They need to approach problems as learners in contrast

to knowers and "[they] need to be curious versus thinking 'I know the answer' [because] yesterday's solution does not solve tomorrow's problem."[23] Leaders must be able to operate in a dynamic environment. Their ability to apply abstract knowledge "to solve a problem and to develop and execute a solution" is attributable to the breadth and depth of their knowledge.[24]

Instructors Facilitate Learning

Instructors guide discussion. Enacting this role helps the student to solve problems. They "lead discussions, asking open-ended questions, guiding the process and task, and enable active participation of learners and engagement with ideas."[25] This is a unique change from previous methods of instruction where the instructor "presents every aspect of the course or . . . controls how information is presented or re-presented for evaluation."[26] In adaptive training, instructors serve as guides and mentors. Although academic experts, they observe students "as they learn, respond to direct questions, and guide [them] forward in their learning process" by encouraging the use of learning venues such as group interaction, interactive media, social networks and self-study.[27]

Creating the Training Environment

Diminishing Effects

Line of Failure

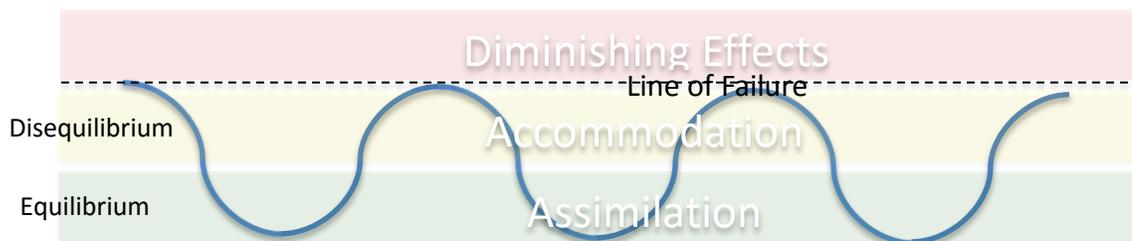Disequilibrium

Accommodation

Equilibrium

Assimilation

Figure 2. Adaptive Training Model (author)

To build adaptive leaders, the training environment must include states of equilibrium and disequilibrium to capitalize on behavior development. In Figure 2, the Adaptive Training Model, a wave curve illustrates the disequilibration with the

introduction of a catalyst, forcing a transition into disequilibrium (or the optimal learning environment) until the learned behavior restores equilibrium. The "Line of Failure" defines the role of the instructor, who ensures that the level of difficulty in solving the stimuli does not exceed the student's capabilities, resulting in a diminishing effect on the student's willingness to learn.

The adaptive training environment--delineated by two axes, learned and unlearned behavior/known and unfamiliar problem--stresses the students' analytical skills often leading to the development of hybrid behavior or the development of a new behavior based on self-study; all predicated on the application of critical and creative thinking.
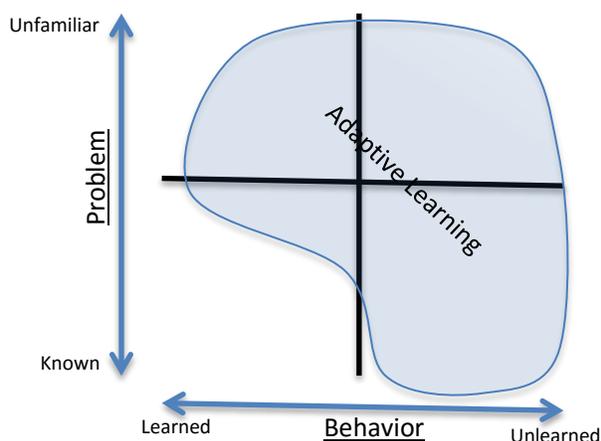
Figure 3. Behavior vs Problem and relationship to adaptive learning (author)

Learned Behavior, Known Problem

This model portrays the development of a student's behavior by deliberately associating it to a corresponding problem. For example, the task is the application of a tourniquet, the condition is a casualty with profuse bleeding from an appendage, and the standard is to stop the bleeding. The instructor presents the student with a problem

(a casualty with profuse bleeding) but then associates the problem with instructions on how to solve it (the application of a tourniquet). From the training model, this technique for developing critical and creative thinking leaders is the least effective method. A Gen Xer would associate it with "old school" learning methods; instructor-centric, step-by-step instructions, and rote memorization. In contrast to these methods, the fundamental approach to adaptive training forces the student into a state of disequilibrium, requiring critical and creative thinking to understand the problem, develop a solution, and apply it. However, despite the absence of disequilibration in this model, the deliberate approach of teaching a skill and associating it to a problem provides a foundation for building a library of knowledge or schemata.

Learned Behavior, Unfamiliar Problem

This training venue creates disequilibration by introducing a stimulus that is initially unfamiliar to the student. Its intended purpose is to force the application of critical and creative thinking to find the appropriate schemata contained within the student's library of knowledge, and apply it to the problem. Using the previous training scenario, for example, the instructor modifies the event by withholding instructions on the casualty but sets the conditions for the students to identify the problem with little to no assistance until the appropriate schema is selected. The objective of this training model is to help the students become more proficient in applying their learned skills to recognize a problem, solve it and, eventually, solidify their behaviors using the resultant behavioral learning reinforcers.

Hence, the application of critical and creative thinking in determining which schema solves the problem becomes the overall adaptive training outcome, and the subsequent positive or negative reinforcement of the consequences of the applied

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action solidify the learned behavior. From the instructor's perspective, the initial unfamiliarity with the situation invokes disequilibration forcing the students to progress towards a "line of failure" as they attempt to select the proper schema for the problem at-hand. To mitigate this progression, the role of the instructor as a facilitator becomes an important training factor. Using techniques to stimulate the student's critical and creative thinking attributes, the self-discovery responses create 'setbacks' delaying the student's progression until the discovery of the appropriate schema occurs. In the end, this method of adaptive training teaches students to sort through learned behaviors to recognition and resolve unfamiliar problems.

Unlearned Behavior, Known Problem

This model seems contradictory to the learning theories, proposing a training program that introduces a recognizable problem without an existing schema. It provides a stimulus for disequilibration but the inherent nature of the stimulus does not associate *directly* to any of the students' schemata. For example, a round-peg-round-hole schema enables the student to associate how to solve a simple problem when given a round peg and a round hole; the peg fits in the hole and equilibrium continues. On the same note, a knife-carves-wood schema enables the student to associate a knife as a tool to carve wood. By introducing a familiar problem, a square hole, the ensuing disequilibration allows the students to recognize the problem due to its familiarity with their existing schema. Given a knife, how would they respond to a square hole? This adaptive model forces them to develop a hybrid schema combined from the 'skills' in their library of knowledge. By possessing schemata to associate round pegs with round holes and knives with carving, the students learn to apply critical and creative ingenuity, and create a hybrid solution--either carve a round hole or carve a square peg. Unlike

the previous training model, which focuses on the identification and application of a learned schema, the outcome for this venue forces synthesis and innovation to create a hybrid one, ultimately leading to an expanded library of knowledge for application in more complex training events as it continues to grow.

Unlearned Behavior, Unfamiliar Problem

This particular model places a heavier emphasis on the students' analytical skills. It introduces an unfamiliar stimulus forcing the students to apply research, analysis, and synthesis in the development of an applicable schema. In contrast to the previous adaptive training model, where a familiar problem resulted in the creation of a hybrid schema, this particular model presents students with an unfamiliar problem and a requirement to research the solution. The major difference between the two is the application of a hybrid solution in the previous model versus the self-discovery of a new one in this model. An example is ethics development where disequilibration occurs with the introduction of an unfamiliar case study forcing students to apply research and analysis in developing a solution to resolve the ethical problem. The emphasis on research stimulates critical and creative thinking, compelling the students to use multiple venues such as the Internet, multimedia, books, interviews, etc., to gather information related to the particular problem. The application of the resultant discovery and the associated positive or negative reinforcement (feedback from peers, from the instructor, or the consequences of the schema's application) solidifies the applied schema. Ultimately, the outcome for this training model teaches the student that critical and creative development can be achieved through self-discovery learning and, in some cases, without the need for an instructor to facilitate learning.

Generation X versus Generation Y

The generation of leaders serving in senior and mid-career positions, and the new generation of leaders arriving to the service presents a source of friction for the implementation of adaptive training.

Today, Gen Xers serves in brigade and battalion level positions. They are the key influences in the development of the next generation of junior leaders entering the service. Born between the early 1960s and 1980s, the Gen Xers consider themselves to be a stubborn generation.[28] They arrived to the workforce accustomed to multitasking with the advent of cell phones, video games, and the laptop computer, and they saw the utility in the application of technology to replace the analog work habits of their Baby Boomer predecessors.[29] Gen Xers were not intimidated to stand alone in the implementation of organizational change, which may have been contrary to the status quo.[30] This stubbornness is attributable to two factors that heavily impacted their childhood years. First, they grew up during a time of increased divorce rates in the Baby Boomer generation. Second, as women entered the workplace in large numbers, Gen Xers became the "ultimate latchkey children" developing a survivor mentality living alone and relying on themselves in the absence of their working parents.[31] They are skeptical about authority, originating from a "lack of confidence in the people and institutions that let them down repeatedly."[32] In contrast to the Baby Boomer generation, who were nurtured under the ideal nuclear family setting, "quality time" for a Gen Xer was seldom, meaning they learned to "trust only themselves."[33]

Today's up-and-coming generation of young leaders are the Millennial (or Network) Generation and they are unique compared to the generation serving in senior leadership positions. The "Net Gens" were born after 1980 and they have unique

characteristics such as multitasking (the ability to talk, text, surf, and scan simultaneously), a constant craving for connection to others, and the need for instant gratification (an artifact of the high-speed internet).[34] Statistically, over 90% of this generation uses the digital network to work, communicate, socialize and learn, and they are able to accomplish these feats simultaneously.[35]

The Net Gens crave information and prefer learning more from group discussion and web surfing than from textbooks and lectures, and, in lieu of long reading assignment or long "text-based" step-by-step instructions, the Net Gens prefer graphic layouts.[36] They also prefer to conduct their research on the Internet instead of the "old school" alternative of going to the library. In essence, these individuals prefer multimedia to books and videos to photographs; all obtainable on the worldwide web.

In contrast to Net Gens, Gen Xers tend to be structured, punctual and linear, whereas Net Gens prefer autonomy.[37] In the performance of a task or a project, Gen Xers are more risk averse preferring to research the problem and prepare a solution before validating it, which is unlike the Net Gens who tend to approach the same problem with a discovery learning mindset until the solution is found.[38]

> [Gen X] tends not to want to try things unless or until [they] already know how to use them. If [they] don't know how to use the appliance or software, [their] instinct is to reach for a manual or take a course or call up an expert . . . The [Net Gens] want to turn the thing on, get in there, muck around, and see what works. [They] get on the Web and link, lurk, and watch how other people are doing things, then try it for themselves.[39]

The differences between Gen Xers and the Net Gens present challenges in reshaping how today's leaders will be developing the adaptive and innovative qualities of the new generation of leaders, equating to new learning methods:

- The Net Gens learn through multimedia, classroom discussion and "information navigation."[40]

- They associate learning as a discovery-based environment versus "an authority-based, lecture-oriented school."[41]

To harness the full potential of the Net Gens, Gen Xers must recognize the "paradigm shift" and embrace it. Successful organizations naturally resist change. However, the nature of the VUCA environment requires critical and creative thinkers, yet the systems for training and developing these skills across generational differences are not in synch. It requires a fundamental cultural shift in how the Army approaches training and development.

Implementing Change

The military's dominant concept of war originates from "when the service last displayed its institutional competence and power at its very best" and this concept drives the military's inherent resistance to change--inferring that Gen Xers are hesitant in adapting new training methodologies due to their association with "things that have worked in the past."[42] They are more adept to teach "what" to think versus "how" to think due to their own particular behavioral development in "an authority-based, lecture-oriented school."[43] Although contradictory to the adaptive approach for teaching the Net Gens, the "old school" method for developing Army leaders did contribute to the reformation of the Army Non Commissioned Officers corps in the post-Vietnam era, the development and implementation of the AirLand Battle doctrine, the end of the Cold War, and victory in Operation Desert Shield/Storm.[44] Thus, the justification for a revision

in leader development presents a valid anti-innovation argument from the current generation of senior leaders.

However, this does not imply that changing the military culture is without possibility. One option emphasizes that leaders prioritize the fundamentals of adaptive training at the institutional and organizational levels using the old adage "that units do best what the [leader] checks."[45] Leaders must communicate the relevance of critical and creative thinkers. They must implement programs to inspect the application of adaptive training in the subordinate commands and institutions reviewing programs of instruction, training assessments, and other feedback mechanism such as focus group feedback. With consistency, this emphasis eventually permeates the subordinate commands holding the institutions and organizations accountable to their leaders, achieving cultural change.[46]

Another option inculcates a sense of urgency, denoting that the development of critical and creative thinking leaders is paramount to the success of the military and security of the nation.

> Today's world cannot be understood through the lens of the 20th century security paradigm. The nature of instability, conflict, and war has evolved dramatically beyond conventional fights between armies of nation states. An examination of the conflict trends since the end of the Cold War provides empirical evidence of . . . patterns of irregular conflict and instability. These trends constitute a pervasive part of a complex 21st century international security environment that differs markedly from the ways the US . . . prepared for armed discord during the 20th century.[47]

The VUCA environment epitomizes the rapid escalation of the complexity of the world. As it grows more complex, the urgency for critical and creative thinkers remedies the growing concern of the Army's ability to cope with the complexity of the global environment.

Finally, modify an artifact that reflects a leader's potential for promotion and "increased" responsibility--the evaluation report. Leaders must justify how their subordinates are performing in the application of adaptive training within their organizations and in their personal development as critical and creative thinkers. Implement the requirement for leaders to justify the subordinate's critical and creative thinking skills as a measure of future potential. How did the rated individual develop adaptive leaders? How did the rated individual demonstrate the critical and creative thinking qualities needed for positions of increased responsibilities? As a common denominator for promotion in the military, modifying the evaluation system has a strategic impact that penetrates not only the Army culture but also its sub-cultures (operational force, generating force, combat arms, special operations, etc.).

As these embedding mechanisms shape the culture of the organization, additional reinforcing mechanisms can facilitate the transformation. One example is to focus on symbols such as important events and people that exemplify the hallmarks of critical and creative thinkers, like Captain William D. Swenson and other Net Gens who are recipients of the Congressional Medal of Honor.[48] They are the next generation of leaders whose "get in there and see what works" approach to learning highlight a necessity for educational reform if the Gen Xers want to capitalize on the unique characteristics and potential of the next generation.

Another option emphasizes organizational restructuring to reinforce the implementation of adaptive training. Similar to Sexual Assault Response Coordinators or Master Fitness Trainers, creating "Adaptive Master Trainers" anchors an institutionally-trained expert to the organization who provides expertise in adaptive

training development and objective feedback to commanders on the effectiveness of the unit's training programs.

With the rising influx of Net Gens joining the ranks of the military and the new security paradigm of the 21st Century, the importance of critical and creative thinking leaders is a necessity for maintaining a competitive edge over adversarial threats to the nation. This necessity requires a new approach in the development of adaptive, critical and creative thinking leaders.

Conclusion

The development of leaders possessing the critical and creative thinking capacities to solve complex problems in a VUCA environment is an important component in leader development. Two of the learning theories which best support this development are cognitive and behavioral learning. Behavioral learning is a consequence-based development program where positive and negative reinforcement, extinction or punishment modifies behavior. Cognitive learning uses observation, interaction, and the environment to provide the student with a behavior (or mental map) to appropriately respond to a particular situation or problem. As the student matures, these behaviors multiply where, eventually, a library of knowledge is created for recognizing and solving complex problems. Using these learning theories in an adaptive training model, the student learns to apply critical and creative thinking in the synthesis and application of behaviors in problem-solving training events. The complexity of the training models--learned and unlearned behavior/known and unfamiliar problem--stress the students' analytical skills often leading to the development of a hybrid behavior or the development of a new behavior based on self-study; all predicated on the application of critical and creative thinking. However, cultural differences between the

current generation of leaders serving in battalion and brigade level positions (Generation X) could be a source of friction in the development of junior leaders (the Millennials) joining the service today. If not addressed, the "old method" of teaching-- rote memorization and step-by-step checklist assessment--which has proven to be a valid learning method (AirLand Battle doctrine, victory over the Soviets in the Cold War and the Iraqis in Operation Desert Shield/Storm) will continue to dominate today's method for developing tomorrow's critical and creative thinkers.

Endnotes

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[48] Captain William D. Swenson is a recipient of the Congressional Medal of Honor for demonstrating adaptive, critical and creative thinking on the battlefield resulting in the disruption of an aggressive and overwhelming force. His ability to assess, modify and apply a course of

action to defeat the enemy and save the lives of his Soldier under extreme pressure are indicative of the Net Gens' adaptive nature.