

**Innovation Versus Adaptability:
Seizing the Initiative Through Creative Thinking
Versus Reacting to the Enemy**

**A Monograph
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Abstract

Innovation versus Adaptability: Seizing the Initiative Through Creative Thinking Versus Reacting to the Enemy by COL Glenn K. Grothe, US Army, 54 pages.

Whether adjusting to a new environment or to an evolving threat, America's Army of the 21st century must be adaptable and become more innovative. The operational environment is becoming more complicated and complex. Societal trends, such as globalization and the impact technology has and continues to have are some of the trends that contribute to this complexity, leading to numerous challenges for an operational force. Whether faced with a thinking and dynamic enemy or an unfamiliar and challenging environment, Army forces must be able to adapt but also—and perhaps more importantly—to innovate in order to maintain the initiative. To facilitate and improve organizational change that produces leaders who are innovative as well as adaptive the Army must institutionally reevaluate how it trains, educates and develops field grade leaders, in order to ensure that they are innovative and adaptable and moreover, that they are willing to underwrite risk and reinforce innovation of subordinates within their organizations. This is perhaps even more critical as it will enable innovation throughout the institution and potentially transform or fundamentally change the approach to officer education.

Army leadership doctrine addresses innovative and adaptive leadership but could do this more effectively. Corporate approaches to innovation within the contemporary business world are relevant, even though there are distinct differences between corporations and the Army. Learning organization behavior, the concept of complex-adaptive problems and organizational culture are concepts that can be applied to both business corporations and the Army. Academic research provides a view of how hierarchical and bureaucratic organizations improve organizational innovation within their respective culture.

Changes the Army can and must make involve leadership, doctrine, training and education to move from a culture of process to a culture of innovation. Army leadership can make changes that over time can foster a change to Army culture. Leadership must be committed to learning, underwrite experimentation, and create an environment that generates creative thought and innovation. Doctrine must incorporate more aspects of innovation, creative and critical thinking and innovative leadership. The Army's training constructs produce adaptive leaders, but must start to assess innovation as well, in order to generate this within the force as well. The most critical area the Army must focus change in is within Professional Military Education for field grade officers. Intermediate Level Education and the Command and General Staff College must focus on generating critical thinkers who can address the complex-adaptive problems the Army will face in the future, from state and non-state actors in the complex operational environment of the 21st Century. The Army must conduct a review of ILE to evaluate the schools effectiveness in accomplishing stated goals.

The Army must produce leaders who have the skill and imagination to generate new ideas; that are innovative and generate change based on critical and creative thinking. These leaders must be capable of looking at problems in a different context and reconceptualizing the variables associated with complex-adaptive problems. This will enable them to deal with complexity more effectively and provide innovative solutions enabling the Army to seize and maintain the initiative while fighting an agile and thinking enemy. The ability of the Army to continue transformation and to fight and win the nation's wars will depend on its ability to produce field grade officers who demonstrate critical thinking skills and are innovative leaders for their units and the institution.

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Introduction

Whether adjusting to a new environment or to an evolving threat, America's Army of the 21st century must be adaptable and become more innovative.¹ Agility, adaptability and innovative leadership are becoming more critical at all levels within the Army in order to address unanticipated situations. Within the new operational environment, Army junior leaders are taking on an additional burden and can find themselves thrust onto the world stage through the capabilities of modern technology, the pervasiveness of the world press and the immediacy of the internet. Decisions they make can have immediate and strategic repercussions. The ability of the Army's junior leaders and especially field grade officers to be adaptive and innovative is critical.

Current Army doctrine discusses the evolving nature of warfare, with an operational environment characterized by instability and persistent conflict.² Both state and non-state actors will challenge and redefine the nature of global change and its impact on the balance of power. Societal trends, such as globalization and the impact technology has and continues to have are some of the trends that contribute to the complexity of the operational environment.³ This complexity can lead to numerous challenges for an operational force, whether faced with thinking and dynamic enemy or an unfamiliar and challenging environment. Army forces must be able to adapt but also—and perhaps more importantly—to innovate in order to maintain the initiative. By challenging old methods of dealing with challenges and providing new ideas, innovation creates opportunity.⁴ Army leaders can seize the initiative through the opportunities generated by creative thought. Innovative organizations embrace uncertainty, recognizing that an uncertain

¹ U. S. Army Field Manual 6-22, *Army Leadership*. (Washington, DC: Headquarters, Department of the Army, 2006), 10-1.

² U.S. Army Field Manual 3-0, *Operations* (Washington, DC: Headquarters, Department of the Army, 2008), 1-1).

³ *Ibid.*, 1-5, 1-2 and 1-18).

⁴ Donald T. Phillips and James M. Loy. *The Architecture of Leadership: Preparation Equals Performance*. (Annapolis: Naval Institute Press, 2008), 71.

future potentially holds as many opportunities as it does threats.⁵ While some leaders might shy away from the challenges associated with innovation, those that embrace this uncertainty see the opportunities and are willing to accept the risk that accompanies innovation.

As an institution, the Army must be able to adapt and innovate in order to counter the traditional and nontraditional threats emerging and fight and win the nations wars. Moreover, the Army must develop adaptive and innovative leaders who are able to think critically when confronted with new and dynamic challenges in order to turn the opportunities inherent in the uncertainty of war into positive action. Army field grade officers are essential to this process, whether serving in critical positions in battalions and brigades executing combat operations or serving as action officers on higher-level staffs. Their ability to be innovative, to think critically and to look at problems in a different context will enable the Army to maintain the initiative while fighting an agile and thinking enemy and diverse threats. This is the proverbial “thinking outside the box” often used to challenge an organization or to explain how the organization or new team will improve upon how things were done in the past.

Given the technological innovations occurring in the greater civilian community, military innovation and change are inevitable as the military is a reflection of the society in which it exists to protect.⁶ Given this dynamic environment, how the Army innovates and responds will be a critical factor in the ability of the Army to react to threats on the twenty-first century battlefield.⁷ Truly gifted leaders recognize that change is a constant, understand the acceleration of change that globalization has spawned and more importantly, anticipate change.⁸ To facilitate and

⁵ David A. Fastabend and Robert H. Simpson. “Adapt or Die: The Imperative for a Culutre of Innovation in the United States Army.” *Army Magazine*, (February 1, 2004), 17.

⁶ Williamson Murray. “Innovation: Past and Future,” in *Military Intervention in the Interwar Period*, ed. Williamson Murray and Allan R. Millett(Cambridge: Cambridge University Press, 1996), 301.

⁷ Ibid.

⁸ Phillips and Loy. *The Architecture of Leadership*, 71.

improve organizational change that produces leaders who are innovative as well as adaptive, the Army must institutionally reevaluate how it trains, educates and develops field grade leaders in order to ensure that they are innovative and adaptable and moreover, that they are willing to underwrite risk and reinforce innovation of subordinates within their organizations. This is perhaps even more critical as it will enable innovation throughout the institution and potentially transform or fundamentally change the Army's approach to officer education. Additionally, the Army will benefit throughout the organization as innovative leaders positively affect the institution over time, with the potential to change the culture within the Army and create an exponential expansion of innovation and creative thought throughout the institution.

A common foundation is important; part of this is to establish a baseline for definitions of words and terms. Innovation is the introduction of something new, a new idea, method, or device.⁹ The Microsoft Word Thesaurus provides synonyms of novelty, modernism, modernization, improvement, advance and originality. Being innovative is having the skill and imagination to create new things.¹⁰ Field Manual 6-22, *Army Leadership*, describes innovation as an Army leaders' ability to introduce something new for the first time when needed or an opportunity exists. Being innovative includes creativity in the production of ideas that are original and worthwhile.¹¹ Synonyms include groundbreaking, pioneering, inventive, original, new, novel, and modern.

To adapt is to adjust to different conditions, or the environment;¹² synonyms include changing, modifying, or altering. Adaptive is being able to adapt, or to adjust for use in different

⁹ Merriam-Webster Online Dictionary/Thesaurus, <http://www.merriam-webster.com/> (accessed January 16, 2009).

¹⁰ Ibid.

¹¹ Field Manual 6-22, *Army Leadership*, 6-2.

¹² Dictionary.Com, Princeton University, <http://dictionary.reference.com/> (Accessed January 16, 2009).

conditions and situations. The word adaptation can connote coping or passively submitting to an external unbending reality, adjusting to different conditions or the environment without attempting to influence them.¹³ Adaptability is encouraged by a collection of thought habits that include open-mindedness, ability to consider multiple perspectives, not jumping to conclusions about what a situation is or what it means, willingness to take risks and being resilient to setbacks.¹⁴

The nature of being adaptive is reacting to external stimuli, changing because of an external influence. On the other hand, the nature of innovation is generating change based on creative thinking. Innovation is inventive and pioneering change. A key theme for innovation is creating something new; implicit in this is the creative thought process that allows for new and inventive ideas. Contrasting this with adapting or being adaptive is change based on an outside stimulus of some sort. An example would be reacting to the environment or in the case of the military, reacting to the threat. While developing adaptive leaders is essential, it is also vital to develop innovative leaders who are able to understand their environment and the threat, to look at them in a new context in and through critical thinking to demonstrate innovation. Through critical thinking, they are setting the conditions for operations and seizing the initiative in order to achieve decisive results.¹⁵

While they have different definitions, the two concepts of innovation and adaptability are interconnected. Adaptation can be either passive (shaped by the environment) or dynamic (one shapes their environment).¹⁶ Passive adaptation is allowing the environment to determine the

¹³ Ronald A. Heifetz, *Leadership Without Easy Answers* (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 1994), 26.

¹⁴ Field Manual 6-22, *Army Leadership*, 10-9.

¹⁵ Field Manual 3-0, *Operations*, 3-3.

¹⁶ Donald E. Vandergriff, *Future Leader: The Journey of Developing (and Nurturing) Adaptability, The Future is Now*, White Paper--Coordinating Draft, (Alexandria: Army Futures Center Forward, 2005), B-2.

course of events with minimal influence while dynamic adaptation is shaping the environment in an effort to determine outcomes in a positive manner. A prerequisite for dynamic adaptability is innovation. One must be able to create new inventive concepts in order to shape and influence the environment. It is through the creative thought processes that innovation enables dynamic adaptability and actively shaping the environment through decisions and actions.

This monograph will review current Army leadership doctrine concerning innovative and adaptive leadership in light of the current and future threats facing Army leaders. Corporate approaches to innovation within the contemporary business world and academic research are relevant to view how other hierarchical and bureaucratic organizations improve innovation within their respective cultures. While military culture is unique, there are ways to improve the organizational climate and make it more conducive to innovative and creative thought. Successive chapters will review where the Army is now, where it needs to move in the future concerning innovation, and ultimately make recommendations to improve leadership innovation throughout the force.

The training and leader development constructs used by the Army produce field grade officers who are very adaptive both to the environment in which they operate in and to the enemy. What is even more critical is the ability of Soldiers, and especially field grade officers, to not only be adaptive, but more importantly, to be innovative. As the Army continues to deploy operational forces in this era of persistent conflict, it must produce both adaptive and innovative leaders who are able to react to and implement operations that allow Army forces to retain the initiative and keep the enemy off balance and not merely adapt, or react to, the tactics of the enemy. The ability of Army leaders to adapt and innovate is critical, as this will allow them to get inside the enemy's decision cycle and to seize the initiative operationally. This in turn will improve Army units' ability to develop and implement creative solutions to complex problems they encounter operationally. Institutionally, this will enable the Army to respond quicker to the nation's threats

and maximize the potential benefits from new and emerging organizational designs resulting from the recent and ongoing Army transformation.

Current Concepts on Adaptive and Innovative Leadership

Complex environments demand innovation and creativity—new ideas or a novel approach, looking at the problem in a different context. Approaching them from a conventional perspective will produce results that are unable to address the emerging complexities and the second and third order effects they cause. Therefore, it is essential that Army leaders understand the environment they will operate in now and in the future. There are several studies that look at this with similar conclusions but also some differences. Contemporary academic and business process models provide a similar construct with challenges that are comparable to those the Army faces. Emerging from this is the concept of complex-adaptive problems and the unique problems and challenges that they generate. Finally, a review of current Army doctrine concerning adaptive and innovative leadership and perspectives on this from the business world will establish a foundation for addressing changes the Army can make in order to increase innovation and innovative behavior throughout the institution.

Operational Threat Environment

The Army's capstone operations manual, Field Manual 3-0 *Operations*, characterizes the operational environment of the future as dominated by instability and persistent conflict¹⁷. There are complex local, regional, and global changes that generate a cloud of uncertainty—or risk—but also provide possibilities for opportunity. The risk generated by these changes contributes to local and regional instability and facilitates the continuing state of persistent conflict.¹⁸ *Field*

¹⁷ Field Manual 3-0, *Operations*, 1-1.

¹⁸ *Ibid.*

Manual 3-0, Operations, outlines some of the trends that are driving instability. These include the interdependent economies brought about by Globalization, the disparate levels of wealth this generates and the inherent tension within and between nations. Technology has a pervasive impact on the quality of people's lives and provides significant opportunities for irregular and asymmetrical warfare that potential adversaries can use. Rapid population growth in the developing world and continued urbanization both contribute to opportunities for increased instability, radicalism and extremism. Competition for natural resources between countries with growing populations and established western economies that do not produce enough domestically, coupled with the instability in many locations that are producers of natural resources again contributes to international instability. Climate change and natural disasters have the potential to cause humanitarian crises and compound already challenging situations in developing countries. The ever-present threat of the proliferation of weapons of mass destruction and the potential catastrophic effect their use could have, both regionally and globally, also contribute to instability. All of these trends have a significant impact on failed and failing states, creating regional security challenges for neighboring countries.¹⁹

The Joint Forces Command study that describes the Future Joint Operating Environment (JOE) outlines similar trends but adds others, including Economics, Pandemics and Space.²⁰ This study specifically identifies economics based on the job creation requirements that developing countries with expanding economies experience and the resulting potential widening of the income and wage gap within these countries. While the risk of a global pandemic might not be that great, either the potentially destructive capability of a synthetic, genetically engineered or a natural pandemic could be devastating and therefore have global implications. The Joint

¹⁹ Field Manual 3-0, *Operations*, 1-1 to 1-3.

²⁰ United States Joint Forces Command Center for Joint Futures (J59), *The Joint Operating Environment (JOE) 2008, Challenges and Implications for the Future Joint Force*, Futures Study, (Suffolk, Virginia: Joint Forces Command, 2008), 1.

Forces study identifies Space as a potential future theater of conflict, one that the United States has historically maintained an advantage over most of the world. More nations however, are experimenting with space flight and technological advances could allow military operations in space.²¹

The Training and Doctrine Command Futures Study identifies global drivers and associated trends while looking at the future operational environment.²² These drivers and trends are similar to those outlined in *FM 3-0 Operations* and the *Joint Forces JOE* but include a specific discussion about rapid proliferation and advances made in science, technology and engineering and the resulting impact these will have on societies and warfighting.²³ This includes far reaching impacts on weapons systems, logistics systems, medical advances, smart fabrics and textiles, and robotics. With globalization this spread of technology is unstoppable, and along with providing great benefits to society, potential enemies and threats also can take advantage of these technological advances.

The Army War College *Strategic Leadership Primer* describes the strategic environment as characterized by volatility, uncertainty, complexity and ambiguity, or VUCA.²⁴ Volatility addresses the rate of change of information and the situation, brought about by our increased ability to monitor actions. Uncertainty is the inability to know everything about current situations and the difficulty of predicting what the effects of proposed change today will have on the environment and the enemy in the future.²⁵ Ambiguity involves the different ways that an event

²¹ Joint Forces Command Center for Joint Futures, *The Joint Operating Environment (JOE) 2008, Challenges and Implications for the Future Joint Force*, 1.

²² Training and Doctrine Command G2 (Intelligence Directorate) *The Contemporary Operating Environment* (Fort Leavenworth, Kansas: TRADOC Intelligence Support Activity, 2007), 8

²³ *Ibid.*, 50

²⁴ Stephen A. Shambach, ed., *Strategic Leadership Primer*, 2d edition. (Carlisle Barracks, Pennsylvania: United States Army War College, 2004), iii.

²⁵ *Ibid.*, 12.

can be interpreted or the fact that decision-makers cannot grasp the significance of a given situation or event.²⁶ The only constant in this dynamic environment is the relentless acceleration of the rate of change that compounds the degree of uncertainty.²⁷ Complexity is different from uncertainty and addresses the “intricate web of cause and effect linkages,” looking at the complex nature of interrelated systems and the ability of senior leaders to formulate and execute effective policy in such multifaceted environments.

Not only has the nature of land operations become more complicated (difficult to analyze, understand or explain), but it is also becoming more complex (made up of complicated or interrelated parts).²⁸ Thus, complicated problems combine to generate complex challenges in the environment and other factors contribute to compound this complexity. The operational environment is becoming more and more saturated with information and access to telecommunications and the Internet is available virtually anywhere in the world and by anyone possessing basic cyber technology.²⁹ Potential enemies are becoming more and more adept at utilizing information operations. American forces have the reputation of being the most advanced in the world with access to joint capabilities and unmatched capacity to generate combat power. With this significant advantage in capabilities however, comes a corresponding increase in the complexity of operations. These complications and all of the factors outlined by the various future assessments of the operating environment combine to increase significantly the complexity of operations.³⁰

Within this complicated and complex operational environment, threats will confront the United States conventionally and unconventionally. Both state and non-state actors will

²⁶ Shambach, *Strategic Leadership Primer*, 13.

²⁷ Ibid.

²⁸ Merriam-Webster Online n.d.

²⁹ Field Manual 3-0, *Operations*, 1-18.

³⁰ Ibid.

challenge and redefine the nature of warfare and threats, be they traditional or irregular, and they will use the environment and adapt quickly.³¹ Global change and societal trends, the changing nature of the threats and evolving nature of warfare, all contribute to the complexity of the operational environment³². The complexities of the strategic environment often make identification of the logic and cause of external influences challenging at best and intellectually difficult and time-consuming to come to grips with.³³ The Army is realizing the impact of this at lower and lower levels, frequently requiring innovative solutions at battalion and brigade level covering a wide range of diverse subjects. It is imperative that the Army's field grade officers have the necessary tools with which to function and excel in this complex operational environment in order to provide creative solutions to these complex problems.

Complex/Adaptive Problems

In addressing the complicated and complex challenges the Army faces in the current and future operational environment, a discussion of systems theory is applicable given the similarities associated with complex/adaptive problems. "Chaos makes war a complex adaptive system, rather than a closed or equilibrium-based system"³⁴ Systems theory discusses the relationships among the components within a system's structure and the plurality of the structure based on the multiple and variable relationships between these components.³⁵ The relationships within an

³¹ Field Manual 3-0, *Operations*, 1-3 and 1-5.

³² *Ibid.*, 1-2 and 1-18.

³³ Shambach, *Strategic Leadership Primer* 12-13.

³⁴ James N. Mattis, "USJFCOM Commander's Guidance for Effects-Based Operations." *Joint Forces Quarterly*, no. 51 (4th Quarter 2008) 105; from Justin Kelley and David Kulcullen, "*Chaos versus Predictability: A Critique of Effects Based Operations*," *Australian Army Journal*, no 1 (Winter 2004), 90.

³⁵ Jamshid Gharajedaghi, *Systems Thinking: Managing Chaos and Complexity*. (Boston: Butterworth Heinemann, 1999), 44.

interactive social system demonstrate this where the interactive network of variable members with multiple relationships continuously recreates itself.³⁶ “The local randomness or unpredictability exhibited by nonlinear systems is fundamental and modern technology (faster computers and better algorithms) cannot make the inherent local unpredictability go away”.³⁷ The dynamic and complex operating environments in which the Army conducts operations present an infinite number of variables with complex relationships.³⁸ Within this complex systems framework, Army leaders at all levels, including field grade officers at battalion and brigade level, must make critical and timely decisions.

When attempting to manipulate the components of a system, there are challenges given the relationships between the different variables within the system. The emergent and counter-intuitiveness of system dynamics interact to produce unpredictable outcomes. Systems theory looks at the product of interrelated aspects of different parts of the system and not just a sum of individual parts.³⁹ Leaders and managers cannot analyze or manipulate emergent properties alone, but must consider the impact within the overall system.⁴⁰ Systems can react in a counter-intuitive manner, as manipulating a system, can cause a distinctly different reaction and in some cases generate an opposite result. Principles that underscore this concept include (1)“cause and effect may be separated in time and space. (2) Cause and effect can replace one another, displaying circular relations. (3) An event may have multiple effects and the order and importance can shift over time; and (4) a set of variables that initially played a key role in

³⁶ Gharajedaghi, *Systems Thinking*, 44.

³⁷ Murray. “Innovation: Past and Future,” 303.

³⁸ James N. Mattis, “USJFCOM Commander’s Guidance for Effects-Based Operations.” *Joint Forces Quarterly*, no. 51 (4th Quarter 2008), 105.

³⁹ Gharajedaghi, *Systems Thinking*, 45.

⁴⁰ *Ibid.*

producing an effect may replace a different set of variables that produce the same effect.”⁴¹

Noted systems methodology author, Jamshid Gharajedaghi uses the welfare system as an example of these principles: Expanding the welfare system in an effort to reduce the number of disadvantaged families may counterintuitively lead to an increase in their number. Raising taxes to provide additional resources may cause the wealthy and businesses to relocate, diluting the tax base and reducing revenues. A more attractive welfare system can attract more needy to the region and can reduce the incentive to work both increasing the burden to the system. These impacts will lead to increased costs and reduced revenues, negating the original intent of actions taken. ⁴²

Simply put, playing the game changes the game even as it is being played; and playing the old game with tenacity can convert success into failure if leaders or organizations are not able to comprehend and act upon the changes.⁴³ Merely recognizing the presence of change or its pervasiveness in our globalized world is enough. Whether this change occurs in the environment or within the organization, leaders must recognize and more importantly, know when to act up on change. In doing so, leaders will demonstrate dynamic adaptability as opposed to passively reacting to the external environment.

Just as the military faces new and dynamic challenges based on globalization and the impact of technology, so too is the business world finding new challenges and is therefore struggling with the increasingly complex environment in which they operate.⁴⁴ Wicked problems, as discussed by University of Pittsburgh Professor of Strategic Management John Camillus, are neither just tough nor persistent nor merely --associated with a degree of difficulty.

⁴¹ Gharajedaghi, *Systems Thinking*, 49.

⁴² Ibid.

⁴³ Ibid., 55.

⁴⁴ John C. Camillus, “Strategy as a Wicked Problem,” *Harvard Business Review*, (May 2008), 99.

They are complex problems that traditional processes cannot resolve. There are innumerable causes, the aspects of the problem are difficult to describe and there is not one right answer or solution.⁴⁵ Though there is no set definition of what constitutes a wicked problem, Camillus outlines some characteristics that when present can indicate a wicked problem: The problem involves many stakeholders with different values and priorities. The issue's roots are complex and tangled, with interconnectedness reflecting a complex system. The problem is difficult with which to come to grips and changes with every attempt to address it. Finally, the challenge has no precedent on which to base a response and there is nothing to indicate the right answer to the problem.⁴⁶ There are similarities here with Garajedaghi's concepts, that playing the game changes the game and the idea of an interactive network of variables. What Camillus does, however, is provide another perspective of complex-adaptive problems and how organizations can deal with them. Camillus posits that it is impossible to find actual solutions to wicked problems but that organizations can implement effective strategies that allow them to cope with them.⁴⁷ Involving all stakeholders, documenting various opinions and communicating between actors helps to create a shared understanding of the problem and foster commitment to possible avenues of resolution.⁴⁸ Focusing on action by experimenting with a number of strategy options helps to establish the relationship between cause and effect within complicated systems. Finally, corporations must adopt a 'feed forward' orientation (vice feedback that has limited relevance with wicked problems). In doing so, they must focus on envisioning the future and the strategies that increase the likelihood for realizing this future.⁴⁹ Camillus concludes that the biggest challenge is to identify correctly a problem as wicked, otherwise organizations will use

⁴⁵ Camillus, "Strategy as a Wicked Problem," 100

⁴⁶ Ibid., 99-100.

⁴⁷ Ibid., 102.

⁴⁸ Ibid.

⁴⁹ Ibid., 105.

conventional problem solving processes and not effectively address the strategic issue that is the root of the problem.⁵⁰

Wicked problems often surface when organizations face constant change or unprecedented challenges. Over the last five years, the U.S. Army has been undergoing transformation, involving extraordinary changes in organizational structure and doctrine. At the same time, it has been conducting the War on Terrorism with forces deployed in two operational theaters (Iraq and Afghanistan) as well as supporting ongoing training and humanitarian support missions around the globe. Whether one calls it a complex-adaptive problem or a wicked problem, the challenges facing the Army today are significant. The interconnectedness and interrelatedness of the variables within the systems (operational environment) create a tangled web of dynamic challenges with increasing complexity. Change is difficult to implement, to control once implemented, and even more difficult to understand the impact of change between the interconnected variables. The Army requires field grade leaders who have the analytical capacity to develop new and creative approaches to these unique challenges and can deal with the changes and challenges complex-adaptive problems generate. These leaders must be innovative and capable of dynamic adaptability in order to cope with and overcome these wicked problems and to ensure success on the twenty-first century battlefield.

Military Doctrine and Related Business Concepts

There are undoubtedly differences between leading and managing a large commercial business or corporation and leading and managing within the military. Given that, there are similarities as well and both fields often look to each other for methodologies and concepts that will help them to improve their respective organizations. Whether the business world is looking

⁵⁰ Camillus, "Strategy as a Wicked Problem," 106.

for more pure leadership skills or the military is looking to enhance their managerial skills, there are concepts in both domains that are relevant to a discussion on adaptability and innovation.

A corporation's willingness to innovate often equates to its ability to stay competitive with competing corporations and thrive in this environment.⁵¹ Business executives can be on the receiving end of change either reacting or adapting to their competitors, or they can be innovative and drive change within their respective markets. The concepts of dynamic and passive adaptation operate within the business world as well, through influencing the environment instead of reacting to the environment. Successful organizations remain on the leading edge and drive innovation within their markets and established business niches.

As creative people with extraordinary expertise in their chosen fields, leaders tend to come up with new and different ways of achieving their vision. These leaders are out front as facilitators of change and, in essence, propel change through their vision and personal commitment within their organizations and markets.⁵² As a result, they have the motivation and ability to introduce and encourage new methods, new ideas, and new products internally into the organization and externally into the marketplace.⁵³ This innovation allows a business to remain competitive in the increasingly complex global market and, in the end, can determine their ultimate viability as business entities.

Innovative ideas and products can have a synergistic effect on an organization. They can excite people and propel them forward generating more creative thought and innovative ideas within the establishment. Successful innovation can also create new opportunities as this creative energy produces and drives change. Within these changes is the inherent presence of opportunity

⁵¹ Phillips and Loy. *The Architecture of Leadership*, 71.

⁵² Ibid.

⁵³ Ibid., 71.

for leaders, individuals within the organization and for the organization itself.⁵⁴ People are usually more inspired to take action on their own initiative when given freedom to be creative and when they are in an environment conducive to generating creative ideas. This can lead to more energy, more creativity and more productivity that can build on itself throughout the organization.⁵⁵

The Army's leadership manual discusses the conceptual components that affect army leaders' intelligence⁵⁶. These include agility, judgment and innovation.⁵⁷ Mental agility is flexibility of mind and a tendency to anticipate or adapt to uncertain or changing situations. This is important to military leaders as it demonstrates the ability to adapt to the fight the enemy and not to narrowly fight the plan. It ensures commanders have the ability to see the bigger picture as the battle unfolds and to notice opportunities as they present themselves. The basis for mental agility is based on critical thinking or the ability to reason critically, while keeping an open mind to multiple possibilities.⁵⁸ A leader's mental agility in quickly isolating a problem and identifying solutions allows the use of initiative to adjust to change during operations. Leaders must instill agility and initiative in their subordinates by creating a climate that encourages team participation.⁵⁹

In the doctrinal discussion of adaptability, there are elements of both passive and dynamic adaptation. The initial concept of adaptability, an effective change in behavior in response to an altered situation appears to focus on passive adaptation, by reacting to an altered or

⁵⁴ Phillips and Loy. *The Architecture of Leadership*, 71.

⁵⁵ Ibid.

⁵⁶ Field Manual 6-22, *Army Leadership*, 6-1.

⁵⁷ Ibid. This list is not all-inclusive but highlights the key components relevant to adaptive and innovative leadership.

⁵⁸ Field Manual 6-22, *Army Leadership*, 6-1.

⁵⁹ Ibid., 6-2.

changed situation.⁶⁰ Adaptability is an individual's ability to recognize changes in the environment, identify the critical elements of the new situation, and then to implement personal and required organizational changes to address emerging requirements. In doing so, adaptable leaders scan the environment, understand and then drive the key characteristics of the situation, and are aware of what they must do in order to perform in the changed environment.⁶¹ This latter discussion begins to address dynamic adaptation through driving the key characteristics of the situation.

Deciding when to adapt is as important as determining how to adapt.⁶² Leaders must use their experience to enable them to discern changing environment and to recognize not only that they must change but also how and when to change. Adaptability has two key components: identification of the essential elements critical for performance in new and dynamic situations and the ability of a leader to change personal or organizational practices to capitalize on internal strengths and to minimize weaknesses.⁶³

Judgment reinforces and is complimentary to agility.⁶⁴ Making the right decision at the right time based on limited information is critical. Discerning between conflicting elements of data can complicate this but is an important component of conceptual abilities for effective leaders. Leaders develop judgment over time based on expert knowledge within a given field. In challenging times, organizations rely on experts based on their knowledge and expertise and the belief that their judgment will prove to be decisive in resolving and exploiting opportunities generated by unfamiliar circumstances.

⁶⁰ Field Manual 6-22, *Army Leadership*, 10-8.

⁶¹ Ibid.

⁶² Ibid.

⁶³ Ibid., 10-9.

⁶⁴ Ibid., 6-2.

Whether an executive is responding to a competitor in the commercial market place or an Army battalion operations officer is responding to a dynamic and imaginative enemy, leaders must be adaptable and innovative. They must demonstrate critical thinking skills and be able to get in front of their competitors, both figuratively and literally, whether they are an enemy combatant or a business competitor. The skills reviewed in this section are critical to this ability. More importantly, there are ways the Army can improve innovation within the institution and more critically, within the field grade officer ranks.

Increasing Innovation Within the Army

Operations today require versatile, well-trained units and tough, adaptive commanders. There is not set formula for applying landpower. Each campaign and major operations requires an original design and flexible execution.

FM 3-0, Operations⁶⁵

Dynamic Adaptation and Innovative Leadership

As *FM 3-0 Operations* outlines, the Army needs well-trained units and thinking, dynamically adaptive commanders capable of developing and implementing unique and flexible operations. Army forces will operate on complex battlefields that will present numerous challenges for the operational force. These challenges could be from an unfamiliar and demanding environment that debilitates equipment and soldiers or from a thinking and dynamic enemy. Army forces must be able to adapt but also—and perhaps more importantly—to innovate in order to maintain the initiative. Operational initiative is setting or dictating the terms of action throughout an operation, forcing the enemy to fight the war on your terms and at a disadvantage to them. The principle of the offensive is about seizing, retaining, and exploiting the initiative as

⁶⁵ Field Manual 3-0, *Operations*, 3-2.

the surest way to achieve decisive results.⁶⁶ This requires positive action to change both information and the situation on the ground. Risk and opportunity are intrinsic in seizing the initiative.

Opportunities never last long—there will be a small window in time and space where situations on the battlefield are such that a critical decision and action by the commander can change conditions on the battlefield and allow the commander to seize the initiative.⁶⁷ The risk is in—inaction, that not taking action will close the window of opportunity. There is also the tactical risk associated with any decision that what the commander intends to achieve will not happen or generate unintended consequences because of friction, inadequate information, or the constantly changing dynamics of battle. Commanders must weigh all of these factors when balancing risk and opportunity. Unless commanders are willing to accept risk and act, the enemy is likely to close the window of opportunity and exploit the situation for their benefit.⁶⁸ The ability of leaders to exhibit innovation and think critically is linked to and vital to the ability of organizations to seize the initiative.

Successful commanders often have the buzzwords “bold” and “innovative” attached to them as descriptors of their leadership style. The Director of the Army’s Military History Institute, Dr. Conrad C. Crane, conducted a detailed analysis of 25 American generals who commanded at Army level and above in major wars of the 20th century. Only two of the 25 generals Crane examined fit the dictionary definition of boldness (showing or requiring a fearless daring spirit).⁶⁹ Crane links innovative with boldness and defines bold as being “daring and

⁶⁶ Field Manual 3-0, *Operations*, 3-3.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Merriam-Webster Online Dictionary/Thesaurus n.d. and Conrad C. Crane, “Beware of Boldness.” *Parameters*, (Summer 2006), 92. The two Generals being John J. Pershing and Douglas MacArthur.

fearless, having or showing a willingness to take risks”.⁷⁰ Commanders offered up as particularly innovative or daring risk takers Crane characterizes as aggressive leaders who took advantage of opportunities that were present in particular tactical or operational situations. Another definition of this is demonstrating initiative. An example he uses of this is George Patton. According to Crane, Patton was not a gambler but exploited enemy weaknesses through superior information (intelligence) and mobility.⁷¹

Initiative can manifest itself in different forms across the spectrum of operations. In combat operations, commanders force the enemy to respond to their actions. In stability and civil support operations, initiative implies improving conditions for the local populace and applying combat power in order to prevent the situation from deteriorating in a manner that would benefit the enemy.⁷² Ideally, as the enemy reacts, Army forces maintain the initiative by altering their application of lethal and nonlethal actions, forcing the enemy to adapt to the actions of the friendly force and to remain on the defensive.⁷³ This allows the friendly force to maintain the initiative and to dictate the terms on which the engagement occurs. Commanders must continuously interpret developments in the operational environment, make critical decisions in a timely manner to shift the weight of effort in order to seize, retain and exploit the initiative to achieve decisive results.⁷⁴

Throughout this doctrinal discussion concerning initiative, the concept of dynamic adaptation is prevalent, indicative of the linkage between innovation and initiative. Commanders

⁷⁰ Crane, “Beware of Boldness.” *Parameters*, (Summer 2006), 90.

⁷¹ *Ibid.*, 94-95. Patton is best known for the 3d Army’s breakout of Normandy and then relieving the siege of Bastogne during the Battle of the Bulge. Patton’s prior two tours as an intelligence officer and use of the 6th Cavalry Group enabled him to incorporate cavalry and intelligence into operations, demonstrating initiative and taking advantage of tactical opportunities.

⁷² Field Manual 3-0, *Operations*, 3-3.

⁷³ *Ibid.*

⁷⁴ *Ibid.*, 3-21.

are able to seize and maintain the initiative by making decisions that shape their environment, by being willing to accept tactical risk and to think critically and look at problems in a different context. Army leaders, especially field grade officers must possess the intellectual skills and foster a climate that encourages innovative and creative thought within their formations. This will allow them and their units to recognize opportunities on the battlefield and to exploit these opportunities in order to seize, maintain, and exploit the initiative. This is part of dynamic adaptability—a leaders ability to influence the environment instead of allowing the environment to influence them.

Innovation in Organizations

Conrad Crane posits that truly innovative ideas usually come from staffs and subordinates. As opposed to being innovative themselves, leaders, especially at higher levels, must be able to recognize innovative contributions from others and incorporate them into the practices of the larger organization.⁷⁵ Leaders create boldness within an organization starting at the top. Peter Senge, senior lecturer and director of the Center for Organizational Learning at MIT Sloan School of Management states: leaders who demonstrate learning “provide the spirit for the learning organization.”⁷⁶ By being willing to accept and implement ideas from subordinates and by modeling innovation, leaders can create a sense of boldness within their organization. What leaders must do is foster an atmosphere in their unit that enables decentralized adaptation. Leaders act on creative ideas generated at lower levels of their organization, expand on the initial idea and spread this creativity throughout the organization.

⁷⁵ Crane, “Beware of Boldness.” 88.

⁷⁶ Peter M. Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York: Doubleday, 1990), 141.

An example of decentralized innovation that Crane cites is the development and application of the “Rhinceros” or “Rhino”, which was used to bust through hedgerows during the allied breakout from Normandy. A sergeant in the 102d Cavalry Reconnaissance Squadron invented the creative device and eventually the Army outfitted 60% of American tanks with Rhinos for the Normandy campaign.⁷⁷ A more recent application of this concept was the “Rhino” created by troops in Operation Iraqi Freedom to defeat Improvised Explosive Devices (IED’s). A glow-plug for a High Mobility Multi-Purpose Wheeled Vehicle (HMMWV or Hummer) diesel engine was placed in an ammo can and then extended out in front of vehicles (similar to a rhinoceros horn) providing a heat signature that defeated infra-red triggered IED’s.⁷⁸ While one could argue that both of these examples are merely passive adaptation either technological or environmental, what makes them examples of innovation is that they were new ideas, inventive and creative solutions to problems generated within tactical units with leaders willing to take the professional risk to champion the idea in order to provide organizational momentum.

Another example of decentralized innovation during OIF was the local development and installation of makeshift armor for vehicles to protect Soldiers from IED’s. Unfortunately, the press and others derisively referred to this as “hillbilly armor”.⁷⁹ Once again, though this displays the creativity and ingenuity of the American Soldier and the willingness of commanders

⁷⁷ Crane, “Beware of Boldness.” 92. The two Generals being John J. Pershing and Douglas MacArthur.

⁷⁸ David G. Cotter and Glenn K. Grothe, Transition of Authority Visit to the 181st Transportation Battalion Skunk Works, Logistics Support Area Anaconda, Balad, Iraq, August 2006.

⁷⁹ Michael Hirsh, John Barry and Babak Dehghanpisheh, *Newsweek.com: Hillbilly Armor*. December 20, 2004. <http://www.newsweek.com/id/56115> (Accessed February 3, 2009).

to allow junior leaders and individual Soldiers the leeway to implement new ideas. The 181st Transportation Battalion named their internal add-on armor facility “Skunk Works”.⁸⁰ The Soldiers working here were from the battalion maintenance office augmented from subordinate companies. They were mostly junior Soldiers (Private First Class through Sergeant), with minimal supervision from more senior Noncommissioned Officers.⁸¹ These are only a small example of decentralized innovation at the unit level by creative individuals that leaders capitalized on and spread throughout their formations but are indicative of leadership fostering an innovative atmosphere within their units and encouraging creativity.

Much like the OIF example of establishing an environment for innovation to flourish is that of World War II aircraft production and design from Lockheed Aircraft Corporations “Skunk Works” (today’s Lockheed Martin).⁸² The individual credited with developing the Skunk Works was Clarence L. “Kelley” Johnson, who along with his engineers was able to deliver a proposal for the XP-80 in only 143 days, seven less than required even though the formal contract arrived four months after work had begun.⁸³ What allowed Kelly to accomplish this so effectively and

⁸⁰ Richard E. Killblane, “Transportation Corps in Operation Iraqi Freedom 2 (Draft), April Uprising,” *U.S. Army Transportation School*. <http://www.transchool.eustis.army.mil/lic/documents/transportation%20Corps%20inOperation%20Iraqi%20Freedom%202.doc> (accessed January 16, 2009); named after the Lockheed aircraft production facility, the original “Skunk Works”.

⁸¹ Cotter and Grothe 2006.

⁸² Lockheed Martin Corporation, Skunk Works. <http://lockheedmartin.com/aeronautics/skunkworks/> (Accessed January 16, 2009). The original name, “Skonk Works” came from the secret moonshine factory in Al Capp’s cartoon, “Lil’ Abner.” The name “Skunk Works” was later copyrighted by Lockheed Martin.

⁸³ Lockheed Martin Corporation. The XP-80 was a jet fighter designed as a response to the rapidly growing German jet threat. After World War II, the Lockheed Martin Skunk Works continued producing innovative aircraft. Their accomplishments include the U-2 spy plane and the SR-71 Blackbird, the first aircraft to fly in excess of Mach 3 and still the highest and fastest flying plane; and more recently the F-117 Nighthawk stealth fighter.

efficiently was his unconventional organizational approach that promoted innovation and creative thought, challenging the existing bureaucratic system.⁸⁴

Kelley outlined his philosophy in 14 practices and rules, some of which are still applicable today to organizations focused on generating creative thought and fostering innovation.⁸⁵ These include his idea that managers and leaders must be delegated virtually complete control of their programs, reducing filters between those generating ideas and decision-makers. There must be a simple concept and concept approval system with flexibility for in-stride changes.⁸⁶ This flat overhead allows rapid implementation of new ideas and concepts. There must be a minimum number of reports required, but Kelley insisted that they recorded important work. This concept of minimal reports can be counter to military staff processes where with modern technology there is rapid accessibility to a multitude of data. The key for Army organizations is to track and report what is important and relevant to decision-makers, and not everything that the staff can report, just because it is possible. Kelley required monthly cost reviews—there has to be accountability and oversight. There also must be mutual trust and very close cooperation. Finally, you must reward good performance.⁸⁷ Creating this type of organizational environment will cultivate creativity and innovation while reducing the chance for misunderstanding.

Regardless of how one spells it, Skonk Works, Skunkworks, or Skunk Works, this term commonly refers to research and development efforts, usually working in small teams under a time constraint that uses unconventional methods with minimal overhead and maximum leeway

⁸⁴Lockheed Martin Corporation n.d.

⁸⁵Ibid.

⁸⁶ Ibid. In the original Skunk Works this concept and concept approval process was focused on engineering drawings and the drawing release process implemented by Clarence Kelley.

⁸⁷ Ibid

for creativity and innovation.⁸⁸ As Clarence Kelley's Skunk Works demonstrated, a more flattened organizational structure can allow for the creative flow and implementation of innovative ideas. With the growth in size of military staffs and large corporate bureaucracies, perhaps this has had an unintended consequence of limiting or stifling creative innovation within the predominantly large hierarchical staff structures commonly associated with bureaucracies. Large bureaucratic organizations and processes do not lend themselves to the flat overhead, minimal filters, and flexibility built into the concept/approval process of Kelley's Skunk Works.

Innovation is one of the keys to institutional survival as demonstrated by Lockheed Martin. Many large organizations have embraced continuous adaptation to remain ahead of their competitors.⁸⁹ One of the concepts associated with continuous adaptation is the Learning Organization.

Learning Organizations

As organizations grow and face wicked or complex adaptive problems this usually generates change within an organization. Making progress with adaptive problems requires learning, at the individual and the organizational level.⁹⁰ Progress demands new ideas and innovation in order to maintain or set the pace with competitors. The task of leadership consists of directing and focusing the learning process within organizations.⁹¹

Learning is not desirable just for learning's sake or for abstract academic purposes but is an organizationally existential requirement to get the job done. Learning is essential to achieving

⁸⁸ Merriam-Webster Online n.d. and Dictionary.com n.d.

⁸⁹ Fastabend and Simpson. "Adapt or Die" 15.

⁹⁰ Heifetz, *Leadership Without Easy Answers*, 187.

⁹¹ *Ibid.*, 187.

the desired organizational results.⁹² There are many definitions of what constitutes a ‘learning organization’.⁹³ Senge defines a learning organization as “a place where people are continually discovering how they create their reality...and how they can change it”.⁹⁴ Similarly, David A. Garvin, the C. Roland Christensen Professor of Business Administration at Harvard Business School, defines a learning organization as an organization skilled at creating, acquiring, interpreting, transferring, and retaining knowledge, and at purposefully modifying its behavior to reflect new knowledge and insights.⁹⁵ In a 2004 Army Magazine article titled *Adapt or Die: The Imperative for a Culture of Innovation in the U.S. Army*, the authors define learning organization behavior as critical-thinking behavior extended beyond the individual level.⁹⁶ What is more important than a definition for a learning organization is an understanding that learning can be managed and fostered within an organization.⁹⁷

Life transitions usually motivate the need for learning as individuals. As a result, learning is problem-focused, and linked to a desire for self-renewal and personal growth.⁹⁸ Organizations learn through the collective learning of individuals within them. Individual learning does not guarantee organizational learning but must be present for an organization to acquire knowledge.⁹⁹ Corporations have similar needs associated with learning but are focused on the ability to stay competitive in an era of significant transformations that requires organizational renewal and growth. One manifestation of this is the annual value of company-

⁹² David A. Garvin, *Learning in Action: Putting the Learning Organization to Work* (Boston: Harvard Business School Press, 2000), 7-8.

⁹³ See Appendix A for a more complete review of various definitions for Learning Organizations.

⁹⁴ Senge, *The Fifth Discipline*, 13.

⁹⁵ Garvin, *Learning in Action*, 11.

⁹⁶ Fastabend and Simpson. “Adapt or Die” 21.

⁹⁷ Garvin, *Learning in Action*, 8.

⁹⁸ *Ibid.*, 4.

⁹⁹ Senge, *The Fifth Discipline*, 139.

sponsored education and training that takes many forms.¹⁰⁰ Some of America's leading companies have their own corporate universities—McDonald's, Motorola, General Electric—where managers and workers go to improve their knowledge of internal corporate processes, increase their professional knowledge and then return to their respective organizations to implement and disseminate this newly acquired knowledge.¹⁰¹

Yet even with these commitments, most managers can be surprisingly ambivalent about learning and merely give lip service to its importance voicing strong public support for efforts to broaden employees' knowledge and skills. However, when pressed with the prospect of losing a valued employee for a company sponsored training program, many managers express different feelings as this takes an employee out of the production process and the 'real work' that must be done.¹⁰² Corporate executives, just like military leaders, are action-oriented and their immediate goal is to get things done, to accomplish the mission. They tend to view with suspicion and skepticism any activity that does not produce immediate, tangible results that contribute to the bottom line. If these programs require time for reflection, synthesis and review, those elements that product critical thinking, this can increase leaders' skepticism.¹⁰³ Regrettably, programs that stimulate learning frequently fall into this category, even though they can have a long-term benefit to the trainee as well as the organization.

The result can be a clash of organizational values, a proverbial example of "I can make the widget or sit here with you and talk about making it". A typical analogy compares academic scholarship and the world of academia with the down-to-earth reality of corporate managers and military leaders who are executing and producing—not just theorizing about it. The competitive

¹⁰⁰ Garvin, *Learning in Action*, 4; Dollar value in 2000 was \$60 billion.

¹⁰¹ Ibid.

¹⁰² Ibid.

¹⁰³ Ibid.

environment and associated time constraints concentrates their focus on workable solutions rather than pursuing the elusive ideal solution.¹⁰⁴ Unfortunately, established routines that inhibit creative thought serve the organizational norms and values of stability and predictability that focus on efficiency.¹⁰⁵ Most workers strive to meet and conform to organizational norms. Stability is important, especially in large bureaucratic organizations. For these reasons, leaders have yet to embrace learning in many organizations and thus learning has to occur “more often through benign neglect than active support”.¹⁰⁶

These concepts associated with bureaucratic corporations are directly transferable to the military and Army leaders. Institutional learning, or education and training, is an academic process that normally takes place in the generating force, not the operational force or tactical units. Soldiers arrive at their units with an elementary understanding of the basic skills associated with their military occupation and these are further honed and refined through repetitive training at consecutively higher levels within the organization. Professional development sessions that are often part of organizational training programs focus more on professional norms, required leader training, established operating procedures and specific leaders’ tasks and less on creative and reflective thinking that generates new ideas. Predictability and efficiency have their foundation in established tactics, techniques and procedures (TTP’s) that are often associated with specific types of missions and organizations. This does not mean that these TTP’s do not evolve and change over time, but there is usually a strict approval process both organizationally and institutionally that they must go through before being widely accepted and implemented. This is an example of passive and not dynamic adaptation. The TTP’s evolve as a response to what the enemy is doing or responding to the environment.

¹⁰⁴ Garvin, *Learning in Action*, 5.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid., 6.

Unfortunately, too many leaders, whether in the Army or the business world, continue to regard time spent learning as a necessary but unproductive evil and have a very narrow and limiting concept of the potential impact learning can have on an organization. Far from being just an unproductive and inefficient academic or philosophical pursuit, corporate learning is much more likely to be practically applied and tied to the organizations bottom-line.¹⁰⁷ This has a direct correlation to the military and is especially true in the current operational environment, where dynamic and complex problems require the ability to engage in creative thinking. Just as in the corporate world where learning is tied to the bottom-line, there is a direct link in the Army between organizational learning and accomplishing the mission, as well as potentially saving the lives of soldiers.

Corporate learning is often associated with transformation within a business environment. New learning is required to deal with change; the greater the amount of change will have an associated greater amount of new learning required.¹⁰⁸ Creating this new model for an organization involves internal cultural transformation, associated with societal learning, with a resulting change in what some within the society might consider the default values of the organizing principles.¹⁰⁹ According to Gharajedaghi, the type of learning process that organizations require to deal with this transformational change is second-order learning.¹¹⁰ First-order learning represents a quantitative change, increasing the amount of knowledge or variables. Second-order learning involves challenging the underlying assumptions of the variables

¹⁰⁷ Garvin, *Learning in Action*, 61.

¹⁰⁸ Ronald A. Heifetz and Marty Linsky, *Leadership on the Line: Staying Alive Through the Dangers of Leading* (Boston: Harvard Business School Press, 2002), 13.

¹⁰⁹ Gharajedaghi, *Systems Thinking*, 87.

¹¹⁰ *Ibid.*, 86-87. Gharajedaghi's discussion of second-order learning is done within the context of social learning. Social learning is not merely the sum of the isolated learning of each member within the social organization, rather, it is learning manifested in the notion of a shared image and culture. Through learning, the society develops a shared identity and culture that reflects the shared learning within the society. Social development reflects a societies ability to learn and share knowledge and in doing so to increase their capacity for higher levels of organization.

themselves. Second-order learning represents a qualitative change—how one actually approaches the problem—identifying a new set of alternatives and objectives. It redefines the rules of first-order learning. Second-order learning involves questioning long-held assumptions and developing a collective ability to reconceptualize the relevant variables into a new ensemble with a new characterization of its own.¹¹¹ Second-order learning is a participative process of redesigning the future and inventing the means to bring it about.¹¹² Part of second-order learning is engaging in creative thinking that allows reconceptualizing the variables—to think critically and look at problems in a different context. It also involves dynamic adaptation, actively shaping the environment through decisions and actions and in so doing, to redesign the future—actively generating the desired future by taking positive action.

For real innovation to occur, active approaches to learning are essential which usually requires some sort of experimentation.¹¹³ Experimentation is designed to produce deep understanding, not superficial knowledge. Knowing how imparts partial knowledge, knowing why is more fundamental.¹¹⁴ Just as with second-order thinking, reconceptualizing the variables and arranging them into a new characterization, knowing why captures underlying cause-and-effect relationships and provides a more comprehensive understanding.¹¹⁵ In experimenting, people are encouraged to try alternative paths, test ideas to the point of failure and learn from the experience. The organization as a whole is agile, ready to learn, continually changing and improving.¹¹⁶ Organizations should admire and encourage experimentation and prudent risk taking. The key being is it must be sensible and deliberate, with leadership fully engaged to

¹¹¹ Gharajedaghi, *Systems Thinking*, 87.

¹¹² Ibid.

¹¹³ Garvin, *Learning in Action*, 139.

¹¹⁴ Ibid., 143.

¹¹⁵ Ibid.

¹¹⁶ Fastabend and Simpson. “Adapt or Die” 16.

ensure the expenditure of resources for experiments are within the parameters of the organizational goals and objectives. Experimentation and thus innovation is an unending process of trial, feedback, learning, renewal and experimenting again.¹¹⁷ If an organization is not trying to develop a better mousetrap—it definitely will not! This iterative process of challenging old assumptions and processes generates new and innovative ideas.

Innovative organizations depend less on forecasting, planning and control and more on scanning, agility and feedback.¹¹⁸ Feedback is critical to learning within an organization and assists companies in altering fundamentally sound strategies, taking corrective action to correct minor deficiencies based on feedback. However, feedback has limited relevance for wicked problems. Using feedback is learning from the past but the fundamentally different nature of wicked problems requires innovative and novel approaches to problems that arise from unanticipated, uncertain and unclear futures.¹¹⁹ A positive methodology in approaching this is to develop a feed-forward orientation concerning relevant information (feedback). The critical component is what an organization does with this information. The feed-forward concept entails envisioning the future and then provides new conceptualization of what different strategies could bring this future about.¹²⁰ Taking the information normally utilized in decision-making can lead an organization in the same potentially wrong or organizationally destructive direction. Second-order learning is required; qualitatively rethinking what information is necessary to bring about true transformation and effecting desired change. The Army's field grade leaders must be capable of this, to reconceptualize the variables and look at problems in a new context.

¹¹⁷ Fastabend and Simpson. "Adapt or Die" 16.

¹¹⁸ *Ibid.*, 16-17.

¹¹⁹ Camillus, "Strategy as a Wicked Problem," 105.

¹²⁰ *Ibid.*, 105.

Leaders can also reinforce the innovation process through effective team building by making everyone responsible for and stakeholders in the process of developing creative solutions.¹²¹ Team learning can harness the creative thinking of stakeholders when there is a need for innovative approaches and new insights about complex issues.¹²² Leaders can rely on their intuition, vast experience and knowledge, as well as input from their subordinates to tap into innovation. By engaging everyone and making them stakeholders, leaders actively generate an environment that is conducive to innovation and creative thinking. This environment is part of what makes up an organization's culture.

Organizational Culture

One way to improve innovation within an organization is to establish an organizational climate that facilitates innovation, or, an organizational culture that promotes calculated risk taking, collaboration, and trust.¹²³ An organizational climate or culture like this enables people to learn from their mistakes and has a foundation of trust between members of the organization that new and critical thinking is welcome and that if an idea does not succeed, everyone continues to work towards a solution. Leadership must not penalize workers for ideas that do not work. It should be part of the institutional process towards finding a workable solution. A culture like this can also support quicker execution of ideas and a more agile organizational structure, all of which minimize exposure to innovation risk.¹²⁴ This concept can be challenging to implement in a time of constrained resources where organizational leadership can view the generation of unworkable

¹²¹ Field Manual 6-22, *Army Leadership*, 6-2.

¹²² Senge, *The Fifth Discipline*, 236.

¹²³ Rajesh Jugulum and Philip Samuel, *Design for Lean Six Sigma* (Hoboken, New Jersey: John Wiley & Sons, 2008), 39.

¹²⁴ *Ibid.*

solutions as a waste of critical resources. Leaders must identify how this fits into their organizational structure, their vision for the future and ultimately their organizational culture.

In contrast to a culture that generates ideas geared towards doing things better is the climate necessary to produce efficiencies. The climate for a culture of efficiency has a foundation based on certainty, precision and minimization of risk.¹²⁵ Both of these cultures, fostering innovation and producing efficiencies, can coexist within an organization. The key is to develop an organizational governance mechanism that facilitates both the creative environment necessary to generate creative ideas while simultaneously enabling efficient management.¹²⁶ Understandably this is easy to discuss theoretically but in reality can be difficult to implement as it appears these cultures are opposed to each other and can generate conflict. It requires deliberate leadership, open to new ideas and willing to accept personal and organizational risk to generate this governance mechanism.

If innovation is to become systemic, systematic, scalable, and repeatable across the organization, leaders must understand, manage, and leverage the underlying processes that enable innovation. These can include collaborative, high performing innovation teams with creative people working together on similar projects. A systematic process for executing innovation projects within a climate that supports innovation and creativity and a governance system to manage the innovation process and activities.¹²⁷ These are similar to the fourteen rules that enabled the Skunk Works to generate innovative ideas, including a flat organizational structure, incentives for innovation, minimal reports and a streamlined concept through approval system.

¹²⁵ Jugulum and Samuel, *Design for Lean Six Sigma*, 40.

¹²⁶ Ibid.

¹²⁷ Ibid., 30.

There must be a “psychologically safe” environment where employees feel that the benefits of pursuing new approaches exceed the costs; otherwise, they will not take the personal and often professional risks associated with innovation.¹²⁸ Garvin outlines five distinguishing features of a psychologically safe environment: 1) there are opportunities for training and practice. 2) Support and encouragement to overcome fear and shame associated with making errors. 3) Coaching and rewards for efforts in the right direction. 4) Organizational norms that legitimize the making of errors, and 5) norms that reward innovative thinking and experimentation.¹²⁹ A good example of this type of environment are the innovative ideas that came from the original Skunk Works, where innovative thought and experimentation were encouraged and rewarded and the organizational norms reinforced this both explicitly and implicitly. Kelley established an environment that generated mutual trust which cut down on misunderstanding and monetarily rewarded good performance from engineers for creative ideas, not just how many people they supervised.¹³⁰

Coaching, organizational support, encouragement, and organizational norms all address the organizational culture. These elements of organizational culture enable people within organizations the freedom to generate and engage in bold new thinking that challenges organizational bureaucratic inefficiencies that can stagnate organizations and creative thinking within the establishment. Rewards and incentives recognize the efforts of those willing to display these necessary skills and attributes and help to reinforce the climate that facilitates this for the individuals as well as the organization.

¹²⁸ Garvin, *Learning in Action*, 39.

¹²⁹ Ibid.

¹³⁰ Lockheed Martin Corporation n.d.

Yet even with a supportive culture and positive incentives for innovation, employees can resist new ideas if they perceive that there are penalties for anything less than perfection.¹³¹ This preoccupation with perfection, or a zero-defects mentality, can stifle creative thinking and innovation within an organization. Thus, organizations face a difficult dilemma: the organization cannot solve a problem until the problem is known but there must be an environment where people are willing to articulate what they believe to be the problem.¹³² Unless people are open and willing to discuss what they believe are problems, the organization will be unable to address them. For the people to tell the king he is wearing no clothes, the king must be willing to hear this and take action to correct the problem, not castigate those bearing the message.

There must be a culture that does not demand infallibility and perfection, where there is freedom to fail without punishment. Business environments are inherently uncertain; as is the operational environment within which military leaders make and implement decisions. No one gets it right every time, and, those who do are invariably risk-averse and plodding.¹³³ While there must be an environment that allows mistakes and people are free to engage in creative thinking that does not always produce perfect solutions, there must also be accountability. “Freedom to fail should not be confused with a license to commit foolish mistakes.”¹³⁴ Leaders must also take into account the criticality of the situation: in life and death situations—combat or survival of a business enterprise—it needs to be right and leaders must allocate resources to this end. There must be organizational systems that identify, then analyze and review errors in an effort to

¹³¹ Garvin, *Learning in Action*, 40.

¹³² *Ibid.*, 40-41.

¹³³ *Ibid.*, 41.

¹³⁴ *Ibid.*

improve and not just place blame.¹³⁵ Organizations must achieve a balance here between identifying the cause for errors and focusing on solutions.

The article *Adapt or Die: The Imperative for a Culture of Innovation in the U.S. Army*, outlined a strategy to improve innovation in the Army through changing the military culture.¹³⁶ Though the change the authors discuss is not about introducing innovation, it is about changing how and when military leaders innovate in order to abbreviate the cycles of change.¹³⁷ Their definition of a culture of innovation is “one in which people at all levels proactively develop and implement new ways of achieving individual, unit and institutional excellence and effectiveness”.¹³⁸

One of the impediments to creating a culture of innovation within the military is the use of processes to reduce or at least attempt to deal with complexity. Developing a culture of innovation will require the military to supplant the “culture of process” in the military with a culture of innovation.¹³⁹ Likewise, General Mattis, commander of U.S. Forces Command, alluded to this when he said the military could not afford to substitute effects-based thinking and its associated tools for the basic intellectual skill of critical thinking and creative campaign design.¹⁴⁰ Focusing on the process can optimize results but can inhibit innovation by not focusing on the product. This does not mean to imply that processes are inherently bad, but recognizes the fact that bureaucratic processes are optimized for control rather than change.¹⁴¹ Leaders can allow and facilitate innovation by managing attention to issues instead of focusing on

¹³⁵ Garvin, *Learning in Action*,.

¹³⁶ Fastabend and Simpson. “Adapt or Die” 15.

¹³⁷ *Ibid.*, 16.

¹³⁸ *Ibid.*

¹³⁹ *Ibid.*, 18.

¹⁴⁰ Mattis, “USJFCOM Commander’s Guidance for Effects-Based Operations.”, 108.

¹⁴¹ Fastabend and Simpson. “Adapt or Die” 17-18.

process outputs or dictating solutions.¹⁴² Timely ideas can languish because of complicated and bureaucratic processes that are not responsive to the pace of rapidly changing technology and creative ideas that are time-sensitive.

Soldiers must have the moral courage to speak up when they believe they have something relevant for senior leaders to hear; at the same time, leaders must foster an organizational climate that encourages constructive dissent and be willing to listen. “Army leaders must create an environment where critical thinking is the norm and reasoned debate replaces unspoken dissent.”¹⁴³ Many leaders discuss this in their command philosophy but their actions when confronted with differences in opinion will more readily identify whether or not this is truly part of their personal values. Trust is a critical element of this relationship between leaders and led, fostered by a culture that encourages positive and constructive differences.

Crane presents an alternative point of view. His main argument is that the U.S. Military does not need to foster a culture that encourages daring risk-takers, but rather “should advocate aggressive exploitation of opportunities, with due concern to mitigate risks”.¹⁴⁴ At the same time, commanders must encourage innovation throughout their organizations and be prepared to acknowledge creative ideas of subordinates in order to create the same atmosphere of decentralized adaptation that was so successful for the American Army in World War II.¹⁴⁵ In order to take advantage of the opportunities and aggressively exploit them, one could argue that it will require some creative thought generating new ideas, all tempered with judgment.

The officer corps is directly responsible for establishing military culture in that historically, the officer corps is the body that assesses the external environment, analyzes

¹⁴² Heifetz, *Leadership Without Easy Answers*, 88.

¹⁴³ Fastabend and Simpson. “Adapt or Die” 21.

¹⁴⁴ Crane, “Beware of Boldness.” 96.

¹⁴⁵ *Ibid.*

potential responses to identified threats, and ultimately determines how the Army prepares to defeat the threat in combat.¹⁴⁶ “Military culture might best be described as the sum of the intellectual, professional, and traditional values of an officer corps”.¹⁴⁷ A key element here is the intellectual component of military culture with its foundation in the officer education system. Values placed on education and their roles within military culture are critical. Through a dedicated commitment to their profession and a willingness to intellectually engage the complexities of war in a critical manner, leaders will be able to see and exploit the potential of long-term innovations.¹⁴⁸ To change culture, the Army must focus on behaviors first and then changes to the culture will occur over time.¹⁴⁹

Education

Critical thinking is the thought process that aims to find truth in situations where direct observation is insufficient, impossible, or impractical. It allows thinking through and solving problems and is central to decision making. Critical thinking is the key to understanding changing situations, finding causes, arriving at justifiable conclusions, making good judgments, and learning from experience. Critical thinking implies examining a problem in depth, from multiple points of view, and not settling for the first answer that comes to mind.

FM 6-22, *Army Leadership*¹⁵⁰

Critical thinking is both an art and a science, techniques that can be taught and learned.¹⁵¹ Techniques for critical thinking include the careful application of logic or the alternative

¹⁴⁶ Murray. “Innovation: Past and Future,” 313.

¹⁴⁷ Ibid.

¹⁴⁸ Ibid 325.

¹⁴⁹ Fastabend and Simpson. “Adapt or Die” 18.

¹⁵⁰ Field Manual 6-22, *Army Leadership*, 6-1.

¹⁵¹ Fastabend and Simpson. “Adapt or Die” 20.

application of deduction and induction.¹⁵² Fastabend and Simpson recognize the power of education and its role in the military and the profession of arms and call for a thorough review of the institutional educational system in order to assess its effectiveness at engendering critical thinking.¹⁵³ Dr. Williamson Murray, professor emeritus of history at Ohio State University, is also an advocate for fundamentally rethinking the approach to professional military education.¹⁵⁴ He identifies the relationship between operations and schools as being a significant factor in successful innovation during the interwar period.¹⁵⁵ “Professional military education must remain a central concern throughout the entire career of an officer.¹⁵⁶ It is more than just developing a better school system but must foster changes in cultural values and encourage intellectual curiosity.¹⁵⁷ The ability of the officer education system to develop and encourage critical thinking should be one of the paramount objectives of this system. Critical thinking is a learned behavior with its foundation in the Army Education System. Moreover, this can be the most effective lever of cultural change.¹⁵⁸

A keystone of the profession of arms and Army culture is the education system. “The goal of the officer education system is to produce a corps of leaders who are fully competent in technical, tactical, and leadership skills, knowledge, and experience...can operate in an environment of complexity, ambiguity, and rapid change; and can adapt to and solve problems creatively.”¹⁵⁹ This regulatory description of the education system does a good job of outlining

¹⁵² Fastabend and Simpson. “Adapt or Die” 20.

¹⁵³ Ibid., 21.

¹⁵⁴ Murray. “Innovation: Past and Future,” 327.

¹⁵⁵ Ibid.

¹⁵⁶ Ibid.

¹⁵⁷ Ibid.

¹⁵⁸ Fastabend and Simpson. “Adapt or Die”, 21,

¹⁵⁹ U.S. Army Regulation 350-1, *Army Training and Leader Development* (Washington D.C: Headquarters, Department fo the Army, 2007), 52.

the expectations and requirements for educating officers and incorporates aspects of the current complex operational environment. The critical education that field grade leaders in the Army receive is Intermediate Level Education (ILE) at The Command and General Staff College. Army Majors and senior Captains attend ILE ideally between their eighth and twelfth years of service. The goal of ILE is to provide advanced branch, functional area, and branch-immaterial staff process training.¹⁶⁰ Institutional training along with education is one of three domains that achieve the Army's leader development concept.¹⁶¹ The purpose of this system is to "produce adaptive leaders who act with boldness and initiative in dynamic, complex situations to execute mission according to present and future doctrine."¹⁶²

Williamson Murray identifies professional military education as a central theme in fostering an atmosphere that generated the imaginative powers and ultimately enabled successful innovation during the interwar period and its importance in the future.¹⁶³ Murray states "professional military education was clearly a major player in the process of innovation in the interwar period; it will probably be even more important in the future, but only if it provides the broad conceptual framework that innovation requires."¹⁶⁴ He also found that poor or ineffective officers' education "where schools were more interested in inculcating an absolute doctrine...or where the values of military education never formed a significant portion of the officer corps' worldview" that, the result was less successful or flawed innovation.¹⁶⁵ This history of the interwar period suggests that thinking in terms of creating an officer corps educated and

¹⁵⁹ U.S. Army Regulation 350-1, *Army Training and Leader Development*, 52.

¹⁶⁰ *Ibid.*

¹⁶¹ *Ibid.*, 7; the other two domains are operational assignments and self-development.

¹⁶² *Ibid.*

¹⁶³ Murray. "Innovation: Past and Future," 317-318.

¹⁶⁴ *Ibid.*, 325.

¹⁶⁵ *Ibid.*, 317-318.

encouraged to innovate is a key step in generating innovation within the Army. The education and value system of the officer corps are essential to effective innovation, at both the unit and institutional level.

Army leaders must seize opportunities to think creatively and use innovative thinking as they solve problems and challenges they face. This can manifest itself in looking at an old problem in a new way, or dealing with a new challenge that requires a novel approach. Thinking creatively is a key concept of innovation and involves developing new ideas and ways to challenge subordinates with new approaches and creative ideas.¹⁶⁶ Creative thinking can involve adaptive approaches (using previous experiences as a basis for solving problems) or innovative approaches (coming up with new and novel solutions). Challenging subordinates with forward-looking approaches and ideas can help prevent complacency and generate a culture that facilitates and encourages innovative thought. Leaders can foster this within their organizations by modeling this type of behavior and thinking. This will reinforce these concepts in future generations of leaders.

Changes the Army Needs to Make

Fostering an Innovative Culture

Leadership

While culture is a difficult concept to define and even harder to change, few would argue that there is not a culture unique to the Army and the profession of arms. Changing culture is a slow process that evolves over time, and in fact can take an entire generation of officers to effect change as the intellectual fabric of the Officer Corps and organizational norms alter the

¹⁶⁶ Field Manual 6-22, *Army Leadership*, 6-2.

institutional values. There are actions that the Army can take to work towards improving innovation and creating an environment where Soldiers are willing to think critically, challenging the status-quo and established bureaucracy. The quest for learning must be part of all Army units, through unit-level professional development as well as institutional training and education. Army leaders must encourage and underwrite efforts at experimentation allowing ideas to come to fruition and quickly capitalizing on those that work and analyzing those that do not work—not to persecute the generator of the experimental idea—but to understand what did not work, to determine why and what can be done to improve for the future. This will help units become better and facilitate the process of developing dynamically adaptive and innovative leaders. Small changes over time, made deliberately across the institution, will enable the culture of the Army to change, to improve the environment and make it more conducive to innovation and to move the institution towards a culture of innovation.

The organizational culture must be open to and facilitate innovation. As part of that, Army leaders must continue to work towards minimizing the zero-defects mentality that can quickly establish itself insidiously within an organization focused on process outputs and data generation instead of actionable information and idea generation. Pressure alone to produce results will not necessarily produce bold and innovative thinking. The environment must encourage risk taking.¹⁶⁷ These concepts might seem counter to the military culture or at least the realities that a staff officer faces while operationally engaged whether supporting combat, humanitarian relief operations or training. The realities of working on a staff are similar to a pressure cooker—not necessarily based on the leadership climate—but by virtue of the environment. There are immense institutional pressures to produce results in a short and often time-compressed model. There are immense amounts of data that are available to sift through in

¹⁶⁷ Garvin, *Learning in Action*, 39.

order to define and refine information critical to decision-makers. Staff officers are compiling and finalizing daily operational briefings, developing and refining operational and contingency plans all done under immense pressure to produce near-flawless products. The key is for leaders to recognize this tyranny of the immediate and attempt to instill discipline within internal organizational processes and systems to minimize the pressure for perfection while maintaining high standards.

Leadership is critical to improving innovation within the Army. As Senge stated, it starts at the top with a commitment to learning. By encouraging critical and creative thinking, experimenting, and generating a trusting environment, Army leaders will facilitate innovation throughout the institution.

Doctrine

The Army's doctrine must incorporate more aspects of innovation, innovative leadership and creative thinking as it continues to develop. This does not mean to imply that there should be a codified doctrine concerning innovation, but that the Army must address innovation in training and leadership doctrine. The evolution of doctrine is a dynamic process with lessons learned coming back from operations and training in the field and as part of professional dialogue and discourse throughout the profession of arms. Doctrine changes directly impact how the Army fights, conceptualizes the enemy and other threats, and how the Army trains and educates leaders. Ensuring that innovation and creative thought are an ongoing part of the doctrinal evolutionary process will help to inculcate innovation into the culture of the Army.

Structure

The Army should not make any structural changes specifically related to innovation. Creating offices of innovation or functional areas focusing on innovation merely increases the bureaucracy and will not attract the creative and dynamic personalities intent on driving

change.¹⁶⁸ Change must come from within the culture and primarily from officers in the mainstream of their profession that have the respect of their peers and potential for increased advancement who are willing to take risks.¹⁶⁹

Leaders must be aware, however, of the impact that large hierarchical organizational structures can have on innovation. As Clarence Kelley demonstrated with Skunk Works, a flat overhead with minimal filters provides an environment that is more conducive to generating innovative ideas and allows for in-stride modifications to existing plans. Leaders must foster an environment that enables decentralized adaptation or innovation within their existing organizational structures.

Training

The Army has institutionalized the After Action Review (AAR) process, whereupon completing training soldiers conduct an internal review of what the training audience intended to accomplish, how they accomplished their mission, and to discuss among themselves how they could have accomplished the mission differently at both the individual, collective and leadership levels. They also relate this back to doctrine to ensure their actions are grounded doctrinally. This process at installation level in conjunction with the Combat Training Centers (CTCs) has been very successful in generating the highly trained Army recognized today.

There are already countless examples of innovation and dynamic adaptability exhibited by soldiers and leaders. By incorporating aspects of risk-taking and creative thought into the after action review process, training exercises will begin to facilitate more innovation and innovative thought and highlight to training audiences where these ideas came from and how they can

¹⁶⁸ Murray. "Innovation: Past and Future," 326.

¹⁶⁹ Ibid.

capitalize on these ideas. The Army must start to assess innovation and creative thought, to identify it when exhibited and reward efforts to take chances and experiment.

Education

To improve the potential for innovative thinking within the field grade ranks, the Army education system and especially Intermediate Level Education must focus on developing critical thinking skills. This is the intent of the British Joint Services Command and Staff College. In the 1990's, the British transitioned from a single service, process-based instruction model where the focus was on 'professionals training professionals' to a Joint and interagency model with the focus on providing intellectual tools for effective decision-making. Instructors and methodology changed with a military-academic partnership bringing in civilian professors providing students with a broad exposure to a series of concepts and tools, not just the minutiae of doctrine and theory.¹⁷⁰ This honest and introspective evaluation allowed the British Army to implement what they believe to be important and effective change.

While all levels of the officer education system are important, earlier courses focus primarily on task training and the necessary skill sets company grade officers require to enable success early in their careers.¹⁷¹ With the potential for complex-adaptive or "wicked" problems to dominate future conflicts, leaders must be able to solve problems creatively for effective decision-making, whether on the battlefield or the halls of the Pentagon. Critical thinking provides the foundation for this ability to look at problems from a new perspective, with an appreciation for the socio-cultural implications of specific courses of action, looking at second and third order effects of critical decisions.

¹⁷⁰ Discussion with Professor Matt Uttley, Dean of Academic Studies, Joint Service Command and Staff College; AOASF Visit to UK Defence Academy; Shrivenham, UK; October 14, 2008.

¹⁷¹ AR 350-1, *Army Training and Leader Development*. Current officer education courses include Basic Officer Leaders Course, with pre and post-commissioning phases for Cadets and Lieutenants and the Captains Career Course for junior Captains.

The Army must evaluate the effectiveness of Intermediate Level Education (ILE) for its ability to produce critical thinkers, developing the intellectual tools needed in current and future Army leaders. Fastabend and Simpson called for a comprehensive review of the officer education system, as did Murray.¹⁷² The Army must conduct a review of the effectiveness of universal ILE to accomplish its stated goals. The Command and General Staff School, the predecessor of ILE or the manner in which the Army accomplishes ILE has long been the cornerstone of the officer education system. With universal attendance at ILE, the Army has institutionalized this important educational course and it is now the first time that all officers attend a centralized school utilizing the same curriculum.

The Army must focus more on developing innovative leaders as opposed to adaptive leaders—or at least give these concepts the same focus. Being adaptive is reacting to external stimuli, changing because of an external influence. Without the complex discussion of dynamic versus passive adaptation, the word adaptation can connote coping or passively submitting to an external unbending reality, as Ron Heifetz, noted author on organizational leadership, discussed.¹⁷³ The Army must produce leaders who have the skill and imagination to generate new ideas that are both innovative and generate change based on creative and critical thinking.

The Army must take a critical look at how it educates its field grade leaders. Is the current system providing a foundation in critical thinking as well as doctrine that will encourage innovative and dynamic adaptation in leaders? Can it do this more effectively and how should professional military education accomplish this? The Army's serving officers and senior leaders should conduct this critical assessment and not farm it out to contractors or think tanks who

¹⁷² Fastabend and Simpson. "Adapt or Die" 21, and Murray. "Innovation: Past and Future," 327.

¹⁷³ Heifetz, *Leadership Without Easy Answers*, 26.

inherently have an agenda or ulterior motives based on business models. The Army can and should be able to conduct this internal review to provide an optimal solution for the Army.

The current and future operational environments are inherently complex with multiple and interconnected complex-adaptive or wicked problems. The ability of the Army to remain relevant, to continue to transform the Army, and to fight and win the nation's wars will depend on its ability to produce field grade leaders who demonstrate critical thinking and are innovative. They must be able to look at problems in a different context, to reconceptualize problem variables, to engage in second-order learning, and have the moral and physical courage to underwrite the risk associated with fostering innovation within their formations. This will enable them to be capable of dealing with complexity more effectively and providing innovative solutions that will in turn allow their units and Soldiers to seize and maintain the initiative while fighting an agile and thinking enemy and facing other diverse threats.

Appendix 1

Definitions of Organizational Learning¹⁷⁴

1. Organizational learning means the process of improving actions through better knowledge.¹⁷⁵
2. Organizational learning is increasing an organizations capacity to take effective action.¹⁷⁶
3. An entity learns if, through its processing of information, the range of potential behaviors is increased.¹⁷⁷
4. Organizational learning is a process of detecting and correcting error.¹⁷⁸
5. Organizational learning is defined as the process by which knowledge about action-out-come relationships between the organization and the environment is developed.¹⁷⁹
6. Organizations are seen as learning by encoding inferences from history into routines that guide behavior.¹⁸⁰
7. Organizational learning occurs through shared insights, knowledge, and mental models...[and] builds on past knowledge and experience—that is, on memory.¹⁸¹

¹⁷⁴ Table 1-1 from David A. Garvin, *Learning in Action: Putting the Learning Organization to Work* (Boston: Harvard Business School Press, 2000), 10.

¹⁷⁵ C. Marlene Fiol and Marjorie A. Lyles, "Organizational Learning," *Academy of Management Review* 10 (1985): 803.

¹⁷⁶ Daniel H. Kim, "The Link Between Individual and Organizational Learning," *Sloan Management Review* (Fall 1993): 43.

¹⁷⁷ George P. Huber, "Organizational Learning: The Contributing Processes and the Literatures," *Organization Science* 2 (1991): 89

¹⁷⁸ Chris Arbyris, "Double Loop Learning in Organizations," *Harvard Business Review* 55 (September/October 1977): 116.

¹⁷⁹ Richard L. Daft and Karl E. Weick, "Toward a Model of Organizations as Interpretation Systems," *Academy of Management Review* 9 (1984): 286.

¹⁸⁰ Barbara Levitt and James G. March, "Organizational Learning," *Annual Review of Sociology* 14 ((1991): 319.

¹⁸¹ Ray Stata, "Organizational Learning—the Key to Management Innovation," *Sloan Management Review* (Spring 1989): 64.

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