

The Future of TECOM

Applying learning principles and best practices
to more effectively create an intellectual edge in our Marines

by Chris Casey and MAJ Donald Vandergriff, USA(Ret)

The core concepts presented in the Vision section of the forthcoming *TECOM Strategic Plan* and outlined in several recent conferences, particularly the “Greater Emphasis on How Marines Learn” and the “Focusing on Outcomes Based Learning,” imply an approach to learning that differs significantly from that which TECOM has traditionally employed. The purpose of this article is to:

- Argue that, while it met our needs in the past, the Marine Corps traditional (and current) approach to learning is based on an outdated theory and understanding of our warfighting needs.
- Provide the reader with contextually grounded explanations of the *38th Commandant’s Planning Guidance* (CPG), the *TECOM Strategic Plan*, and the new *MCDP 7, Learning* core concepts, inclusive of critical principles and best practices, and why these represent a better pathway for the future of Marine Corps learning.
- Stimulate the reader to evaluate how these concepts, principles, and best practices should be adapted and applied across formal schools in TECOM and in the Fleet Marine Forces.

The article begins with a depiction of a fictional class at a TECOM formal school, taking place in the near future. The description of the fictional class is very different from the TECOM classes most Marines have attended, whether in training or education. To explain why, the article provides a historical context for both the learning theory and warfighting needs that underlies the TECOM’s traditional (and current) approach to training and education, arguing that, while our traditional approach met a critical need in the past, it is no

>Mr. Casey is a Management Consultant who has spent the last two years with TECOM as a consultant with G-3/-5/-7 and now G-5, where he worked on the emerging TECOM strategy. He has consulted a wide range of organizations to include the World Bank, the United Nations, the Postal Service, as well as spending several years at Booz Allen Hamilton.

>MAJ Vandergriff was an enlisted Marine and U.S. Army Tank Officer. He is now a contractor in support of TECOM G-5. He has written and edited several books and articles dealing with maneuver warfare, personnel reform and leadership, as well as learning. His latest book *Adopting Mission Command: Developing Leaders for a Superior Command Culture* was released through Naval Institute Press in September 2019.

longer appropriate. The article then explains the “what, how, and why” for key learning principles and best practices aligned with the *TECOM Strategic Plan*’s core concepts using fragments from the class narrative, demonstrating that the approach embodied in our fictional example is a better way to engender the adaptive, critical thinking, decisive warfighters we need now and in the future.

A Marine Corps Formal School Classroom Sometime in the Not-Too-Distant Future

The entering students notice the hand-drawn map on the white board. The map is similar to ones they have seen in previous classes but is clearly not the same. The students wonder about the focus of the day’s tactical decision game (TDG) or decision-forcing case (DFC) as the class has jumped from focusing on one subject to another and then back again seemingly without a pattern, almost always using TDGs as a foundation. (In most cases, class exercises have required the students to apply many different skills in whatever TDG or DFC the instructor has created, though one or two take precedence in terms of the discussions and the after-action reviews [AARs] that are always conducted.)¹

It shortly becomes clear to the students that creating an effective operation order (OPORDs) will be the focus of class today. (The students had started off by reviewing OPORDs in one of their first sessions.) But then they had moved almost immediately to creating them for whatever TDG the instructor put on the board, beginning with easier scenarios and then moving to more complex situations. The instructor was never consistent though. One day the class’ primary focus would be on creating an OPORD and then the focus would not return to OPORDs again for a week or so, focusing instead on other, widely varying warfighting skills.

The instructor reads out the situation (an ambush scenario), describes the map (terrain features, etc.) that has been drawn on the white board, and finally the requirement for the exercise. The instructor gives a location and intelligence on the enemy as further background. The students are informed that they will have five minutes to plan their mission and to write their OPORD to their (theoretical) squad. (When a student points out that they have never been shown how to conduct an ambush, the instructor simply informs the class that they are to do their best.)

At the end of the five minutes, the instructor tells the students to stop and hand

their papers to their fellow classmates. (The students notice that the instructor even manages to vary the fellow student to whom they are required to hand their paper.) A volunteer is identified to read their OPORD to the rest of the class. The volunteer retrieves her own OPORD and then goes to the white board. When she begins to tell the class what she intends, the instructor stops her and counsels her to read her OPORD to the class exactly as it is written. At the conclusion of the OPORD writing, the instructor asks the class (as she always does when the group practices whatever skill seems to be the focus of the day's class) for critiques, reminding them that the critique is limited to the volunteer's OPORD rather than their own.

The instructor participates in the critiquing process in a very limited way, keeping the discussion moving and focused on constructive feedback. When students provide non-additive comments ("It's a good plan."), the instructor reminds them that open-ended statements are not valuable feedback by themselves and then pushes the commenter to explain why they believe what they believe. When a student piggybacks on another's comment ("I agree with ..."), the instructor reminds them that we take ownership of our own critique, rather than simply relying on someone else's opinion. When a student points out that the volunteer's OPORD does not use standard terminology, the instructor nods, but then asks whether the OPORD allows the commenter to understand and explain the nature and purpose of the mission, whether he understands what the squad is to accomplish, whether there are any gaps in the information provided that could cause confusion or uncertainty later, and whether the OPORD presents a viable course of action. When the commenter responds that the OPORD satisfies all these conditions, the instructor nods and moves the critique on.

After each critique is provided, the presenting student is allowed to reply or defend their OPORD. The students' progress through each of their OPORDs in this manner. When students use their own words, rather than doctrinal terms, to describe an action, the instructor queries the students to see if anyone knows the accepted doctrinal term and then uses a second white board to memorialize the

correct doctrinal term in place of the student's description. (The instructor does not criticize the student for his lack of use of doctrinal terminology.)

As the class nears its end, the instructor stops the presentation of the OPORDs and critiques to conduct an AAR. (By now, the students know that the AAR is coming. It is a ubiquitous feature of every class.) During the AAR, the instructor shows the students what the actual OPORD looked like for this mission and what the actual squad leader did. (In this case, the mission had been a real one, taken from Marine Corps history. The instructor and the Curriculum Design Specialist who teamed to design the course had discovered the mission during their research into lessons learned, the Marine Corps archives, and other historical repositories.) The instructor asks the students to think about and discuss how their OPORDs differed and why their respective courses of action might have been better or worse, given what they now know. This results in a robust back-and-forth amongst the students,

... open-ended statements are not valuable feedback ...

facilitated by the instructor. At the end of the discussion, the instructor emphasizes that while their OPORDs were good given their still limited exposure, using appropriate doctrinal language standardizes communications, which provides warfighters, as a profession, with a common language (which, in turn, provides maximizes clarity and speed and minimizes the risk of miscommunication).

At the conclusion of the AAR, the instructor hands out an article that deals with how a small unit leader uses the OPORD as part of the OODA loop to solve a tactical problem. (Next class, during a break in the planned exercise, the students will discuss the impact of the article on their understanding of the OPORD and the OODA loop.) When a student asks the instructor to define the OODA loop, the instructor replies, as she

has many times before, that the student should look it up and come back next class to inform his peers of his findings.

With that, the class ends and the students depart, talking amongst themselves about how strange this class is compared to all the others they had taken during their childhood and adolescence—and how much they are looking forward to the next one.²

Why Does This Look So Different From What We Do Now?

Some of the elements in the previous example might ring a bell. Most of us, at some point in our Marine careers, have participated in a TDG. Almost all of us have been a part of AARs. But, were all of these things a designed combination in a single class, much less as the foundation of an entire program of instruction or formal school approach to learning? Definitely not. In fact, in most respects, this is the opposite of the way Marines learn now. Understanding why is critically important to recognizing that the learning approach embodied in the story above illustrates a far more effective future for the Marine Corps.³

The Marine Corps' approach to learning—from World War I through the Cold War, largely surviving today—is derived from a concept called "scientific management," which was a theory created in the late 1800s by the original "efficiency expert," Fredrick Taylor.⁴ At the time, the United States was engaged in a foundational shift from being a primarily farming-based society to a highly industrialized society. The precepts of scientific management fit this shift to industrialization almost perfectly. Scientific management maximized efficiency and productivity through standardization. Work was broken down into discrete, quantifiable tasks; observable outputs were measured; and, close control was closely exercised over workers. Each employee was delegated a simple task to repeat over and over.⁵ Workers were expected to complete each task under a predetermined work time. Organizations systematically derived best practices and planning, attempting to eliminate opportunities of chance or accident to investigation and control of every detail.

To support this large-scale shift to industrialization, the United States needed a large labor force to work in our new manufacturing environments under scientific management. In the early part of the 20th century, scientific management was adapted into a complementary model for education in public schools, many elements of which still survive today: lecture and teacher-centered classes; lessons broken down into time-specific increments; heavy emphasis on studying the same subject or element continuously with a test at the end; and grades based on practiced regurgitation of fact or the application of discrete models under constant conditions. Even the bells, which signal the end of a class, are an artifact of this system. The advantages of scientific management in education were easy to understand. A large population of workers could be efficiently trained to a basic level of competence to dutifully complete repetitious, largely rote tasks in highly controlled settings (as were factory floors).⁶

Learning of more complex, higher order skills—critical thinking, rational decision making in shifting, complex environments, adaptability—where scientific management did not perform as well simply did not matter in this context. Under scientific management, which by now pervaded the U.S. economy, workers had been stripped of their freedom to choose their work as well as how it should be done. And, of course, with most manufacturing being based on “competent, rote repetition,” there was no need for workers to understand why they were doing what they were doing—just to do it competently.⁷

When the U.S. military, including the Marine Corps, needed to dramatically increase in size in a very short time period to fight the wars of the early and mid-20th century, we institutionalized the same basic model used in U.S. public schools. We succeeded, providing the Marine Corps and the U.S. military at-large with an overwhelming force of “dutifully competent” Marines, Soldiers, Sailors and Airmen with which to fight these wars. Afterward, we not only retained this approach but expanded it, partially because of inertia, but also

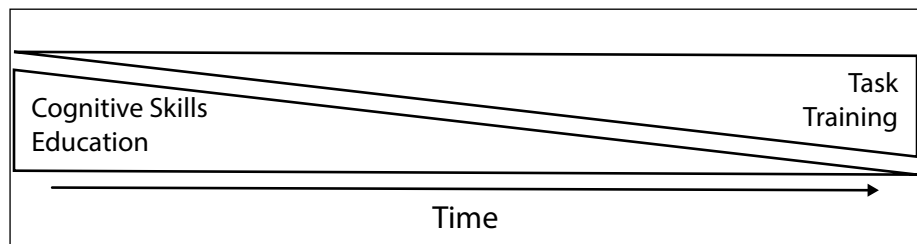


Figure 1. “The basics” are first teaching people how to think critically. Tasks or processes, “what to think,” are taught second. This broadens their frame of reference, their ability to adapt.

because it aligned almost perfectly with a “force-level” approach to manpower. To this day, we can—and do—calculate almost exactly the number of Marines that we can train to competence given a finite amount of time and money.⁸

How and Why Does This Fictional Example Illustrate a Better Future for Marine Learning?

We know that the needs of the Marine Corps vis-a-vis modern warfighting have changed dramatically. We can no longer rely on overwhelming force and manpower to provide the decisive edge in battle. Moreover, the proliferation of battlefield technology to small- and non-state actors means that we can no longer count on technological superiority to win the day. Both our own warfighting doctrine, *MCDP 1, Warfighting*, and our institutional knowledge, embodied in writings such as Gen Charles C. Krulak’s “The Strategic Corporal in the Three Block War,” strongly argue for leaders at the lowest levels who demonstrate critical thinking, bold decision making, rational risk taking, and adaptability under pressure.⁹

In short, clearly, we must evolve the “intellectual edge” identified in the TECOM CG’s guidance of 18 July 2018. Given its well-known weaknesses in fostering complex, higher order skills, our current approach—which is still based in the efficiency of Fredrick Taylor and 20th century school—is simply not, in aggregate, up to this challenge. So, why does the fictional example above represent a better path?

Employing best practices in adult learning. First and foremost, our example puts greater emphasis on how adults—and, in this case, Marines—actually learn. The fictional narrative is con-

structed to demonstrate principles and best practices in effective andragogy (adult learning theory). While our formal schools and programs of instruction vary widely, these andragogical principles and best practices, outlined in greater detail below, can be adapted and applied to virtually any learning need.¹⁰

The most immediate thing that should jump out is the role of instructor, which is as a guide and facilitator. The class is *learner-centric* in that it focuses on the students’ actions, thoughts, and reflections to stimulate learning, rather than relying on the instructor (and probably a long set of slides) as the bastion of knowledge and center of attention. Learner-centricity (also called “student centricity”) recognizes a central truth: All learning is internal to the learner. Training and education—as the Marines define them—are methods to stimulate learning, but they are not synonymous with learning. Learning happens when a student internalizes and integrates information/knowledge in his thought processes, behaviors, and/or psychomotor performance (depending on what is being learned). Given the internal nature of learning, personal motivation is an enormous factor. By becoming learner-centric, rather than instructor or slide deck-centric, we will be working to increase the motivation of our students and thus the likelihood of long-term retention and performance.¹¹

Also, rather than passively receiving instruction on how to write an OPORD, students are being presented with a problem (an ambush) based on actual historical event and are being asked to solve it: in this case, by developing and communicating an effective OPORD to their squad under time and

pressure. In this manner, the class is also employing an *active, contextual learning* approach, which emphasizes immersive, problem-solving in authentic, real-world situations in the learning process. While it could be said that issuing an OPORD in a classroom does fully replicate the act of doing so in the field, the same lesson could be run as part of a scenario-based, force-on-force engagement. Moreover, as indicated, the situations presented in the TDGs are purposely ambiguous and changing, which, in turn, deeply embeds learning and pushes students to continually practice reconfiguring their skills and knowledge to fit the new situation. In other words, this variation helps Marines learn to adapt.¹²

Our example also involves the students critiquing each other's solutions as a group, rather than the instructor simply communicating right and wrong based on a discrete answer set. This collaborative feedback process not only further illustrates both the principles of learner-centricity and active learning, it also demonstrates *peer-to-peer learning* wherein students collaborate during the learning process. Our doctrine and the realities of warfighting rely heavily on effective teamwork, so it only makes sense that our learning approach emphasize this.

Finally, note that the instructor does not harshly criticize students for errors (e.g., using non-standard terminology in their OPORD) but rather employs mistakes as a platform for learning. This is an example of a *supportive learning* environment, where students are safe to make mistakes, fail and learn from them and where the instructor is a repository of knowledge to be mined by the students according to their learning needs. A supportive learning environment helps to build and reinforce a learner's personal agency, which is especially critical to engendering leaders who are willing to take rational risks and to be decisive.¹³

For some of us, there will be an automatic, viscerally negative reaction to terms like "student-centered," "supportive," and "personal agency" being used to describe learning in the Marine Corps. As the world's premier fighting

force, we are the New York Yankees of warfighting, not a Montessori elementary school. Thus, we react negatively toward any indication that we might be "going soft" or lowering our high bar for performance even slightly. Rest assured, if anything, we will be raising it.

*Introducing desirable difficulties.*¹⁴ Our fictional example illustrates another core learning concept, known as *desirable difficulties*, which demonstrates exactly how we will further raise the bar in a constructive manner that better reinforces long-term learning and performance. Desirable difficulties re-orient our normal crawl-walk-run approach, which currently focuses primarily on the student achieving competence at each level of "what" and "how" for a skill or subject area before moving to the next level. With the introduction of desirable difficulties—some of which are highlighted below—we are attempting to constantly force the student beyond their comfort zone (in fact, to keep them from developing one). Desirable difficulties apply constructive stress throughout the learning process to force students to constantly adjust, adapt, and perform through ambiguity, failure, and constant change to reinforce long-term learning.¹⁵

At the outset of our fictional example, we noted that "the class has jumped from focusing on one subject to another and then back again seemingly without a pattern." In reality, there is a very intentional method being applied here,

which is called *interleaved learning* (see Figure 2).¹⁶ Most of us have exposure to the much more familiar practice of "block learning." In block learning, students focus on one subject or specific set of information until we achieve whatever level of mastery is desired and then we move on and do not return. Think of your elementary school math class. You probably did a weeks-long unit on "long division" and then moved on to "extended fractions" and then moved on again. When you finished any given unit, you had a test or a quiz. You likely then did not return to the same unit again. Block learning like this is very effective for short-term retention and near-term test performance.¹⁷

Interleaved learning, by contrast, varies the focus between multiple different subjects, sets of information, techniques, approaches, etc., moving from one to the other and back again. While it might seem that this would detract from learning that is not the case. Interleaved learning has been demonstrated to improve long-term learning and performance in comparison with block learning. Interleaved learning appears to achieve this by forcing the student to engage in a more cognitively rigorous learning process which aids retention. Given that Marines must apply warfighting skills and knowledge at irregular intervals with, in some cases, years between instances, a practice shown to promote long-term learning in this way has particular value to us.¹⁸

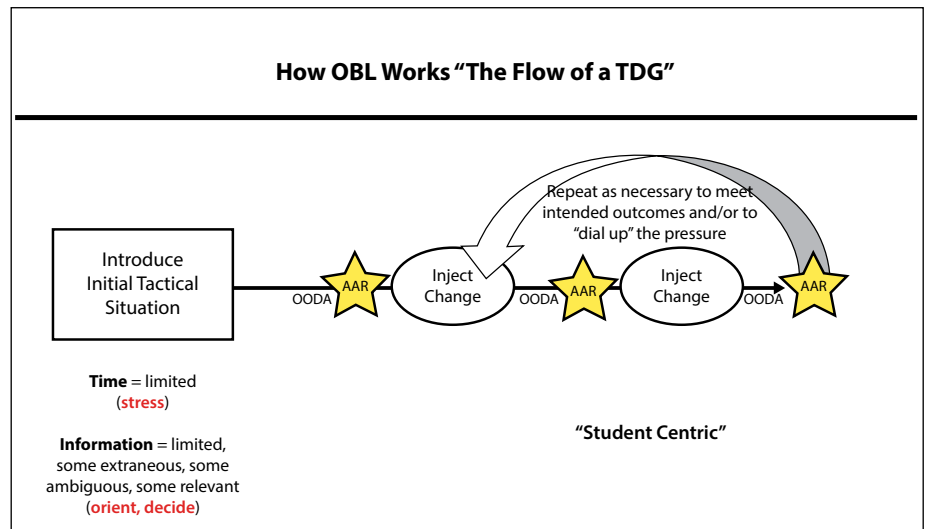


Figure 2. Desirable difficulties and interleaved learning using a TDG.

The example also states that students studied OPORDs in one of their first classes, but then almost immediately moved to executing them in the context of TDGs (in this case, using an ambush scenario with which the students had little to no prior experience). We have already outlined the learning advantages that accrue to active, contextual learning. Rather, it is the almost immediate move to repeated execution of OPORDs that we want to highlight here. While it may seem counterintuitive, an approach emphasizing limited study and increased evaluation—a *study-test-test* methodology—has been shown to be more effective for long-term learning and performance than one based on longer study and more limited evaluation (study-study-study-test). Again, a cognitively rigorous learning process applied to the same set of knowledge/information appears to result in better long-term learning and performance. Dr. Robert Bjork, the leading learning authority, found that such an approach was better for retention by constant application of knowledge by varying problem solving. People remember such experiences because they were challenging and always different.

Focusing on outcomes. Finally, the instructor’s reaction to a student critique’s assertion that an OPORD did not use standard terminology was also different. The instructor’s reaction was to tacitly acknowledge the validity of the criticism. In fact, the use of standard terminology is a component of standard training and requirements (T&R) event checklists for OPORD presently. By the checklist, this OPORD was non-compliant and therefore a failure under our current T&R methodology. However, rather than stop the critique or even immediately correct the OPORD’s author, the instructor moved the discussion to the impact of the OPORD. Despite the non-standard terminology (which, per the example, the instructor would eventually redress in a non-threatening manner), the OPORD explains the nature and purpose of the mission, allows the squad (or larger unit) to understand what they are to accomplish, does not contain any gaps in information that could cause confu-

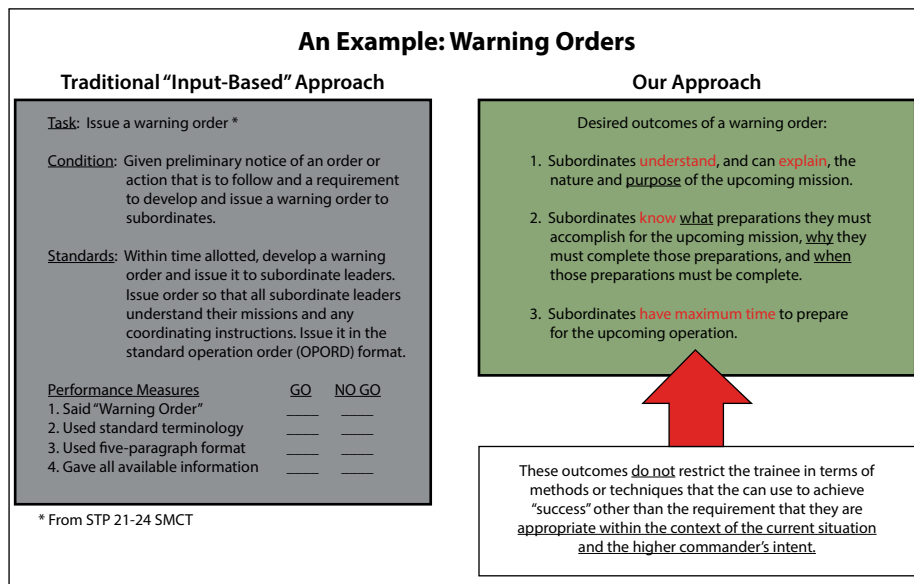


Figure 3. Comparison of industrial task with OBL.

sion or uncertainty later, and presents a viable course of action. In short, the OPORD has satisfactorily fulfilled its intended outcome, despite its technical flaw. This is an example of a limited application of outcomes-based learning (OBL).¹⁹ (See Figure 2.)

In its broadest conception, OBL is an approach to planning, managing, and delivering learning that uses observable outcomes to measure student development and learning effectiveness. OBL centers on engaging students in framing problems and solving them and evaluating primarily on results achieved, rather than by strict adherence to preferred methods or processes. Under OBL, methods and processes are considered important guides or tools which do not have the same priority in evaluation as a student’s ability to successfully adapt to the perceived needs of a given situation or to find a better solution via a non-standard approach. Most importantly, OBL emphasizes students learning the why—the underlying concept and reasoning for an action or choice—and not just the “what” and “how,” so that the student develops the intangible attributes, such as initiative, critical thinking, and judgment, required for effective conduct of maneuver warfare.²⁰

The Implicit Adaptive Challenges in our Fictional Example

You might imagine that our fictional

example presents a number of challenges to the Marine Corps: you would be right. First, the role of the instructor is vastly different from its current conception in most of our formal schools. In our fictional example, lectures and slides have been largely replaced with TDGs, DFCs, and Socratic discourse. Creating instructors who can be effective in this learning approach requires that we start with Marines with more personal and intellectual discipline and more aptitude for teaching, and then dedicate more time to inculcating the approaches, practices, and techniques outlined. (You may have also noticed the reference to the instructor and the *Curriculum Design Specialist* collaborating on course design and development.)²¹ Such a change would not only require similar modification to our Curriculum Design Specialists and their current development approach, but also to our base approach for instructional design.) Second, our fictional example clearly raises the bar on students as well. Students are no longer allowed to be passive learners who can then succeed by demonstrating short-term competence in largely controlled conditions and situations. To learn effectively in our fictional example, our students must be better prepared before the start of their program of instruction, which has myriad implications. One of these implications is that we must be more

selective in our student and Marine populations—ensuring they arrive at a course ready for the learning challenges which they face.

Finally, as a practical matter, it would be highly problematic to set a higher bar for learning and to push students to achieve greater levels of learning and performance only to present them with a reality upon graduation that does not live up to their capabilities. In other words, we cannot have a system that says it values learning and then does not reward those who have learned. We need to have an Fleet Marine Force and a Supporting Establishment that use and value what our best students will know and will be capable of. At a minimum, we need to ensure that those that have truly succeeded in our formal schools are selected for post-schooling opportunities that reward them for that performance.

In short, the Marine Corps will need to make changes outside of TECOM's responsibilities—most notably, to our manpower system—to truly reap the benefits of the changes outlined in this article. That said, we must start somewhere. Our fictional example clearly represents a better way for the Marine Corps to develop and sustain the intellectual edge we seek. The principles and best practices outlined can and should be adapted across TECOM, for both training and education. Our pathway to a better future for Marine Corps Learning must start here.

Notes

1. Donald E. Vandergriff, *Raising the Bar: Creating and Nurturing Adaptive Leaders to Deal with the Changing Face of War, 2nd Edition*, (Charleston, SC: Create Space, May 2012). Thanks to LTC Chad Foster, USA, for his insights. This fictional story is based on classes taught using the same method at the United States Military Academy, West Point, NY, the U.S. Army Reconnaissance Course at Fort Benning, GA, and selected U.S. Army Reserve Officer Training Corps programs.

2. Donald Vandergriff, "From Swift to Swiss: Tactical Decision Games and their place in Military Education and Performance Improvement," *Performance Improvement*, (Hoboken, NJ: Wiley, 2006).

3. William F. Mullen, "The MEU(SOC) Program: Are We Preparing Properly," *Marine Corps Gazette*, (Quantico, VA: March 1997).

4. Antoine Bousquet, *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity* (New York, NY: Columbia University Press, 2009).

5. Frederick W. Taylor, *Scientific Management: Comprising Management, The Principles of Scientific Management and Testimony before the Special House Committee*, (New York, NY: Harper and Row, 1964). The Competency model first appeared in New York City Schools in 1905. It was developed, and public schools patterned afterward, on producing factory workers. You see today in such concepts as "Leave No Child Behind," where students are trained for the test using memorization.

6. John Taylor Gatto, *Dumbing Us Down: The Hidden Curriculum of Compulsory Schooling*, (New York, NY: New Society Publishers, Limited, December 2004); John Taylor Gatto, *The Underground History of American Education: An Intimate Investigation into the Prison of Modern Schooling*, (Gabriola Island, CAD: New Society Publishers, Ltd., January 2001); John Taylor Gatto, *Weapons of Mass Instruction: A Schoolteacher's Journey through the Dark World of Compulsory Schooling*, (Gabriola Island, CAD: New Society Publishers, Ltd., April 2010); and Dan Glazier, *Military Reform through Education*, (Washington, DC: Project of Government Oversight, October 2015).

7. Donald Vandergriff, "What are the Basics? Developing for Mission Command," *Strategy Bridge*.

8. MG John J. Pershing to the Adjutant General, U.S. Army, 9 September 1917, in *The United States Army in World War I 1917-1919*, (Washington, DC: Government Printing Office, 1948). See also Jack C. Lane, *Armed Progressive*, (New York, NY: Bison Books, 2009). Lane presents Chief of Staff Leonard Wood's argument against the Uptonian view that civilians would require years of training in a unit to become effective professionals. Allan Millett says Pershing "had to have general officers who were military looking (in the parade ground sense)."

9. Gen Charles C. Krulak, "The Strategic Corporal in the Three Block War," *Marine Corps Gazette*, (Quantico, VA: June 1999).

10. Christophor Pappas, "The Adult Learning Theory—Andragogy—of Malcolm Knowles," eLearning Industry, (May 2013). Also based on discussions with Dr. Alana Nicastro, Chief

Education Officer, Marine Corps Operations Training Group, Twentynine Palms, CA.

11. Elaine D. Pulakos et al., *Adaptability in the Workplace: Development of a Taxonomy of Adaptive Performance*, (Arlington, VA: Personnel Decisions Research Institutes, 1999).

12. Gary Klein, *Sources of Power: How People Make Decisions*, (Cambridge, MA: Massachusetts Institute of Technology, 1998).

13. Personal agency is a well-understood and researched concept in human psychology. It refers to an individual's ability to create and direct action to a specific purpose (e.g., making a well-rationalized decision in a warfighting scenario under intense time pressure). It is influenced by the individual's belief in their effectiveness in performing the specific tasks, called "self-efficacy," as well as by the individual's actual skill.

14. R.A. Bjork, "Forgetting as a friend of Learning," in D.S. Lindsay, C.M. Kelley, A.P. Yonelinas, & H.L. Roediger, III (Eds.), *Remembering: Attributions, Processes, and Control in Human Memory: Papers in Honor of Larry L. Jacoby*, (New York, NY: Psychology Press, February 2015).

15. Robert C. Bjork, "How We Learn Versus How We Think We Learn: Implications for the Organization of Army Training," Briefing, (Fort Monroe, VA: U.S. Army Training and Doctrine Command, August 2006).

16. "Forgetting as a Friend of Learning."

17. "How We Learn Versus How We Think We Learn."

18. Interview with Dr. S.R. Stewart on 8 June 2009. Dr. Stewart is one of the leading scientists on how to develop adaptability.

19. Donald Vandergriff, "Today's Training and Education Development Revolution: The Future is Now," (Arlington, VA: The Institute of Land Warfare, 2010).

21. Theoretical and empirical support for this possibility comes from some domain-general decision-making research, as well as some wayfinding research.

22. Daniel Kahneman, *Thinking, Fast and Slow*, (New York, NY: Penguin Books, 2011).

