Fires of Kuwait.

U.S. Navy (S. Gozzo)

Military Education for the New Age

B–17s over England.

U.S. Air Force Collection, National Air and Space Museum

By ERVIN J. ROKKE

During his transition from Princeton University to the White House, Woodrow Wilson is alleged to have said that academic politics are the worst kind because the stakes are so low. As any dean with curriculum revision experience will attest, Wilson had a point. Squaring curricula with student needs at the expense of faculty interests is a complex task.

The stakes clearly have changed, however, at least in the context of professional military education (PME) at the war colleges. Not only has the post-Cold War era placed new substantive and pedagogical requirements on military educators, but new demands on the relationship between PME institutions and the policy community as well. Adapting to this change is the basic challenge confronting the war colleges today.

The issue is straightforward: either the war colleges become agents for change within the individual services and joint arena or they become anachronisms. Whatever the nature of academic politics, the downside is irrelevancy at best and demise at worst. Five major factors contribute to this phenomenon.

Factors for Change

International Politics. Historians and political scientists hold that the international system changes when new answers emerge to three fundamental questions: Who are the major players?

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What can they do to one another? What do they wish to do to one another? The unexpected end of the Cold War was only the latest watershed in the world order. One classic example is the French Revolution which spawned a new player (democratic France), a new capability (a citizen army), and new intentions (liberty, equality, and fraternity). Similar transitions occurred with the Congress of Vienna (1815), German unification (1870), Treaty of Versailles (1919), and agreements following World War II.

From the perspective of war college curricula, it is useful to examine the ongoing post-Cold War transition against the backdrop of past changes. In each instance the results were not readily apparent. The answers to questions concerning players, capabilities, and intentions are no more likely to surface quickly or clearly today than in previous realignments of the international system. Assessments made in the democratic atmosphere of Paris circa 1789 did not foresee an autocratic Napoleon on the horizon. Similarly, most internationalist projections made at Versailles following World War I failed to predict a global depression or a resurgent Germany.

perhaps no single factor has as much potential as the information explosion

The first requirement then for the curricula at war colleges is to ensure that students do not presume to know who their future opponents or coalition partners will be. This appreciation for uncertainty is the beginning of wisdom in the post-Cold War era. But underscoring uncertainty is not the same thing as saying that everything is up for grabs. On the contrary, it means that the war colleges must delve into what is known but is frequently neglected in the defense establishment. For example, students must understand more than their predecessors about economics, technologies, and diverse cultures to make sound judgments. This perspective brings into question several major tenets of defense policy which were prevalent in a bipolar world. Although it offers few clear-cut policy prescriptions, it is essential to appreciating the security implications of a world order in flux.

Technology. Advances in technology are hardly new phenomena. Stirrups, gunpowder, the steam engine, radio, stealth, and other innovations dramatically changed the nature of warfare. Curricula are replete with cases of how such advances were treated by institutions and individuals wedded to more traditional approaches.[1] Recently, however, breakthroughs related to warfare have occurred with greater frequency, more substantial impact on quality versus quantity tradeoffs, and increased organizational implications.

A former director of the Defense Intelligence Agency, Lieutenant General James Clapper, has raised an excellent case of the accelerating impact of technology on quality-quantity tradeoffs.[2] During World War II some 9,000 bombs dropped by more than 1,500 B–17 bomber sorties were required to destroy a 6,000 square foot target. In Vietnam the destruction of a similar target took only 176 bombs delivered by 88 F–4 fighter sorties. During the Gulf War, one bomb carried by an F–117 fighter-bomber did the job. This is not to imply that a single 2,000 pound bomb can today destroy every 6,000 square foot target. Advances in guidance system technology, however, have made a qualitative improvement in weapon effectiveness. Technological advances by ground and naval forces also resulted in impressive warfighting efficiencies during Desert Storm.

Equally important for PME are the organizational, structural, and budgetary implications of accelerated technological breakthroughs. The price of improved technology is high, particularly if applied to such systems as the stealthy F–117 aircraft. Indeed, given the tradeoff between a new item of equipment representing a breakthrough in sophistication as opposed to just a better, simpler item, some defense experts argue for the latter.[3] Whatever the ambiguity of quality versus quantity tradeoffs, however, the organizational impact of increasingly expensive high tech items is clear. As the cost and operational complexity of systems increase substantially, the organizational response is centralization. In the case of the evolution from photographic reconnaissance aircraft to satellites the focal point of operations and control moves from the battlefield to Washington.

Information. Perhaps no single factor has as much potential as the information explosion for changing the way in which military organizations function, both during peace and in war. The widespread adoption of information technologies in the latter part of this century has set the stage for a social transformation of historic magnitude by making unprecedented amounts of information instantaneously available in easy-to-use forms at ever-diminishing cost. The emerging information highway, which extends from earth to geosynchronous orbit, will certainly alter society, to say nothing of conflict. Worldwide 24-hour connectivity and sensors and hardware needed to support information processing are already in place. So are stand-off weapons that can be

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launched from almost anywhere and strike targets with accuracy measured in fractions of yards.

To date the best thinking on innovative applications for information age technologies has been done by the staff of the Office of Net Assessment under Andrew Marshall at the Pentagon. They have recast functional areas associated with traditional service expertise into precision strike, dominating maneuver, space warfare, and information warfare. Moreover, they suggest that the potential for a revolution in military affairs (RMA) exists in a zone where these new warfare areas intersect and offer a new construct that demonstrates the military potential afforded by information. The Vice Chairman, Admiral William Owens, with similar logic, has advanced a vision of a 200 square nautical mile battlefield box about which virtually everything is known on a near real-time basis and within which all targets can be hit using standoff weapons.[4]

U.S. Army (Larry Lane)

"Digital" soldier.

Not surprisingly, debates about whether RMA notions are fact or fiction provide grist for the mill in many PME seminars. But information age issues go far beyond procedures for waging war to the heart of military organization. Cheap microchips and breakthroughs in communications have made huge amounts of information available and created pressure for decentralization and flat organizational structures. Bluntly stated, vertical organizational structures long associated with the military, along with the centralization resulting in part from high tech and costly equipment, are not optimal for the information age. When tank, ship, and aircraft operators can directly receive much of the information they need to fight, at least some higher headquarters will become extraneous.

Jointness/Coalition Warfare. Consistent with the Goldwater-Nichols Act, the increasingly prominent combatant CINCs have responsibility for command and control in warfare. To support them, the services have made major improvements in collaboration and interoperability. Jointness is in. Outstanding professionals are now assigned to positions on joint staffs, and a succession of JTF exercises and deployments has proven that the Armed Forces are capable of functioning within multi-service command structures. Even service monopolies on developing requirements have been redressed by the Joint Requirements Oversight Council (JROC) overseen by the Vice Chairman.

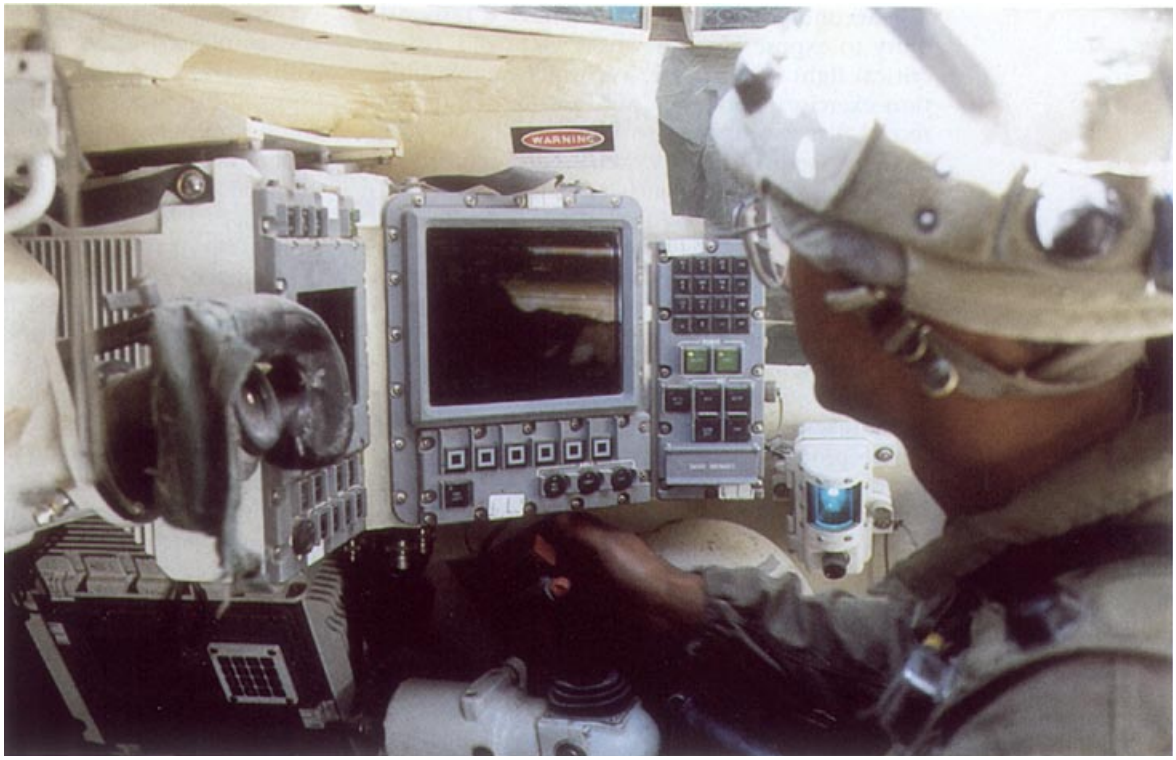
As the services become more familiar with joint responsibilities and work more effectively together, we also are finding that the likelihood of the United States fighting alone is becoming remote. Experiences such as the Gulf War, former Yugoslavia, and other recent crises suggest that alliances and well-greased multinational command chains are insufficient if not outmoded. Ad hoc alliances and coalitions are the norm, and the United Nations is increasingly involved in humanitarian and peace operations.

Coordinating strategy and tactics to include rules of engagement as well as the distribution of intelligence to coalition partners with both varying capacities for information and differing levels of security access are tasks that war college graduates face. The problem becomes more complex as tensions arise between the centralizing tendencies of jointness and the decentralizing, multiple chain of command biases of coalition warfare.

Ecology. Perhaps less known but significant in their impact on security are environmental phenomena. While this area has received little attention in PME, it is drawing increasing emphasis worldwide. It embraces climate change, ozone depletion, deforestation, biodiversity loss, and air and water pollution. Recent examples include the 1989 conflict between Senegal and Mauritania which was sparked by a scarcity of water and arable land, and the mass migration from Rwanda which became a crisis of epic proportions because of the lack of potable water. In short, ecological developments could well affect the circumstances under which the Armed Forces are used as well as how they are used. Clearly this new challenge is relevant to PME—although it has gone largely unaddressed.

And so it is that various factors, from international politics and ecology through technology and information, are moving doctrine, organization, and operations in new and often conflicting directions. As General Wayne Downing, Commander in Chief of U.S. Special Operations Command, told students attending the School of Information Warfare and Strategy, "In the information age, the very nature of war is changing."[5]

Inter-vehicle information system.



U.S. Army (Larry Lane)

Imperatives for PME

The central task of war colleges is to prepare students to succeed across a broad spectrum of national security challenges. The impact of these institutions is in large part a function of how well their graduates perform. We are in the business of equipping leaders to deal with the security environment of the 21st century. The unpredictable nature of the ongoing process of change makes this more akin to a floating craps game than an exact science. Nevertheless, it is a game in which we all must play. As the Chairman, General John Shalikashvili, observed, "The unexpected has become the routine; we need people who are comfortable in an uncertain world."[6] In this game, the role of war colleges is to make the odds better for graduates. And those odds can be shortened by doing everything possible to convey an understanding of the emerging security environment as well as teaching students to recognize and deal with the unexpected. This is the PME challenge.

war colleges must equip leaders to function in a world where rapid change is the norm

Managing change is what national security is all about. War colleges must equip leaders to assume this critical responsibility. We must give graduates the tools to function comfortably in a world where rapid change is the norm. To do so, however, professional military education needs to adapt in three ways. First, we must strengthen the capability to affect the full spectrum of national security policies by embracing added roles for PME. Second, we must revise curricula and supplement the substance of what we teach. Finally, we must update pedagogical concepts, approaches, and technologies.

Like most institutions of higher learning, war colleges can become ivory towers divorced from the world which they serve. If they are to help align military culture with the technological, environmental, and geopolitical revolutions, they must be fully in tune with national security processes which stimulate and implement change. This goes beyond policy formulation and includes technology insertion, doctrine development, planning and budgeting, and training.

How can PME institutions do this? First, they should be "present at creation" to ensure an environment that encourages new thought and rewards rather than punishes innovation. Similarly, they must follow organizational processes for change. War gaming, policy-relevant research, and faculty participation in ad hoc commissions are classic examples. Each war college has a research institute to connect its parent institution with the activities of the national security community.

Secondly, PME institutions have a responsibility to expose ideas, new as well as old, to the critical light of academe. Wargames and simulation exercises work well. So do informal, off the record discussions between students and visiting lecturers from the policy arena. Each senior PME institution enjoys special relationships with individuals sympathetic to the military and who literally try out new ideas on faculty and students. More of these exchanges are needed with policymakers and leaders who are not instinctively sympathetic to military culture.

Finally, PME institutions have a duty to be harbingers of change. Classes and seminars are common ways for disseminating innovative ideas. So are professional journals. Less developed, but with greater potential, are options associated with the information highway. Without a home page and a routine means for distributing the best of faculty and student research, a war college is simply not doing its job in the information age. In brief, PME can and must play a central role as an agent in altering that greatest barrier to meaningful change—our traditional culture.

Adapting Curricula

In the classroom, as in headquarters or war zones, the basis for innovation lies in critical thinking about capabilities, concepts, and organizations relevant to current and future needs. As in the past, military innovators in the information age must develop an appreciation for what exists as well as analytic skills for critiquing the status quo. It is not a choice between notions of modern warfare and more abstract theories of coercion. Unfortunately, for already tight curricula and busy students, it is a combination of both.

Indeed, because of the complexity of joint and combined operations, curricula must deal with the doctrine and capabilities of multiple nations and services. Moreover, blurred boundaries among military, diplomatic, economic, and psychological tools require unprecedented sensitivity for what policy types call the interagency process. In sum, developing PME curricula—like our security environment itself—is of necessity an exercise in risk limitation. There simply is not the time to cover all contingencies. The most one can do is prepare for dealing with uncertainty.

The classic approach to this dilemma is a balance among academic disciplines, the interests and backgrounds of students, and the demands of theory and practice. Like a classic liberal education, war college curricula must cover a range of academic disciplines that include basic and engineering sciences as well as humanities and the social sciences.

What then is different about curricular requirements today? For a start, the balance of PME has shifted with the advent of the revolution in information technology. While military strategists in past revolutions, such as that brought on by nuclear weapons, tended to be civilian thinkers with humanities and social science backgrounds, the current revolutionary force puts a higher premium on basic and engineering sciences. Historical perspective and an appreciation of bureaucratic politics remain vital, but an adequate intellectual framework in the information age requires some understanding of the ones and zeroes being passed around in such incredible quantities. In short, the center of mass at the war colleges must move toward more technical academic disciplines.

Educational and Research Initiatives

U.S. national security will be increasingly affected by the ability to adapt doctrine, organizational concepts, and operations to fully exploit information technologies. Toward this end, the National Defense University (NDU) has established a teaching, research, and outreach activity to focus on the development of a vision for national security in the information age. The Directorate of Advanced Concepts, Technologies, and Information Strategies (ACTIS), an element of the Institute for National Strategic Studies, merges efforts of the School of Information Warfare and Strategy and the former Center for Advanced Command Concepts and Technology. Working under guidance issued by the Director of the Joint Staff and the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence, ACTIS serves as a center of excellence for information warfare within DOD. This enhances the educational as well as the research mission of NDU by contributing to knowledge in a rapidly evolving field, offering courses on information warfare, and disseminating material on information warfare.

NDU is currently developing a three-tier educational program for the School of Information Warfare and Strategy. On the first tier information concepts will be introduced and integrated into the core curricula of the National War College and the Industrial College of the Armed Forces. On the second the school will offer a broad range of information warfare electives to all students at both colleges. Finally, on a third tier, students will be able to select an intense elective program in information studies to become the information specialists of the future.

ACTIS is the DOD executive agent for research on command and control and information warfare and also designs and manages an extensive research and analysis program. In addition, it provides outreach activities, including short programs of instruction, workshops, symposia, and on-line services, and will disseminate information warfare concepts, research, and course material. JFQ

How We Teach

War colleges justifiably take pride in teaching techniques, which traditionally have included seminar-style classroom interaction as well as lectures by faculty and visitors, many of whom are involved in the policy arena. Excellent student to teacher ratios, as well as diverse student bodies, facilitate the high quality of seminar discussions. Though student diversity across the services and defense-related civilian career fields is most balanced at the National Defense University, service war colleges also ensure student representation from the other services and civilian agencies.

Regardless of quality, however, it is increasingly probable that teaching techniques need to be supplemented to cover a rapidly changing security environment and the increased information age sophistication of incoming students. The notion that a ten-month experience at a war college is sufficient for students who may serve for a further ten years has always been questionable. Most certainly the accelerating pace of change today makes it important that we begin to provide follow-on educational opportunities for PME graduates.

a major challenge for war colleges lies in developing follow-on education

Technology for distance learning is available and the cost of personal computers is falling. Military personnel take lap-top computers on temporary duty to communicate with offices, homes, and educational institutions offering degree programs over the information highway. Beginning last year, students at several PME institutions were issued lap-tops. The Air Force Command and Staff College, in particular, has made substantial progress in offering virtual seminars to students on a worldwide basis. Both the Army and Air Force have begun providing lap-tops with modems to general officers. The Army has also funded a leadership development program at the Industrial College of the Armed Forces which will be implemented using lap-top computers.

A major challenge for war colleges lies in developing the substance of follow-on education programs for transmission via the information highway. Simply transmitting research products is an initial but insufficient step. Faculty members whose dialogue with students has been limited to the classroom must develop and conduct virtual seminars using distance learning. In fact, since faculty resources are unlikely to expand, new course development might involve curtailing some existing courses. Before the next century, PME graduates need the option of communicating with war colleges on national security issues.

To conclude, there is a current revolution in PME that parallels the RMA. In both cases, core functions and procedures are undergoing fundamental changes. In both cases, we are seeing disparate rates of progress among the constituent parts. And in both cases, we are facing difficult resource tradeoffs between traditional approaches on the one hand and information age alternatives on the other.

PME institutions must assume the role played by first class research universities. We have a duty to mobilize our institutions to expand knowledge through research, educate practitioners, and serve as catalysts for change through outreach. The war colleges must provide the intellectual capital for changing the existing paradigm.

The stakes are high in the revolutions in military affairs and professional military education. Significant obstacles and inertia must be overcome. The RMA has the potential to alter priorities among service capabilities. Similarly, the revolution in PME—challenging curricula and teaching methods—has the potential to transform war colleges into innovative centers that spawn and foster new concepts of warfare. In the final analysis, both revolutions demand changes in culture. Since PME shapes and promotes service and joint cultures, it would be difficult if not impossible for the RMA to succeed without a corresponding revolution in war college curricula. This places a major burden on those of us involved in PME and requires that we move ahead with the revolution. **JFQ**

NOTES

[1] A classic example is found in Edward L. Katzenbach, Jr., "Tradition and Technological Change," in *American Defense Policy*, 5th edition, John F. Reichart and Steven R. Sturm, editors (Baltimore: The Johns Hopkins University Press, 1982), pp. 638–51; also see Stephen P. Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, N.Y.: Cornell University Press, 1991).

[2] James R. Clapper, presentation at the National War College, February 9, 1995.

[3] See Jack N. Merritt and Pierre M. Sprey, "Negative Marginal Returns in Weapons Acquisition," in *American Defense,* 3rd edition, Richard G. Head and Ervin J. Rokke, editors (Baltimore: The Johns Hopkins University Press, 1973).

[4] William A. Owens, speech to the Retired Officers Association, Des Moines, Iowa, July 1, 1995.

[5] Wayne A. Downing, presentation at the School of Information Warfare and Strategy, National Defense University, August 16, 1995.

[6] John M. Shalikashvili, presentation at the National Defense University, August 18, 1995.