

Learning While Fighting

# Operational Knowledge Management That Makes a Difference

BY STEVEN MAINS AND GIL AD ARIELY

**T**he advent of new technologies has spawned a number of predictions regarding how information will change the face of warfare. Some have predicted that we are undergoing a *revolution in military affairs* (RMA) characterized by complete battlefield knowledge, total knowledge of friendly force location and status, and possession of a “persistent stare” directed toward enemy forces. This hype of “information utopia” has often overshadowed the real and ongoing revolution regarding the availability and use of lessons and shared knowledge.

Operational lessons are available faster, over greater distances, and from more varied environments than ever before. The collection and use of lessons are neither a new phenomenon nor a new need. What is new is the quantity and velocity of current and historical lessons available to commanders and soldiers in near real time. Despite these recent advances, there is no indication that we have reached a plateau in our ability to collect and share lessons. The question is, “What does this mean for the future?” When looking into the future of leveraging knowledge on the battlefield, and

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in preparing the fighting forces to implement lessons and knowledge from the experience of other forces, it is wholly appropriate that we look into past efforts to learn and implement lessons in military and civilian organizations.

The need to learn quickly and adapt in a dynamic environment is seminal for both military and civilian organizations. Yet the military has developed methodological expertise and experience that may act as a frame of reference for civilian organizations developing similar lessons learned and operational knowledge management (KM) capabilities to accelerate learning and knowledge. This is of even greater value for civil-military cooperation, such as in a Provincial Reconstruction Team (PRT), where commonality in lessons, processes, and culture would enable knowledge-sharing across organizational boundaries.

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This article examines operational knowledge management, or as Americans more often call it, *lessons learned*, through case studies drawn from different wars, militaries, and arenas. We try to exemplify the evolution in knowledge organization from “intuitive” attempts by “entrepreneurial” commanders to structured, deliberate efforts to collect knowledge, analyze it, and integrate it back into the forces—from permeating a lesson to raise situational awareness to changes in programs of instruction or training, or doctrinal adjustments. We use these historical vignettes to illuminate the trajectory and create a proposal for the future.

## World War II

There were several efforts to collect and share combat lessons during World War II. Colonel Russell “Red” Reeder and S.L.A. Marshall wrote detailed accounts of battle experiences in the Pacific. Their work was published as bound books, which were distributed well after the action.<sup>1</sup> To rapidly share lessons across the front, the U.S. 12<sup>th</sup> Army Group, under Lieutenant General Omar Bradley, began distributing a knowledge newsletter entitled *Battle Experiences* immediately after D-Day. Development was centralized at Army level, but the focus was tactical, aimed at “enable[ing] units . . . to profit from the latest combat experiences of our troops now fighting the Germans.”<sup>2</sup>

Distributed daily, each *Battle Experiences* newsletter was one page, printed front and back, allowing for quick dissemination and integration of the lessons, even with the time constraints of commanders in combat. The newsletters dealt with tactical issues—combined arms tactics, leadership, supply—containing both negative lessons for Soldiers to learn from and positive best practices to repeat and emulate. Most were immediately applicable to save lives through improved operations or self-protection. For example, one newsletter recommended adding an “extra armor plate on the bottom of M-8 armed car” to protect against buried mines and included instructions for its application.<sup>3</sup>

Not limited to what the U.S. Army was learning directly, the newsletters included lessons from Allies. Since Soldiers tended to remain in one theater for most of the war, they provided useful insights from other theaters to disseminate lessons across the force.

Interestingly, one of the lessons contained in *Battle Experiences* regarding urban warfare recommended going through walls to avoid the “beaten zone” of the streets. This lesson



U.S. Air Force (Manuel J. Martinez)

Soldier and military working dog jump from Chinook helicopter during Emerald Warrior 2011 exercise designed to leverage lessons learned from Operations Iraqi Freedom and Enduring Freedom

reappeared as a local innovation when the Israelis fought in kasbahs.<sup>4</sup> It is an aside to the World War II example, but central to the theme of this article that hard-won knowledge from the past is often relevant—but unknown or unavailable—to those who need it.

### German *Merkblätter*

The German army sought to disperse and integrate knowledge within tactical levels at the same time, even implementing an approach similar to that of the Allies. The Wehrmacht dispersed knowledge in handouts called *Merkblätter*. These documents were centrally produced brochures or pamphlets, ranging from one to several pages in length. Less focused on novel lessons, the Germans reprinted selections from field or technical manuals to convey proper methods. They were doctrine-oriented to ensure common, established procedures and even discussed the role of “perception management” among soldiers to increase fighting spirit. For instance, to counter the perception that the new Soviet tanks were indestructible, *Merkblatt 77/3*, entitled *Der Panzerknacker* (“The Tank Cracker”), highlighted vulnerabilities to educate the German soldier and give him the confidence that he could destroy Soviet tanks.

A sort of learning competition is apparent in the newsletters as each army tried to gain the advantage by more quickly adapting to change.<sup>5</sup> The U.S. newsletters often contained a section on new “German tricks” that educated Soldiers on what the enemy was learning and disseminated countermeasures against these adaptations. These examples required development of an organization to enhance learning in order to adapt quickly; like many wartime innovations, however, these lessons in learning were quickly forgotten when peace came.

### U.S. Army Postwar Efforts

Although some official efforts captured Korean War lessons and some enterprising officers published Vietnam War lessons, units in these conflicts usually had to capture their own lessons through formal and informal after action reviews.<sup>6</sup> The recognition of mistakes made in Grenada and the opportunity to capitalize on training at the National Training Center (NTC) convinced U.S. Army leaders to form the Center for Army Lessons Learned (CALL) in 1985.<sup>7</sup> The CALL staff initially captured training lessons for a quarterly bulletin so more units could benefit from the experience of units undergoing training at NTC. The need to capture and integrate lessons into the Army became acute after Operations *Just Cause* and *Desert Storm*, but these efforts were reactive, after-the-fact collections of lessons, which

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missed the opportunity to impact the planning or conduct of the operations directly. CALL expanded quickly to collect and disseminate lessons from these operations, then shrank back to its training-focused establishment.

After 9/11, the U.S. Army recognized that it needed *real-time* analysis and dissemination of lessons to improve operations against an adaptive enemy. CALL again expanded to capture what units were doing across the U.S. Army and its allies so that units could learn from each other in real time without having to make discoveries for themselves. CALL now shares challenges encountered by the Army across its schools, training centers, organizations, and other units to locate solutions. If CALL identifies a problem where no

ready solution exists, it notifies the appropriate agency so that it can work on a solution.

CALL links these analysts together in a collaborative network that enables them to quickly record lessons in a database and receive tailored alerts when captured lessons apply to them. The issue almost never is a lack of data, but rather making sense of the mountain of data available. By building this network, CALL has placed the soldier in Afghanistan or Iraq just “two handshakes” away from instructors, trainers, and doctrine writers in the United States. This setup assists in providing context required for sense-making. Also, instead of teaching soldiers about how things were done on previous deployments, instructors can discuss something that may have happened just the day before. The network provides proactive dissemination of lessons to commanders, soldiers, and schools, documenting lessons from actual operations by Active units that are just minutes or hours old and pushing them to the appropriate nondeployed units, schools, and training centers.

Although much of the collection and dissemination occurs through embedded analysts, CALL also actively gathers information on specific topics through collection and analysis teams constructed specifically for each mission. Issues are nominated by the Army leadership or identified through the Combined Arms Center commander’s collaborative issues resolution process. They take an in-depth look at a specific issue, to identify its underlying cause and develop potential solutions, then disseminate their findings through the institutionalized lessons-sharing network.

The results of this integrated effort are well documented. CALL is responsible for many adaptations that were flashed across the Army and adopted within hours or days. The demand for CALL publications has continually increased, indicating that Soldiers find the over 120 articles and handbooks published annually useful.

Customers demand over 500,000 copies of these handbooks each year. Over 3,000 unique users from across the joint, interagency, and multinational communities log in to the CALL Web site each week to download information, handbooks for use in unit standard operating procedures, and “battle books.” CALL answers about 1,000 formal requests for information each month as well as fulfilling countless walk-in requests daily.

CALL draws on this network to “market” knowledge to many different audiences simultaneously, providing lessons proactively and as users request them. Some examples of proactive knowledge dissemination to deployed and training units include:

- ❖ lessons gleaned from 2005 Iraqi and 2006 Bosnian elections that were pushed out ahead of the 2010 Iraqi and Afghan elections
- ❖ forward operating base handover lessons harvested from Vietnam War after action reports to inform handovers in Iraq
- ❖ “combat outpost in a box” instructions on how to build an outpost quickly seized initiative from the enemy
- ❖ “First 100 Days” series outlining what soldiers, junior leaders, staff groups, and Military Transition Teams must do to be successful from the beginning of their deployments.

These products were developed at user request to include recent combat lessons on similar types or regional operations that enable units to begin planning from a “higher step” as envisioned in CALL’s initial charter.

Many other efforts are ongoing around the Army. Every unit has its own internal network

over which to share lessons. Branch schools and centers have resource sites focused on their areas of responsibility. The CompanyCommand Forum, PlatoonLeader, and ArmyNCO networks grew from private Web sites to meet the needs of junior leaders who wanted to share their experiences and ideas.<sup>8</sup> These networks have become part of the Battle Command Knowledge System, which provides forums on a broad array of topics. U.S. Forces Command units provide “warfighter forums” to focus knowledge exchange on particular types of units.

Combat units, most notably the 25<sup>th</sup> Infantry Division, have experimented with operational KM structures, designating battalion, brigade, and division level lessons learned officers and then integrating them with the CALL networks.<sup>9</sup> This internal network facilitates learning; it trains and deploys with the unit, as well as connecting units both horizontally and vertically within the division and with adjacent units. It also links units temporally by contacting and providing updates to follow-on units, impacting their preparation and training. By connecting to the CALL network, the division network shares operational knowledge through Army schools and centers to provide a picture of the current operational environment and to leverage the knowledge and experience of the instructors and students to solve in-theater challenges. The experiment is ongoing, but there is already some empirical data to indicate that this distributed deployment of resources is useful.

### **Operational KM in the Israel Defense Forces**

In 2000, a series of terrorist suicide attacks on Israeli civilians led to operational pressures that exacerbated the ongoing low-intensity conflict. During these operations, a “learning competition” occurred daily, so the Israel Defense Forces (IDF) used methods developed by CALL as a foundation

from which to evolve its own organizational knowledge dissemination.<sup>10</sup> This benchmarking of methods, structures, and procedures was a starting point for the IDF operational KM revolution. Although a foreign organizational construct imported in its entirety would not have fit well in this different organizational context, adapting operational KM methods from the U.S. Army, as well as experience in industry and academia, led to a useful array of methods, organizations, and

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techniques for the IDF. The purpose was similar, but the resultant structure was more decentralized and less technology based than the U.S. example. This can be traced to many reasons, including that the IDF lessons learned effort started in the special operating forces and migrated to general purpose forces, whereas the U.S. Army did just the opposite, and that a different cultural, geographical, and technological context exists in the IDF.

From 2001 forward, some IDF units used a “peer assist” approach. Officers were temporarily attached to similar units for training or operations to gain knowledge that they could carry back to their own formations. Candid “storytelling” of battle lessons by actual participants to units slated to conduct similar operations enabled a transfer of knowledge and an opportunity for inexperienced units to learn from more experienced ones. Adjoining battalions met in structured “learning synchronization sessions,” personally led by their brigade commanders, whenever fighting lasted just a few days. These efforts were very labor and time intensive (and maybe only possible because

of the deliberate pace of low-intensity operations), but through them, operational KM techniques became culturally entwined in the fighting forces. After action reviews became a way of life. Lessons learned repositories emerged at local levels. In many cases, learning and managing knowledge became an integral part of battlefield procedures. Units habitually checked to see which others had previously operated in the region not only to search for written lessons to learn, but also to connect people and exchange tacit operational knowledge. Out of this grew communities of practice to exchange best practices and pitfalls.

One best practice was the addition of a Knowledge Officer to formations at battalion level and higher. These officers acted as a core network among units, as well as bidirectional knowledge nodes to exchange information to and from the units about friendly and enemy innovations, freeing commanders from this full-time responsibility so they could devote their attention to operations.

The IDF Central Command brought commanders and Knowledge Officers together in an entrepreneurial effort using a trained KM facilitator similar to the U.S. Army’s CompanyCommand community of practice. This was the thin edge of an organizational wedge that started in the middle of the organization, then spread upward into professional military education and downward to the lowest units. As a result of the interest gained in operational KM techniques, the IDF established a formal knowledge management branch in the Ground Forces Doctrine Department that codified the ongoing efforts into approved operational KM doctrine.

The Second Lebanon War erupted in 2006 after the abduction of three Israeli soldiers on the Lebanese border by Hizballah. In past wars, most of the learning took place before and after the war, but since the Second Lebanon War was neither predicted nor planned for on the Israeli

side, it was a test case for the operational KM methods developed during years of low-intensity conflict operations. The IDF needed real-time learning to shift rapidly from its low-intensity conflict mindset to one adapted to the hybrid type of warfare encountered.<sup>11</sup>

During the first days of the war, Ground Forces Command launched an ad hoc, real-time Center for Lessons Learned in the Northern Command training base. Every unit on its way to Lebanon received an operations update at the training base to fill any knowledge gaps, “fast-forward” training, an operational knowledge package, and a digest of lessons learned that was updated daily.

As the war continued, printed operational knowledge digests, similar to the one-page *Battle Experiences* handouts, were pushed to all commanders down to company level. These focused on skills required in Lebanon. Ground force commanders in contact and Knowledge Officers were able to collect lessons and sometimes conduct after action reviews during lulls in the fighting to collect and share lessons derived from evolving Hizballah tactics.

Hizballah’s demonstrated ability to learn in short cycles intensified the need to learn while fighting. This need set up a learning competition between the two forces. In one example, after Hizballah attacks on IDF positions in individual buildings, Ground Forces Command issued an operational knowledge digest recommending that multiple buildings be secured together in a reinforced strongpoint with interlocking fires, which was implemented by the battalions within 24 hours. For its part, Hizballah studied this change and adapted their attacks within 48 hours to attack multiple house strongpoints simultaneously, which required further adaptation by the IDF.

The Knowledge Officers collected and disseminated critical information from the unit.

In one example, the Paratrooper Brigade Chief Knowledge Officer described tactical problems when supplies were parachuted to his battalions. On the spot, the lessons were communicated by phone to the air logistics base, which quickly changed the procedures. Without this networked array of knowledge nodes embedded in operational units, such lessons might not have been transmitted or implemented until after the end of the war, perhaps emerging in postoperational reviews and thus being useful only for future operations.

The real-time learning devices implemented in the Second Lebanon War took the form of three building blocks:

- ❖ The IDF implemented a centralized Ground Forces Command Center for Lessons Learned to analyze and disseminate tactical lessons and a learning group focused on headquarters operational level lessons.
- ❖ Networked Knowledge Officers embedded in units were able to share lessons quickly and enable parallel learning.
- ❖ An after action review culture embedded in the units worked to focus critical thinking on how to improve the fighting force.

These efforts became doctrinal through a field manual and were tested once more during Operation *Cast Lead* in 2009, allowing the IDF to adapt quickly and learn faster than Hamas in encounters.<sup>12</sup>

### Learning Civilian Lessons

While the focus of this article so far (and much of the experience of the global lessons learned community) is on the military environment and experience, the need for adapting

quickly to a dynamic environment and learning on the fly is also seminal in civilian organizations, the public sector, and government. The Department of State's inaugural Quadrennial Diplomacy and Development Review recognizes that "[we] have responded to successive events without learning lessons and making appropriate institutional changes to provide the continuity and support."<sup>13</sup> Considering the real-time adaptation required in response to events unfolding in the Middle East in 2011 confirms that it is essential at the strategic level to understand the urgent need for learning across the whole of government. Civilian government organizations have developed organizational structures in separate, local initiatives. The U.S. Agency for International Development, after years of attrition in the learning function, recently recommitted to lessons learned with the establishment of the Bureau for Policy, Planning, and Learning, and the release of a new evaluation policy. Similar efforts in the Department of Homeland Security and the Office of the Director of National Intelligence are focused on their agencies' relevant lessons, sharing lessons between agencies informally.

In recent years, a more structured framework coordinating collection, analysis, and integration of lessons across civilian organizations started to emerge. A lessons learned function was mandated in Presidential Decision Directive (PDD) 56 and National Security Presidential Directive (NSPD) 44.<sup>14</sup> PDD-56 called for U.S. Government agencies to institutionalize lessons and to develop and conduct interagency training programs. NSPD-44 designated the Secretary of State as the coordinator and lead integrator for governmental lessons. In response, State formed the State Coordinator for Reconstruction and Stabilization, which included a Division of Best Practices and Sectoral Experts. This division coordinated with expert, interagency

counterparts in a whole-of-government effort to derive lessons and best practices. The lessons and best practices functions were incorporated into interagency working group tasks after 2008. It was obvious that the complexity of the operations and lessons learned requirements emerging in civilian organizations required coordination; thus, the Center for Complex Operations at the National Defense University was mandated to conduct research; collect, analyze, and distribute lessons learned; and compile best practices in matters relating to complex operations.<sup>15</sup>

The PRT is the best example where efforts would be futile without sharing of knowledge and lessons across organizational boundaries and domains of knowledge. Mistakes would be repeated and actions disjointed, allowing exploitation by adversaries. The differences in culture, structure, and goals among civilian organizations challenge cooperation. The existence of a lessons learned infrastructure can informally network disparate bureaucracies within the government, which is a main tenet of this article—that is, networking hierarchies.

### Emerging Model of Operational KM

When examining these efforts to improve and adapt operations to the changing mission, a model emerges containing three parallel thrusts that differ in nature and time horizon but are similar in goal.

First, in fighting forces, commanders and staff peers must be connected to share knowledge. They must be supported by an array of lessons learned or Knowledge Officers as additional resources to connect them to the generating force through an established knowledge network. These resources become a decentralized device to help units learn in real time and maximize the value of existing organizational knowledge centers in units and schools.

Special Operations Soldiers fast-rope  
from Osprey aircraft during exercise  
Emerald Warrior 2011

U.S. Air Force (DeNoris Mickle)



This network has advantages for the military. It passes information across unit boundaries, and it changes the proliferation of information from a top-down, geometrically expanding, time-phased array to a multidirectional, simultaneous conduit. Many have argued that the Army should become a network to defeat adversary networks. We posit that developing networks *within the existing hierarchy* gains network speed and agility without losing the directive power inherent in a hierarchy. It is more accurate to state that *it takes a networked hierarchy to defeat a network*.

Second, an Army-wide lessons-sharing and after action review culture, developed during leader education and then reinforced through commanders and leader interaction at all levels, improves operations. For leaders to be successful, they must have the “adaptation gene” injected during their initial training, fortified through repeated applications in professional military education and constantly nurtured while assigned to units. This emphasis on continued learning, especially in professional education, enhances future commanders’ abilities to adapt and cope with new complexities. Embedding operational knowledge management in professional military education provides the required conceptual framework, creates awareness, and promotes further research to maximize the ability to improve. We need to revise our operational learning approach and redirect it toward short learning cycles and educating commanders.

And third, a central clearinghouse with visibility across the force to identify emerging lessons from the field should be established. This center should coordinate with the other knowledge-based activities, historians, think tanks, schools, doctrine writers, training centers, and communities of practice. Working together, they can gather, analyze, and disseminate lessons, building a network of people and teams within the hierarchy. A center is also required to create a venue for the Army’s senior leadership to prepare for emerging operational problems and track their subsequent resolution.

We should aim for a synergy in organizational activities, knowledge, and learning to create many channels that combine to form one coherent value stream supporting the fighting force. The Combined Arms Center at Fort Leavenworth attempted to create such a structure in the Combined Arms Center–Knowledge (CAC–K), which included five existing Combined Arms Center organizations with complementary knowledge functions:

- ❖ Center for Army Lessons Learned leads lessons collection and knowledge analysis to integrate the lessons into the field.
- ❖ Battle Command Knowledge System fuses communities of practice.
- ❖ Combined Arms Doctrine Directorate institutionalizes knowledge in the form of doctrine.
- ❖ Combat Studies Institute entwines relevant historical knowledge.
- ❖ Military Review disseminates and helps test knowledge through the kind of dialogue best stimulated by a professional journal.

This effort leveraged knowledge as a resource for the fighting forces to enhance operational effectiveness. CAC–K never reached anything near its potential due to lack of direction and resources, but the concept was right. To address many issues, including increasing the ability to leverage knowledge at ever lower levels, the Mission Command Center of Excellence was formed, which included much of CAC–K. In addition, the Battle Command Knowledge System has been renamed Army Operational Knowledge Management and consolidated its forums with CALL. This organizational development is a step forward in fixing the knowledge

integration problems identified in 2007 when CAC–K was formed.

### **KM Is Not Information Management**

Knowledge is a complex and dynamic resource, and managing it is not the same as managing data or even information, contrary to some popular RMA narratives. Knowledge is often tacit and embedded in people: commanders, soldiers, units, and the society in which they operate. It encompasses history, lessons, real-time information, cultural awareness, and context. It is about people, not technology. While information is a building block, knowledge is interdisciplinary, touching areas such as information operations, media, and Civil Affairs.

An important impetus to change is our adaptive enemy. Modern terrorists and insurgents can act with greater autonomy than in the past. Off-the-shelf communications technologies allow them to operate with greater awareness of parallel efforts, while the ready availability of the tools of violence enables them to operate without direct state sponsorship. Thus, our adversaries have become complex adaptive systems, increasing the challenge of conducting warfare. This requires organizations to develop the ability to become complex adaptive systems, but in doing so it would be wrong to sacrifice the advantages inherent in a hierarchy, such as integrated planning, assignment, and deconfliction of objectives, leadership, and mutual support. It is equivalent to an American football team playing soccer against a street gang with the challenge to retain the superior planning, preparation, and equipment, without being handcuffed by a rigid framework of rules that may or not be appropriate to the changing conditions.

### **Assessing the Benefits**

It is common to greet new ideas with questions, for example, “Will these ideas increase

efficiency, thereby paying for themselves through some sort of cost savings?” RMA theorists proposed that armor protection (or similar conventional capabilities) could be *traded off* to pay for the overall force protection afforded by improved situational awareness. To date, no such increased efficiency has been shown. The bottom line is that there is no free lunch, and if an organization wants to improve its capabilities, it has to pay the price. In the authors’ combined half-century of service, we have seen plenty of initiatives, like CAC-K, which were strangled in their cribs by the cold hands of faint resources and command neglect. The benefit is not efficiency. The benefit is remaining effective against adversaries who are continually enhancing their effectiveness and adaptability.

### Operational Security

Aside from funding, the constant threat to enhancing our ability to learn and adapt is the well-meaning but misguided attempt to apply Cold War security regulations to 21<sup>st</sup>-century technologies. We must make prudent tradeoffs between restricting our adversaries’ ability to access and use our knowledge to their advantage and to putting our own and allied soldiers at risk by withholding knowledge from ourselves. This truth may seem self-evident to any military professional, yet the United States increasingly treats unclassified information as if it were classified by misapplying the classification rules or changing the rules for each situation. This is the antithesis of a lessons-sharing culture that encourages adaptation.

Governments must always safeguard information that will endanger operations or lives, but it is at least as important to share information that will defeat adversaries and empower allies in order to eliminate the danger to our people. Commanders and managers need to define the risk clearly and judiciously, balancing it against the benefits of

sharing with the Soldier in the field, the Reservist preparing to deploy, and the ally standing shoulder-to-shoulder with the United States. This cultural shift is threatened by recent large leaks of classified information. We need to resist the bureaucratic temptation to swing the pendulum away from sharing information while we focus on better ways to safeguard secrets.

### The Road Ahead

Because we have done much of our thinking and experimentation on operational knowledge management in Kansas, the metaphor of *The Wizard of Oz* seems appropriate. When Dorothy and her friends reached the Wizard, he helped them realize that they already possessed that which they sought. Like the Scarecrow who wanted a brain, professional militaries have the requisite knowledge within themselves. They need to retool their structures, processes, and schools in order to unleash the potential energy stored within.

The military has always been a learning organization. Militaries have the most incentive of any institution to use knowledge to adapt; those that do survive, and those that do not are overwhelmed. This article has proposed networking the existing hierarchical structure to enable it to become a complex adaptive system, adapting ever faster in a constantly changing environment. This proposition is empirically grounded in the experiences of Western armies fighting hybrid, networked adversaries. It takes insights from complexity theory to the battlefield recommending organizational structures and processes to learn in combat in real time. The fact that knowledge emerges from the bottom up in combat argues for embedding lessons learned or Knowledge Officers within units.

This approach requires the training and education base to teach and reinforce learning techniques to ensure the learning gene is

injected into and nurtured throughout the force. A central knowledge clearinghouse focused on organizational needs with the connections and resources to develop and disseminate required products is the third leg of the operational KM stool.

Treating knowledge as a resource and entwining the capability to learn and adapt to unfamiliar and changing situations into our structures and “institutional DNA” will unleash the true revolution in military affairs that the information revolution has portended for so long. **PRISM**

### Notes

<sup>1</sup> See Russell P. Reeder, *Fighting on Guadalcanal* (Washington, DC: U.S. War Office, 1943); and S.L.A. Marshall, *Men Against Fire: The Problem of Battle Command* (Washington, DC: U.S. War Office, 1947).

<sup>2</sup> *Battle Experiences* #1, July 12, 1944.

<sup>3</sup> *Battle Experiences* #68, October 19, 1944.

<sup>4</sup> Thomas H. Henriksen, “Security Lessons from the Israeli Trenches: A Half-century of Counterterrorism,” *Policy Review*, no. 141 (Stanford, CA: Hoover Institution, February 1, 2007), available at <[www.hoover.org/publications/policy-review/article/5859](http://www.hoover.org/publications/policy-review/article/5859)>.

<sup>5</sup> U.S. Army Field Manual 3–24/Marine Corps Warfighting Publication 3–33.5, *Counterinsurgency* (Washington, DC: Headquarters Department of the Army/Headquarters Department of the Navy, 2006); Gil Ad Ariely, “Knowledge Is the Thermonuclear Weapon for Terrorists in the Information Age,” June 3, 2003, available at <[www.ict.org.il/Articles/tabid/66/Articlsid/97/currentpage/11/Default.aspx](http://www.ict.org.il/Articles/tabid/66/Articlsid/97/currentpage/11/Default.aspx)>.

<sup>6</sup> See S.L.A. Marshall, *The Soldier’s Load and the Mobility of a Nation* (Quantico, VA: Marine Corps Association, 1950); and David H. Hackworth and S.L.A. Marshall, *The Vietnam Primer* (Washington, DC: Headquarters Department of the Army, 1967).

<sup>7</sup> Gordon Sullivan and Michael Harper, *Hope Is Not a Method* (New York: Broadway Books, 1997).

<sup>8</sup> Nancy M. Dixon, Nate Allen, Tony Burgess, Pete Kilner, and Steve Schweitzer, *CompanyCommand: Unleashing the Power of the Army Profession* (West Point, NY: Center for the Advancement of Leader Development and Organizational Learning, 2005).

<sup>9</sup> Gil Ad Ariely, “Learning to Digest During Fighting—Real Time Knowledge Management,” International Institute for Counter-Terrorism, November 9, 2006, available at <[www.ict.org.il/Articles/tabid/66/Articlsid/229/Default.aspx](http://www.ict.org.il/Articles/tabid/66/Articlsid/229/Default.aspx)>.

<sup>10</sup> Ibid.

<sup>11</sup> Frank G. Hoffman, “Hybrid Warfare and Challenges,” *Joint Force Quarterly* 52 (1st Quarter, 2009).

<sup>12</sup> Gil Ad Ariely, “Learning While Fighting in ‘Cast Lead’ Operation,” *Maarachot IDF Journal*, no. 425, 12–21.

<sup>13</sup> Department of State, *Leading Through Civilian Power: The First Quadrennial Diplomacy and Development Review* (Washington, DC: Department of State, 2010), 123, available at <[www.state.gov/documents/organization/153142.pdf](http://www.state.gov/documents/organization/153142.pdf)>.

<sup>14</sup> Presidential Decision Directive/National Security Council 56, *Managing Complex Contingency Operations* (Washington, DC: The White House, May 1997); and National Security Presidential Directive 44, *Management of Interagency Efforts Concerning Reconstruction and Stabilization* (Washington, DC: The White House, December 7, 2005).

<sup>15</sup> For a more robust discussion of the mission and accomplishments of the Center for Complex Operations, see Melanne Civic and Bernard Carreau, “Building a Civilian Lessons Learned System,” *PRISM* 1, no. 2 (March 2010), 133–140.