Military Innovation Through 'Brilliant Mistakes'

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In February 2004, two bright Army analysts wrote an article published in ARMY Magazine about the need for a culture of innovation because of the risks of war. "Failure does not mean Chapter 11 and an updated resume," wrote then-Brig. Gen. David A. Fastabend and defense analyst Robert H. Simpson. "Failure means death and destruction for ourselves, our comrades and all that we cherish." Their groundbreaking discussion called for a cultural change to advance the importance of innovation. Indeed, the Army has innovated and developed new warfighting capabilities, in large part because the nation was at war. In war, a gap between expected and actual performance of a plan, tactic or system creates a demand signal for change.

As the current condition of war fades into something not exactly peace and not exactly war, it is not clear the Army wants to keep fighting the same way after having learned lessons from the operational experience. The demand signal for innovation is shifting from the requirements of current operations to political, bureaucratic and strategic factors. The challenge for senior leaders is to limit the extent to which the Army's agenda for change is dictated by the first two factors and to encourage the organization to be relentless in identifying emerging performance gaps as it prepares for future conflict. This latter task, what we call "anomaly-seeking," is a way to do it.

How can Army leaders create conditions in which the organization values and seeks information that challenges the "knowns" of military science? The answers to this question will help the U.S. military's approach to the uncertain future. Rather than "adapt or die," it should seek to "innovate to thrive." The fundamental challenge to leading military innovation in peacetime is engineering the competitive context to discover and validate new military problems. To do so, we must foster a culture and develop processes that value falsification of closely held assumptions. Thus, we recommend foremost that war games and simulations be structured to value learning, which must include results that contradict expectations.

It is insufficient to rely on strategic leaders to do this through sheer force of will. Leaders are unlikely to advocate innovations that are not aligned with the dominant culture and strategy. Senior leaders, however, have the responsibility to shape culture, and they can influence the context of innovation. The assumptions upon which a culture is based are changed through the demonstration of viable and preferable alternatives. In the case of innovation, the competitive context in which a new approach is evaluated is this demonstration. Clearly, innovations were required to address the peace enforcement missions in Bosnia and Kosovo during the last half of the 1990s and also during the stability operation phases of Operations Enduring Freedom and Iraqi Freedom.

Concepts of War Might Be Wrong

Theories are starting points for discovery. They determine what questions we ask, what kind of information we value and what methods we use. When we have a theory, we deduce expectations or hypotheses about the world. Theories are never true, because they have not yet been proven to be true—or false. Strong theories produce results that we expect. Anomalies are observations that contradict the expectations of theory. When we accumulate enough anomalies, we decide that the facts are no longer in accord with expectations, and the theory is discredited. "How many anomalies are enough to provoke this change?" is a question for which there is no simple answer.

Creating and seeking anomalies can be uncomfortable because it requires challenging assumptions we hold dear. To paraphrase the late historian Elting E. Morison, military organizations are societies built around and upon the prevailing concepts of war. A challenge to an established concept is a challenge to the organization's social structure.

Militaries operate based on theories of competition. Because human systems—of which war is one—are adaptive, all theories of action in those systems must be provisional. We should therefore be comfortable with the idea that our concepts of war might be wrong. Indeed, in war, every theory of competition will eventually succumb to new facts. Yet, in peacetime, absent the undeniable evidence of operational military struggles and failures, military organizations must synthetically produce "new facts" of war.

Seek Anomalies in War Games, Simulations

Validating new military problems in times of peace is challenging but not impossible. Militaries have numerous resources for identifying new problems that may not yet be legitimated by the organization's culture: the development of military strategy and doctrine; intelligence about the plans and capabilities of actual and potential adversaries; academic research; policy debates in government; innovations in industry and consumer technology; and conflict and other events in other nations. Elements of the new problem can be explored and tested through war-gaming and simulation. Emphasizing the importance of effective war-gaming, historian and author Williamson Murray, a former Army War College and U.S. Military Academy professor, wrote: "The services must ensure that 'lessons learned' analyses aim at more than merely validating current doctrine and processes." In making this point, Murray cites the example of the French conduct of war games during the interwar period, when they "created a system in which exercises and study occurred within narrowly constrained limits that insured the sanctioned approach would again prove out."

Lest we dismiss this as a foible of foreign militaries, consider the following: In the summer of 2002, the U.S. military conducted a major war game involving both live exercises and simulations. The red force in Millennium Challenge 2002 was commanded by retired Marine Corps Lt. Gen. Paul Van Riper. In the initial stages of the exercises, Van Riper employed a preemptive, low-tech strategy that destroyed 16 blue force vessels and led to the suspension of the exercise. When the game was restarted, both sides were instructed to adhere to a script.

In an interview for a 2004 *NOVA* broadcast called "The Immutable Nature of War," Van Riper offered his perspective of what happened: "It started out as a free-play exercise, in which both red and blue had an opportunity to win the game. However, about the third or fourth day, when the concepts the command was testing failed to live up to their expectations, the command then began to script the exercise in order to prove these concepts." The U.S. military must be open and honest in its design and interpretation of war games—which, in turn, supports its development of doctrine.

Recognizing that organizations are adept at ignoring inconvenient information, strategic leaders must also acknowledge that as humans we prefer information that reinforces our understanding of the world. We ignore or explain away observations that contradict our basic assumptions. Every war game, simulation, conflict that involves other nations and adversaries, and examination of strategy (even in fiction) is an opportunity to discover an anomaly. All of that is pointless, however, if we have not determined what information would cause us to question our assumptions. This is the science of anomaly-seeking. It

does not mean that every anomaly causes us to abandon a theory, but the discovery of anomalies should always prompt us to engage in further exploration and experimentation.

'Brilliant Mistakes'

This anomaly-seeking behavior is described by decision theorist Paul J.H. Shoemaker as making "brilliant mistakes" that "accelerate learning and lead to breakthrough innovation." Shoemaker observed that organizations are very clear about their core competencies, but less so the underlying assumptions upon which the competencies are based. He contends that deliberately testing selected assumptions, such as those without catastrophic consequences for failure, will provide a wealth of new knowledge and, subsequently, learning for organizations.

For the U.S. military and the Army, testing the assumptions of strategic and operational concepts to failure is the prudent thing to do. Such challenges to the Active Defense doctrine for Europe gave way to the emergence of AirLand Battle and drove the development of the Big Five systems (Abrams Main Battle Tank, Bradley Infantry Fighting Vehicle, Apache and Black Hawk helicopters, and the Patriot Missile) to counter the problem of the sheer quantity of Warsaw Pact forces.

Validation of new problems is a by-product of anomaly-seeking in games and simulation. As we seek to falsify our existing assumptions, and as we explore new problems, either our existing assumptions will be invalidated and we will begin to discover and validate new problems, or our existing assumptions will remain intact until the next test.

War games and simulations have problem sets and solution sets. The problem sets may be restricted to validated problems—those that an influential agent in the resource allocation process has recognized as requiring a solution, or that are legitimated by the organization's existing strategy and culture—or they may include emerging, not-yet-validated problems. The solution sets include the organization's current and potential solutions (resources, concepts, capabilities and so on) in light of the problem set.

The failure to identify new military problems is the greatest risk in peacetime military innovation. Therefore, the structure of war games and simulations should make the identification and validation of new problem sets the overriding objective. A problem is validated when it is revealed to pose a risk above the threshold requiring a mitigation strategy. The organization then examines whether existing solutions are adequate to solving or managing it. The weak link is usually this second component, when the organization distorts its findings in order to make the preferred solutions (usually the status quo) match the new problem. Instead of recognizing anomalous data as a challenge to a theory, the organization questions the source of the data or the data itself, arbitrarily redefines the problem or the desired outcome, or modifies its theory in order to protect it from falsification.

Reframe 'Winning'

To avoid these errors, we must reframe "winning" in war games and simulations. Military organizations are inevitably biased to confirm their strategic assumptions. War games and simulations should therefore be structured to seek anomalies. This means changing the objectives to reflect the nature of the solution set under consideration. For existing solutions, falsifying outcomes should be valued. For emerging solutions, descriptive outcomes should be valued. In other words, we should describe what *did* happen rather than what *should have* happened.

We specifically recommend that falsification should be the objective of war games and simulations in the context of existing solution sets. That is, these activities should create conditions in which falsifying outcomes are "wins." For example, a war game in which the opposing force reveals a fundamental weakness in an existing solution, as with Millennium Challenge 2002, should be viewed as a success—which, in turn, would prompt further examination.

Our second recommendation is that description or exploration should be the objective of war games and simulations in the context of new or emerging solutions. That is, these activities should create conditions in which outcomes that reveal new information about emerging solutions, challenges in implementing concepts, or issues with training and evaluation are considered "wins." To do this, we must change the language that we use to describe these objectives. Words such as *validate* and *confirm* should not be used in connection with games and simulations except in the identification of new problems.

Finally, we should not combine conceptual experimentation and development with training. Training is about fulfilling expectations—the performance and evaluation of an action according to an established script. Experimentation is about creating conditions in which our expectations may be subverted. In the military, we often confuse the two.

The identification and exploration of anomalies is essential to military innovation. By valuing information that falsifies our assumptions and by seeking those inconsistencies in war games and simulations, the U.S. military will be more likely to discover those anomalies. The irony is that in seeking relentlessly to prove our assumptions wrong, over time we are more likely to have the right assumptions. ★

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