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**DIGITAL LEADERSHIP
PRIORITIES FOR ARMY DIGITIZATION**

BY

**LIEUTENANT COLONEL GREGORY J. FRITZ
United States Army**

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**Digital Leadership
Priorities for Army Digitization**

By

LTC Gregory J. Fritz
United States Army

COL Kevin R. Cunningham Ph.D.
Project Advisor

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ABSTRACT

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The Army has invested considerable time and money digitizing weapons systems. The Army has also made some innovative progress in the development of service-wide digitally based references sources like Army Knowledge Online, and training programs like Army University Access Online. Despite these initiatives, the Army's tendency to favor the digitization of hardware is evident in the Army's Digitization Master Plan. This tendency discounts some of the most impressive potential advances that can be gained from mobilizing an organization's information resources and putting these resources in the hands of operational personnel. This paper argues that the Army should make two fundamental changes in its orientation to digitization. First, it should place higher priority on providing Army personnel the digital tools that help them do their jobs better. Second, it should organize its information resources into knowledge centers that facilitate the execution of the Army's mission. Changing the Army's digitization priorities will not be easy because of the complexity of digital systems and the significant sunk costs that the Army faces in terms of its digital infrastructure. Nevertheless, refocusing the service's digital priorities will have substantial payoff in terms of mission performance and overall operational and training effectiveness.

TABLE OF CONTENTS

ABSTRACT	III
PREFACE.....	VII
DIGITAL LEADERSHIP - PRIORITIES FOR ARMY DIGITIZATION.....	1
CURRENT PRIORITIES	3
ARMY DIGITIZATION MASTER PLAN	3
FROM BYGONE BATTLES TO INTELLECTUAL PREPARATION	4
TODAY'S DIGITAL ENVIRONMENT	6
INTERNATIONAL DEVELOPMENTS	9
ALTERNATIVE APPROACHES TO DIGITIZATION	11
ARMY KNOWLEDGE ONLINE (AKO)	11
ARMY UNIVERSITY ACCESS ONLINE (AUAO).....	13
OTHER DIGITIZATION INITIATIVES	15
NATIONAL DEFENSE UNIVERSITY	15
DEFENSE ACQUISITION DESKBOOK.....	16
PEO C3S KNOWLEDGE CENTER.....	16
SUMMARY AND RECOMMENDATION	17
SUMMARY	17
RECOMMENDATIONS.....	19
ENDNOTES	21
BIBLIOGRAPHY.....	25

PREFACE

I would like to acknowledge the many patient, dedicated people that I worked with from July of 1997 until July of 2000. As the newly assigned Product Manager for the All Source Analysis System (ASAS) Software, I knew very little about software, and even less about the Military Intelligence community that ASAS serves. However, numerous soldiers, civilians and contractors took the time to teach me what I needed to know, and demonstrated exceptional professionalism working with me to get ASAS fielded Army wide. It was this experience that enlightened me about Army Digitization. I would like to thank Colonel (R) Lawrence G.J. Arrol, and Colonel Jerry Proctor, who taught me more about Military Intelligence in three years than I had learned in my previous sixteen years of service. I would also like to Thank Tom Noon, Dick Turner, Debby Ruth, Al Lindley, Chet Husk, Guy Tirk, MSG Steve Mayhew, SFC (R) Tillman Manuel, Dave Ciummo, Phil Enix, George Jacobs, Dan Ellerhorst, Jim Wade and Jim Justice. I once read that bad habits are easy to learn but hard to live with, while good habits are hard to learn but easy to live with. So I would like to thank my parents for teaching me most of what I know about hard work and for imparting to me those few good habits that I have. My parents made me the man that I am and I will never be able to thank them enough for all of the love they brought into the world with 8 children, 28 grandchildren, and 10 great grandchildren, as of the date of this publication. I would also like to thank Susie Fritz for the sons she gave me, our 3 out of those 28 grandchildren. And last, but not least, I would like to Thank my sons Andrew, Henry and Harrison, for their inspiration to "Be all that I could be" as their father and a career Army officer.

DIGITAL LEADERSHIP - PRIORITIES FOR ARMY DIGITIZATION

Know the enemy and know yourself; in a hundred battles you will never know peril.
When you are ignorant of the enemy but know yourself, your chances of winning or
losing are equal. If ignorant of both your enemy and yourself, you are certain in every
battle to be in peril.
Sun Tzu, The Art of War

Technology in the Information Age is redefining what it means to know the enemy and know yourself. Gone are the days of a bi-polar world with the world's greatest Industrial Age armies lined up opposite one another along the Inter-German border. The potential armored warfare in Germany's Fulda Gap between NATO and the Warsaw Pact is a distant memory. Still we pursue Cold War weaponry and tactics far more intensely than we search for understanding of our enemy, and ourselves, in the dawn of the Information Age.

Today we are on the verge of technological advances that will redefine how we wage war and, in many cases, blur the current line between economic competition and warfare. The technology which holds the most promise to enable the nation to achieve her strategic objectives, as well as the most unknown danger, is the world of computer networks – cyberspace.¹ Our competitive advantage in the Information Age will come from the ability of our people to leverage the capability provided by rapidly advancing information technologies.²

Warfare, however, imposes a centuries' old challenge on information. In the words of Clausewitz, "The general unreliability of all information presents a special problem in war; all action takes place, so to speak, in a kind of twilight, . . . like fog."³ This "fog of war" spans centuries of warfare, and evolving information technology is likely to amplify the "twilight," with what we are already describing as "information overload."

Sun Tzu's and Clausewitz's insights on information in war are timeless because war has been and continues to be a violent clash of wills between determined adversaries. A clash characterized by "fog" and "friction" and conducted across the dimensions of force, space, and time. A clash where the role of information has increased in importance and complexity as warriors have extended the limits of the physical domains of war from land and sea to air, space, and finally to cyberspace.⁴

However, there is an equally strong belief that the Information Age will provide a much greater capability to penetrate that fog.

Today's technology is causing revolutionary changes in the way we conduct military operations. The Department of Defense's Information Superiority vision recognizes and responds to these changes and enables new operational concepts for dominant maneuver, precision engagement, focused logistics, full dimensional protection and creates a synergy among them, which together results in full spectrum dominance.⁵

The Army believes that digitization will help reduce the effects of fog and friction and uncertainty, and that digitization will be a key enabler to full spectrum dominance. Digitization is a general term that the Army has used to characterize its investments in Information Age Technology. In the Army's view, digitization is the essential enabler that will facilitate the Army of the 21st Century's ability to win the information war and provide deciders, shooters, and supporters the information each needs to make the vital decisions necessary to overwhelm and overcome their adversary and win the overall campaign.⁶

The Army has defined its vision of a digital battlefield as follows:

Digitizing the battlefield is the application of information technologies to acquire, exchange, and employ timely digital information throughout the battlespace, tailored to meet the needs of each decider (commander), shooter, and supporter...allowing each to maintain a clear, accurate vision of the surrounding battlespace necessary to support both planning and execution.⁷

Soldiers will require extensive training to affect the planning and execution mentioned above in order to capitalize on the Army's digital investments. The National Defense Panel has also observed that there are significant training implications for the digital battlefield:

We must never forget that our people in uniform have been the core of our strength in the past. They, more than any hardware system, form the real defense capability of today and tomorrow. Under no circumstances should we reduce the quality or training of our people. The technology revolution and advanced weapons we seek to embrace will be for naught if we take our military and civilian work force for granted.⁸

Increasing lethality on the digital battlefield is an important objective. This paper acknowledges that the Army will reap considerable benefits from its digitization investments, but it argues that achieving digital leadership requires the Army to focus more on digitizing soldiers and less on digitizing weapon systems. Digitizing weapons should continue, but only as a second priority to training soldiers in the skills that they will need to excel in a digital environment.

As will be shown, digitization is an expensive and somewhat controversial initiative. The Army's approach has tended to emphasize systems that sometimes sit idle for considerable amounts of time. Digital leadership, on the other hand, focuses on soldiers who bring youthful exuberance and unconstrained energy to every mission, to every challenge. Already, soldiers (and civilians too) have demonstrated an uncanny ability to go way beyond the stated capabilities of their digital equipment, doing things that the equipment's designers and developers never even imagined. Arguably, America's greatest competitive advantage is not its equipment and technology, rather, the soldiers and civilians who operate the equipment and

master the technology. Paul Bracken has already observed that taking advantage of the information age requires a refocusing of priorities from preserving the old force structure to mobilizing the information and intellectual resources in the military services.

What is not needed are defense budget increases for preservation of existing cold war force structure beyond what is prudent for immediate security requirements. What is needed is a re-orientation of strategic thinking into an area that has not yet received it. The best way to preserve U.S. competitive advantage is to recognize that the only source of sustainable advantage is learning to come to grips with the new problems and demands. This is organizational learning.⁹

In consideration of the organizational learning described above, this paper will review the Army's current digitization priorities, examine other digital developments, and borrow some lessons learned and good ideas to improve Army digitization. The paper argues that achieving digital leadership means enabling junior soldiers and senior commanders to understand the digital environment and to use the knowledge resources of the Army to achieve a variety of missions with greater effectiveness and speed.

CURRENT PRIORITIES

ARMY DIGITIZATION MASTER PLAN

The "current" Army Digitization Master Plan was completed in 1996. It describes digitization and the roadmap for getting there. As specified in the plan:

Digitization is about interoperability. It horizontally and vertically integrates the Army's diversified battlefield operating systems into an interlocking information exchange network, while also providing a heightened level of essential joint and combined interoperability within a multi-dimensional battlespace. The rapid sharing of enemy and friendly information among all digitized forces within that battlespace will provide near-real time situation awareness, enhance synchronization of combat power, and enable economy of force by making units more lethal and survivable.¹⁰

The future battlefield that the Army envisions is a complex mixture of sensors, command and control systems, and weapons systems. Digitization is not a program in the traditional acquisition sense, but a strategy to integrate command and control systems, the underlying communications systems, and weapons systems to provide information sharing both vertically and horizontally, throughout the Army.¹¹ The Master Plan attempted to capture this complexity and integrate the various systems. Unfortunately, the Plan could not keep up with the technology and was rapidly overtaken by events. The Plan is currently under revision, but that revision is not expected soon.¹²

Most of the funds associated with Army digitization in recent years (\$3 - 4 billion per year) actually support related modernization efforts.¹³ In addition to the multi-billion dollar investments that the Army has already made, budget projections indicate that the Army is committed to this same level of investment for at least the next seven years.¹⁴ This is a very significant financial obligation for an Army that is also attempting a fundamental transformation of its fighting units at the same time.

Given the pace of technological change, it is not surprising that some sources question the utility of the investment outlined in this plan. The General Accounting Office for example released a report in August of 1999, which asserted that the Army has not produced conclusive evidence that its \$20 billion plan to field dozens of advanced information systems to help soldiers exchange information will make its forces more effective on the battlefield.¹⁵ More importantly, even if systems testing, scheduled for November 2001, proves successful, it may be two to three years before officials know if fielding the systems has had any benefit.¹⁶ Nonetheless, Army Digitization continues.

Victory in the 21st Century battlespace will be characterized by the effective leveraging of information technology to rapidly mass the effects of dispersed firepower, rather than relying exclusively on the physical massing of weapons and forces that was the primary method employed in the past. Digitization is a means to that end and the *Army Digitization Master Plan* is the Army's roadmap to getting there.¹⁷

But the Army Digitization Master Plan overlooks the most critical aspect of digitization, digitizing soldiers. The document contains over 100 pages discussing architecture, interoperability, the Army Battle Command System, the Implementation Strategy, Acquisition Strategy, Assessment Strategy, Funding Strategy, Joint and Multinational Digitization, and, buried deep under "Related Digitization Implementation Efforts," one page on Training. Unfortunately, this one page discusses training related to Army systems, and not the digital skills that will be required in the digital battlespace.

FROM BYGONE BATTLES TO INTELLECTUAL PREPARATION

Much thought and effort has gone into Army digitization, and it is a noble cause, but have we taken off charging in the wrong direction? It often seems that the Pentagon's plans for the future, including systems acquisitions, are based on "bygone battles."¹⁸ Worse still, our future competitors are distancing themselves from these "bygone battles" and focusing on new ways to jeopardize American security.

No one else will buy carrier battle groups, infantry divisions, and stealth fighters to compete with us in the next 20 to 25 years, but the threat is even more sinister because it is a threat based around an asymmetric approach. Many of our future competitors have it right; they have figured us out. A little bit of technology applied in the right direction – for example, cheap cruise missiles; sea and land mines; distributed air defenses; the use of cellular telephone technology; and so on – will make an enemy very difficult to take down with a single-dimensional approach, and then enemy then can apply his own advantages.¹⁹

Even the prestigious Defense Science Board has questioned whether Pentagon leaders are willing take the risks necessary to transform the military to take full advantage of the information age.²⁰

Unfortunately, there is an emerging belief in the current American defense community that capabilities and platforms represent the essential component in how the United States needs to design its forces for war in the next century. To put it bluntly, this approach, no matter how much easier it may make defense planning, will not do. Capabilities, no matter how impressive to the engineer or technologist, may prove irrelevant in the next war. In fact, they may prove worse than irrelevant, because technological capabilities that are irrelevant to the war at hand will have involved the expenditure of sums better spent on other systems and capabilities. In the end technology is no more than an enabler—helpful in extending coherent, intelligent concepts of operations, but useless in forces without training or intellectual preparation. Vision and serious thinking about the future of war in the next century are the crucial components to insure vibrant military innovation in the next century.²¹

It is precisely the “training and intellectual preparation” cited above that appears to be missing in the Army Digitization Master Plan. Granted, there is some training and intellectual preparation occurring, but without the commitment to provide it, equal to the commitment in digitizing Cold War weapons.

No one really knows what the next battle will look like, but history suggests that it will likely be representative of ambient technology of the period. And most technological advances today are information technology related, so that is probably the field where further intellectual preparation will yield the greatest results.

Digitization has introduced whole new dimensions to the military profession. Slowly, Army leaders are beginning to understand the broader implications of digitization, and what is needed to achieve information superiority. However, Army efforts to train its leaders about the significance of information superiority pale in comparison to the Army’s investments in weapon systems, and this invites further risks and opportunity costs for Army modernization.

History teaches that technology is indifferent to people’s willingness to accept it. History also teaches that those who understood technological advancements were best able to exploit

its advantages. Thus, the Army must be more proactive in understanding and mastering the information revolution unfolding all around us.

Just as General Heinz Guderian learned in the 1920s that the diesel engine and the improved roads in Central Europe were going to give him the blitzkrieg irrespective of whether he wanted it, the information revolution is going to allow us to build flexibility and "information dominance" irrespective of whether we choose to do so.²²

The Army's sister services appear more proactive in mastering the advances of the Information Age. A good example of the Navy's and Marine Corps' commitment was announced on October 6th, 2000, when Secretary of the Navy Richard Danzig awarded a contract worth nearly seven billion dollars to build and maintain a department-wide Navy-Marine Corps Intranet (NMCI). According to the Navy:

The NMCI will make the naval service more efficient, more productive and enhance its readiness by providing data, video and voice communications to link shore units and interface with the "Information Technology for the 21st Century" (IT-21) initiative and the Marine Corps Tactical Network (MCTN). It enhances and enables our sailors, Marines and civilians to increase their productivity and access resources that extend throughout the Navy-Marine Corps team and our nation. But substantial as these benefits are, they are dwarfed by the implications of empowering instantaneous information access throughout the whole Department of the Navy.²³

It is refreshing to see that an organization as big and traditional as the Navy is willing to make this kind of investment into the future, knowing there will be pitfalls along the way. But fortune favors the bold, and this bold step by the Navy and Marine Corps will empower their marines, sailors, and civilians to become the world's premier Information Warriors. That makes NMCI a very wise investment that seems to reflect a more sophisticated appreciation of today's digital environment. This kind of investment springs from a more coherent vision of the emerging digital environment.

TODAY'S DIGITAL ENVIRONMENT

Computers today are changing the methods of warfare and leadership. Like kinetic weapons, a computer network attack can destroy both military and civilian targets. Unlike kinetic weapons, however, a computer network attack can reach across the world at the speed of light, invisibly transiting many international borders en route to its target.²⁴ Computers and digital communications have also changed the nature of leadership and power relationships within military organizations. Consider for example, what Dr. Stephen Covey wrote about information:

Once you get information, you tend to use it. When you get enough people with information, you raise the consciousness and unleash energies. The higher the consciousness, the more the social, national, and political will develops. For the principle-centered leader, information then becomes power, the power of a collective will to accomplish the mission of the organization.²⁵

While digital technology is empowering, it also imposes significant burdens on individuals and organizations. There are now more information channels than anyone can keep track of, and sometimes, subordinates are better informed than their leaders, who suffer from information overload, and the inability to separate the wheat from the chaff, the meaningful from the meaningless. Consider Dr. Jaclyn Kostner's assessment of leadership over distances. In her book, entitled Virtual Leadership, she wrote:

As a remote leader, when your team is distant from you, you have little or no control over them. In the isolation of distance, the only power and control you have is what your remote team members exercise over themselves. The key way to build high performance across distance is to build trust. Be obvious that every word, every action, every initiative on the virtual team builds trust . . . in you as the virtual leader . . . in the virtual project . . . and in all virtual partners across distance.²⁶

While many of the Army's senior leaders already command and lead widely distributed organizations, not so many understand and have mastered the technology tools which facilitate the "virtual leadership" described by Doctor Kostner. Furthermore, there is precious little formal training to promote "Digital" or "Virtual" Leadership. Some organizations are getting very good at mastering these technologies, such as web-conferencing, virtual meetings, enterprise collaboration and document sharing. Other organizations remain mired in the analog world of management and leadership.

Technology today offers remarkable opportunities to bridge the communications gaps that have long splintered spread-out organizations. There are teleconferences, VTCs, online virtual meetings, online document sharing, collaborative forums, instant messaging, and so on. These technologies enable today's leaders to reach out around the globe to communicate and refine their vision, mission and values. Clearly, technology can never replace the human element in leadership, but it can extend the reach of leadership, both in terms of time, and distance. Twenty years ago, a leader could really only articulate his vision orally, or on paper. Today's leaders can articulate their vision across an immense global network, in real time, using teleconferences, VTCs, and documents shared and updated over the Internet near real time, facilitating two-way communications between the leader and the led. This incredible leap in our ability to communicate enables everyone to refine his or her understanding and to converge on a common vision. In their book Enlightened Leadership, authors Oakley and Krug wrote:

We must operate out of a strategic mindset that is attuned to the future. When asked about the secret of his success, Wayne Gretzky, one of history's greatest professional hockey players, replied, "I skate to where the puck is going to be, not where it is or has been." A leader's challenge then is to "skate where the puck is going to be. We must anticipate where the market is going and will be, not where it is or has been."²⁷

Similarly, with warfare, we are wise to consider and prepare for the future, more than preserving the past. In translating the book Sun Tzu The Art of War, Samuel B. Griffith wrote:

Sun Tzu believed that the moral strength and intellectual faculty of man were decisive in war, and that if these were properly applied war could be waged with certain success. The master conqueror frustrated his enemy's plans and broke up his alliances. He created cleavages between sovereign and minister, superiors and inferiors, commanders and subordinates. His spies and agents were active everywhere, gathering information, sowing dissension, and nurturing subversion. The enemy was isolated and demoralized; his will to resist broken. Thus, without battle his army was conquered, his cities taken, and his state overthrown.²⁸

Sun Tzu's insight provides compelling justification for refining our digital literacy, our digital competence. Both are terms that are hard to define, since they are primarily concepts still in their infancy. Building on Sun Tzu's insight, one might consider digital competence as a discipline enabling the use of information technology to conquer an adversary without battle. This would be the most idealized version of digital competence. For this paper, digital competence will be that set of skills enabling someone to attain the intellectual faculty for the conduct of Information Operations. And Information Operations are those actions taken to affect an adversary's information and information systems while defending one's own information and information systems.²⁹

Referring back to the insights that Kostner, Oakley and Kelly have offered, it is apparent that digital leadership is based on specific skills that vary with the individual's duties and responsibilities within the organization. For example, at the working level within a military organization, digital competence might include the following skills: use of office automation (word processing, database use, spreadsheets), electronic mail, use of web-based information resources for problems solving, as well as demonstrated ability to use technical systems within the scope of the individual's duties. At the management/leader level, digital competence would include many of the skills just mentioned, but expanded to include understanding the organization's information infrastructure, knowledge resources, collaborative consultation and communications resources, and how to focus these resources in keeping with changes in mission. Digital leadership therefore indicates a very high degree of awareness of the digital environment and the ability to synchronize the resources in that environment to help the

organization accomplish its mission through the full engagement of the intellectual and informational resources of all the people in the organization. It is interesting to note that some foreign military observers have also concluded that building digital competence and digital leadership skills in military organizations will be a key factor in victory in the future.

INTERNATIONAL DEVELOPMENTS

Recent stories in the media beg the question whether our potential adversaries understand the concept of digital competence better than we do. In March 2000, CIA Director George Tenet advised the Senate Foreign Relations Committee that: "To a greater and greater degree, terrorist groups, including Hezbollah, Hamas and bin Laden's al Qaida group, are using computerized files, e-mail and encryption to support their operations."³⁰ Additionally, ...extremists hide maps and photographs of terrorist targets – and post instructions for terrorist activities – in sports chat rooms, on pornographic bulletin boards and other popular Web sites. The officials, who declined to name the sites, say it is extremely difficult to intercept the coded messages.³¹

And it's not only terrorists who are busy gathering information and sowing subversion. In Unrestricted Warfare, the Chinese authors wrote "the first rule of unrestricted warfare is that there are no rules, with nothing forbidden. Strong countries would not use the same approach against weak countries because strong countries make the rules while rising ones break them and exploit loopholes . . ."³² The book, which antagonizes our sense of legal order, has recently drawn attention for its advocacy of a multitude of means to strike at the United States during times of conflict. Hacking into websites, targeting financial institutions, terrorism, using the media, and conducting urban warfare are among the methods proposed.³³

These references are, unfortunately, just the tip of the iceberg in terms of the indicators that the nature of warfare and the threats to our national security are changing dramatically. And yet, the preponderance of our resources continues to go towards automating our past warfighting skills, and not dealing with emerging threats in cyberspace.

In 1995, the National Security Agency and Department of Energy estimated that more than 120 nations already had some sort of computer attack capability.³⁴ As exemplified in the Unrestricted Warfare book, the People's Republic of China reportedly is studying numerous types of "dirty war" – "asymmetric attack," in today's military parlance – which include using computer viruses to pitch China's technologically advanced enemies into "political and economic crisis."³⁵ Confident of their own abilities in cyberwarfare, the Chinese ridicule America's approach.

Most of the descriptions of how the digitized troops of the 21st century will conduct war sound like an armored war using new technology to fight with the Warsaw Pact nations. The vast majority of development plans of the present American military, such as those of the army for the 21st century, are all focused upon dealing with an enemy with conventional heavy armor, and if the United States encounters an enemy with low level technology, an intermediate level enemy, or one with equivalent power, then the problem of insufficient frequency band width will possibly occur.³⁶

It is not obvious that these authors fully understand future warfare, but they feel very strongly that the American military is focusing too much on the past and unable to make the mental (bandwidth) leap to prepare for the future. These authors use the Gulf War, Desert Storm, as a departure point, and then systematically criticize the American military for our shortcomings since then. In their words, "the American military has already encountered trouble from insufficient frequency band width brought on by the three above mentioned types of enemies. Whether it be the intrusions of hackers, a major explosion at the World Trade Center, or a bombing attack by bin Laden, all of these greatly exceed the frequency band widths understood by the American military."³⁷

Based on their understanding of the emerging world order, China is developing a strategic information warfare unit to neutralize the military capabilities of technologically advanced foes.³⁸ Not only then is China ridiculing the U.S. Army's digitization, but also, they are pursuing an alternative modernization strategy that would give them a power projection capability that its conventional forces just don't have. This would allow China to reach out and touch U.S. forces that their conventional forces can't physically touch.³⁹

What our businesses (and military) are failing to change is what European and Japanese companies are changing, namely, "making their labor more productive not simply by investing in more equipment but by organizing their workers in ways that upgrade their skills."⁴⁰ We cannot afford to sit still and continue investing so heavily in digitizing equipment, without a corresponding investment in America's intellectual capital. But rather than dwell on the negative, instead I will highlight some of the digital investments that are facilitating the intellectual preparation that will enable our soldiers and leaders to develop their skills as Information Warriors. Thankfully, there are a few initiatives underway already that lend some optimism for our digital future.

ALTERNATIVE APPROACHES TO DIGITIZATION

ARMY KNOWLEDGE ONLINE (AKO)

Army Knowledge Online⁴¹ is one of the Army's greatest digital advancements, offering a wealth of digital capabilities to the entire Army, around the world, around the clock. Like many commercial online applications, Army Knowledge Online is extremely comprehensive and tailorable to many diverse users' digital requirements. Foremost among its many features is an e-mail address for all soldiers to have for the rest of their lives. That is a useful tool for anyone who uses e-mail, but especially for soldiers who routinely move from one location to another, and one e-mail domain to another too. With e-mail for life, soldiers are able to stay in touch with family and friends no matter where the mission sends them, or where they choose to go in retirement too. AKO offers hundreds of other tools, references and applications that simplify "soldiering" immensely. Granted, not everything that a soldier needs can be found at AKO, but the things that can be found there puts an incredible array of digital tools, knowledge, information and references right at soldier's finger tips, accessible from anywhere in the world, at any time, with just an internet connection. It reduces a soldier's basic load of reference materials by about a hundred pounds, and makes it accessible anytime, anywhere. Unlike investments in platforms that are accessible only to a few, and only during certain times and under certain conditions, investments into AKO are accessible to all registered users, anytime that they can secure an internet connection, anywhere in the world. The diversity of tools and references available on AKO is matched only by the diversity of the Army itself, offering everything from Career Development to Pay Tables and a Technical Encyclopedia. There is information on Army Installations, Armed Forces Recreation Centers, and also a People Search function. While AKO is constantly updated, on January 15, 2001, it offered 145 channels of useful information ranging from weather to maps to news headlines, internet news and virus warnings. It has grown to include links to twenty-nine other Knowledge Communities, many offering a complementary array of references and tools for registered users.

Perhaps one of the most useful features of these Knowledge Communities is the ability to retrieve knowledge from them, anytime, anywhere, from any internet connection. Historically, knowledge resided in people's brains, until we learned to write it or draw it onto cave walls and stone tablets. Then, man invented paper and the printing press, and we were able to share knowledge by mechanically reproducing written words and figures. Xerox (copy) machines and fax machines extended this ability, and then we began storing knowledge on computer hard drives and floppy disks. All of these advancements however, kept knowledge stored on a

physical medium, with limited capacity for sharing accessibility. Knowledge Communities, and AKO, have opened up a whole new universe of digital knowledge, applications, and tools, that reside on servers and the internet, but can be shared by an almost unlimited number of users, anytime and anywhere that they can connect to the internet. Previously, information stored in a book or on a hard drive in the Pentagon was not accessible to a soldier keeping the peace in Europe or Korea. But now, any soldier, any where in the world, at any time of day or night, can read the Chief of Staff's Vision, and Army-related news releases from around the world. He can search for an old buddy and check on the weather back home while he is deployed. He can check the pay tables, look up an acronym, and get information on the next installation that he is assigned to.

The utility and reach of AKO represents a remarkable investment that provides immeasurable utility to soldiers and other registered users, and is a model for the kind of digital investment that will launch the Army into the Information Age, without all of the overhead and ballast that accompanies investments into platforms. Leveraging AKO requires broader training for its intended users, and training is one of the stated goals for achieving information superiority.

Promote the development of knowledge management and a skill-based workforce throughout the Department of Defense. Create and maintain reusable knowledge bases; attract, train and retain a highly skilled work force; develop core business processes designed to capitalize on these assets.⁴²

If any place should be leading the way in the Army for "collecting data from various sources and making it readily available to users in an organized, logical form that represents knowledge,"⁴³ that place should be where the Army trains its future strategic leaders, the Army War College. While the College's Department of Distance Education is compiling its curriculum and reference materials online, the rest of the College takes a traditional approach to the classroom environment issuing dozens of textbooks to students, who scribble their ideas into paper notebooks. Many of the College's management and administrative functions are also only partially automated. The War College would be much more effective at building the digital leadership skills of the future strategic leaders by having them work in a digitally enhanced learning environment. All of the students' digital notes, papers, and presentations could be captured in a Knowledge Center. Instead of submitting papers in "hard copy," students could submit electronic versions. Additionally, the students' orientation packets are also paper booklets, which offer none of the advanced search features found on today's computers and websites. As a result, the corporate knowledge of the Army War College is primarily available to resident students only to the extent that they have all of these books and booklets with them.

Meanwhile, industry (and some Army organizations too) are aggressively building Knowledge Management Systems that proactively provide the "latest and greatest" knowledge to their constituents, wherever they can access the internet. As society grows more mobile and more digital, the importance of having corporate knowledge readily available will increase also.

Given adequate funding and support for conversion to a digital based mode of instruction, the USAWC could move beyond paper based instruction and orientation for its resident students, and develop a Knowledge Center that can be leveraged by all authorized users, anytime, and anywhere that they can access the internet. At the same time that conversion to digitally based instruction would improve effectiveness in the teaching mission, the War College would be providing the digital skills required for its future strategic leaders to thrive in an increasingly digital world.

While converting the War College to digitally based instruction would be an expensive project, the National Defense University has already undertaken a similar effort that has had a major positive impact on its efficiency and on the power of the teaching message. The War College is already studying ways to integrate digital technology into its program in keeping with anticipated financial opportunities.

However, elsewhere in the Army, initiatives of this nature have already been approved. These deserve to be assessed in some detail.

ARMY UNIVERSITY ACCESS ONLINE (AUAO)

Another of the Army's remarkable digital advancements is its new online university. For decades, soldiers around the globe have worked on improving their education in many different ways. They attended classes, where and when classes were offered. They took correspondence courses to get an education through the mail. They took on the job training and even received some college credit for military training and experience. But now, the Army has crafted a vision that will make education more universally available to soldiers around the globe and around the clock. AUAO is among a series of dynamic changes that the Army is engaging in to transform the Army. Specifically, the mission of AUAO is to: Increase retention by allowing soldiers to earn credits, degrees and certificates at low or no cost to them while they serve on active duty. Develop educated, Information Age-savvy soldiers who can succeed in the network-centric missions and battlefields of the 21st century.⁴⁴

The importance of this initiative is better understood in light of these remarks by the CEO and Chairman of Apple Computer, John Sculley: "In the new economy, strategic resources no longer just come out of the ground. The strategic resources are ideas and information that

come out of our minds."⁴⁵ Sculley amplifies his views with this observation on the current state of education:

As a nation, we have gone from being resource-rich in the old economy to resource-poor in the new economy almost overnight! Our public education has not successfully made the shift from teaching the memorization of facts to achieving the learning of critical thinking skills. We are still trapped in a K-12 public education system, which is preparing our youth for jobs that no longer exist.⁴⁶

Realizing the shortcomings of our current education system, Army University Access Online's (AUAO's) kickoff appears very timely. Army University Access Online clears one of the greatest hurdles impinging on a soldier's ability to get an education in the past, i.e., the availability of the right course, at the right place, at the right time, with a qualified instructor. With an online university, it doesn't matter whether a soldier is stationed in the Balkans, Korea, Germany, or Fort Hood, Texas. And an online university means that required courses are no longer just taught at a certain place and certain time by certain instructors. When the vision becomes reality, and the Army expands Army University Access Online Army-wide, then all soldiers will have universal access for furthering their educations.

Secretary of the Army Louis Caldera announced today the Army has awarded a \$453 million contract to PricewaterhouseCoopers to provide distance education for an estimated 80,000 soldiers over the next five years, equipping them as students with the latest technologies and quality online-learning experiences. This initiative places the Army at the leading edge in distance education to create a customized, complete online university: Army University Access Online. This cutting edge, cyberspace program will provide unprecedented educational opportunities for our soldiers – allowing America's soldiers to earn post-secondary degrees or technical certifications online anytime, anywhere, anyplace, while they serve.⁴⁷

This is another commendable initiative, but it is limited to 80,000 soldiers. The importance of this initiative suggests that it should be available to every soldier, anytime, and anywhere, that the Army sends them. As the Army begins its transformation, now is a good time to invest more in soldiers (training and education) and less on upgrading legacy weapon systems.

The M-1 Abrams tank is already one of the best in the world, as demonstrated during Desert Storm, but the Army budgeted \$528 million to upgrade 1,000 tanks in Fiscal 2001.⁴⁸ It is hard to reconcile how the Army can afford this kind of upgrade to a generation-old tank, at the same time we're limiting Army University Access Online to just 80,000 soldiers. Considering the importance of intellectual preparation for the Information Age, the Army should make Army University Access Online available to every soldier, active, retired, reserve and National Guard. Not only would this promote a "smarter Army," but it would also be a high impact recruiting and

retention tool. An Information Age Army requires digitally competent soldiers, and not just 80,000. The Army must make digital training and online educational opportunities a top priority for all its personnel. The intent of this initiative suggests that it is too important to be limited to such a small fraction of the Army.

Together, we will inspire educated, Information Age-savvy soldiers to succeed in the high technology missions the Army will be asked to perform in the 21st century. This initiative empowers eligible soldiers to obtain college degrees or professional technical certifications using notebook computers and vastly expanded learning opportunities while they serve in the Army. The technology package includes a laptop computer and printer, a standard suite of software and Internet browser, Internet connectivity, 24-hour call center support, on-line course management and on-line evaluations, a student administration system, and a virtual classroom environment. This e-Learning Network features an initial set of accredited higher education institutions.⁴⁹

Army University Access Online is a good example of providing resources to develop digital leaders. Some people will argue that soldiers will just use this opportunity to get their education, and then get out of the Army. But in the Information Age, can we afford to have an Army that is denied any opportunity to improve education? And what happens when soldiers do get out of the Army? The overwhelming majority go on to lives of further service to their communities and their country, in the private sector, state and local governments, schools, and so on. Is this not also a good investment of taxpayer dollars? Army University Access Online needs to be a higher priority for Army investments.

While the Army struggles to fulfill the vision of the Army University Access Online program, it is important also to note a number of other initiatives with the Department of Defense that are intended to improve digital competence within organizations and digital leadership.

OTHER DIGITIZATION INITIATIVES

There are other exceptional digital advances among government organizations too, most notably National Defense University (NDU), the Defense Acquisition Deskbook, the Joint Electronic Pubs Library, and the PEO C3S (Program Executive Office for Command, Control, Communications Systems) Knowledge Center.

NATIONAL DEFENSE UNIVERSITY

The Information Resources Management College at NDU now offers a multitude of online courses for busy government executives, including the entire curriculum for certification as a Chief Information Officer. This saves considerable time and money for these executives who no

longer must synchronize their schedule with the class schedule and can avoid driving to the classroom, instead, just taking the course from the comfort of their home or office, at a time convenient to them.⁵⁰ Additionally, National Defense University manages a website called NDU Knowledge Net for CIOs with all kinds of references and resources pertaining to Chief Information Officer competencies.⁵¹ It is a dynamic website that is continuously updated by the site's administrators and users, ensuring the latest and greatest resources are available for its audience of CIOs and information technology workers. It offers a wealth of online tools, references and applications akin to the kinds of tools, references and applications that a proposed website for strategic leaders would require on topics relating to strategic leadership and national security.

DEFENSE ACQUISITION DESKBOOK

The Defense Acquisition Deskbook (DAD),⁵² like Army Knowledge Online, also offers a wealth of tools, references, education, training, Quick Links, and a Software Tools Catalog. It also has a comprehensive description of the DoD 5000 Acquisition Model, which explains the Defense Department's research and development process. One of the best features on DAD is "Ask a Professor," which enables anyone to post a question, anytime, and from anywhere, for a professor at the Defense Systems College to answer. For over five years, this feature has been helping to find the "right answer" for all kinds of people, in all kinds of situations, who might have otherwise proceeded erroneously, without the feedback from the online professor.

Again, how do you put a price tag on mistake avoidance, when someone was able to make a better-informed decision because of this digital tool? History shows that we have made our fair share of mistakes in Defense Acquisition, but history may never know how many mistakes were avoided, thanks to this one simple little online utility. Ask a Professor is just one more example of a sound digital investment, and one that should also be incorporated into the Army War College's digital resource environment.

PEO C3S KNOWLEDGE CENTER

A final example of one of the Army's highest payoff digital investments is the Program Executive Officer Command & Control Communication Systems (PEO C3S) Knowledge Center. It goes beyond the previously mentioned examples that focus mostly on providing online access to reference materials, by providing a wealth of collaborative tools that significantly improve communications and knowledge sharing among its users.

The Knowledge Center is a secure, intranet/extranet system for information sharing and collaboration. Knowledge Management was seen as an enabler to

transform the Institutional Army into an information-age, networked organization that leverages its intellectual capital to better organize, train and equip a strategic land combat Army Force.⁵³

This system of networks, collaborative tools, and Knowledge Management applications facilitates the development of the digital skills that will empower Information Age leaders.

Functionality is divided among four areas: Institutional Awareness, Team Tools & Collaboration, Information Exchange and Knowledge Management. Institutional Awareness provides real time information on what is happening within the community. This includes daily broadcasts of Army and C3S news/project updates; calendars/events and meetings, announcements, and instant messaging/chat to community members. A series of Team Tools & Collaboration applications provides the various product teams the ability to share information among their team members who are often widely dispersed and allows them to set up and conduct virtual meetings using the Knowledge Center. Information Exchange Applications provides various electronic libraries, discussion areas and directories that serve as a central depository of key information from every project office. Today, most key corporate information is available on the Knowledge Center.⁵⁴

In many respects, this Knowledge Center is the administrative equivalent of the situational awareness that the Army's digitization effort is developing for warfighters. As a proof of concept, it has demonstrated tremendous utility and cost-effectiveness, but this will not be easily transferable to the battlefield. Over 50% of those surveyed indicated that the Knowledge Center had provided significant time savings each day to their work day. A recent ROI analysis indicated a first year \$ 20 million savings/cost avoidance. Over a million dollars in travel costs alone were avoided by utilizing virtual meetings.⁵⁵ Another major benefit has been added security to document and message exchange. Email and Knowledge Center applications were integrated so documents that had been passed as large un-secure attachments in the past are now posted on the knowledge center in a secure environment and any subsequent message is also sent encrypted.⁵⁶

SUMMARY AND RECOMMENDATION

SUMMARY

"I have the power, the capability, sitting in my home with my computer and my modem – if I only understood how to do it – to wage war. That is a very different environment than anything that we have experienced in the past."⁵⁷ Indeed, the nature of warfare and leadership is changing drastically, faster perhaps than our ability to adapt.

In the past, an organization would acquire computers to automate the way it did things. Now, it looks at how to do things differently. Paving over a zigzagging cow path gives a zigzagging paved road. But first straightening out the road, and then paving it, gives a superhighway. What the Naval War College of the 1930s did was to reengineer the force to deal with a new scale of competition. They designed the work and information flows in carrier and amphibious attack. The result was a new superhighway that led to victory at Midway and the Coral Sea.⁵⁸

Like the Naval War College of the 1930s, the Army finds itself in a position to either pave over the cow paths, automating the way we did things, or, reengineering the way we do things to build the foundation for future victories. We must adapt to the new and emerging realities, and not just upgrade our Cold War weaponry. But if we are to adapt, effectively, I recommend re-prioritizing the Army's digital investments. It is a whole new world emerging, and we should adjust our priorities accordingly. The new form of wealth will no longer principally reside in the number of dollars in American pockets. Rather it will reside in the quality of the minds of our workers.⁵⁹

Unfortunately technology is passing us by at warp speed, and we continue with business as usual, careful not to upset the business models that brought us the world's premier industrial age military. The danger here is the decaying utility of an industrial age Army for fighting Information Age battles. A recent study at the Army War College, entitled "Generations Apart, Xers and Boomers in the Officer Corps," sheds a little light on this phenomenon.

Boomer officers can remember the days when the Army was at the forefront of high-tech equipment, e.g., global positioning systems, laser rangefinders, and night vision devices. The rapidity of development in the commercial world has left the Army behind. Today it is not uncommon for Xer (Generation X) officers to have more up-to-date technology at home than they do at work.⁶⁰

On the one hand, it is exciting to realize that technology has matured so fast that many people are able to afford today that which was prohibitively expensive or not particularly useful just a few short years ago. On the other hand, it is tragic that most teenagers today command more bandwidth and digital applications on their home computers than Brigade Commanders have when they deploy thousands of brave Americans into harm's way. How long will the Army perpetuate practices from the past while the private sector catapults information technology so aggressively into the future? The Acquisition System that gave us the world's preeminent industrial age Army is unable to keep pace with information age advances. We must, therefore, identify and exploit practices that enable Information Age success.

This paper has argued that the best way to capitalize on the full potential of digitization to fulfill the vision of information enabled military strategy and organizations, is by developing a larger conception of digitization and changing the priorities for Army digitization investments.

RECOMMENDATIONS

Priorities for Army Digitization should also improve the quality of the minds of our soldiers, and civilians. To do this, the Army should: 1) Invest more into "intellectual capital" development and networking. More specifically, invest more on digital training, such as Army University Access Online, and more on networking the Army's Online Knowledge Centers. 2) Spend less on digitizing Cold War weapon systems, especially armored systems that are not as strategically deployable as recent missions like Kosovo require. 3) Invest more in leveraging the digital accomplishments of others, and less on "new start" digital initiatives. For example, leverage the Army Knowledge Online and other web-based resources, as part of an effort to create a digital leadership training program at the Army War College. Such an effort, built on investments already made, could help the Army's future strategic leaders overcome their resistance to digital technology and more fully embrace information technology to prepare for future warfare.

In any event, our leadership today will not secure victories tomorrow, unless we continue to refine our approach better than our future adversaries.

At present there are too many in the U.S. and other Western military organizations who believe that they can best address the appearance of a major competitor in the next century by exploring the technologies of the information age to develop ever more effective means of finding the enemy and killing him from a distance. There are, unfortunately, a number of troubling concerns with this premise. The most obvious is that the information revolution will be neutral in this looming competition; in fact it may favor the competition more than it favors Western militaries because potential enemies will be able to tailor new technologies to their particular style of war without becoming information-dependent.⁶¹

The challenge then will be to refine our approach to information technology better than our potential enemies "tailor new technologies to their particular style of war without becoming information-dependent." For modern armies, information dependency is just the flip side of the same coin that enables information superiority. Developing our capacity to achieve information superiority better than our adversaries' ability to exploit our information dependency is the key to our future victories. "By 2010, to have information no longer will be enough; this will result simply in building an Army that only will die smarter. You have to have the ability to act on what you know, to balance your ability, to put speed into the equation so that you can exploit information dominance."⁶² Mastering information superiority requires intellectual agility beyond the doctrine, training, and leader development characteristic of industrial age armies. We must come to terms with the most fundamental problem in education today and that is "the blind

leading the blind." Many educators do not realize that they are functionally blind to the demands of our post-industrial world.⁶³

It will require investments in our intellectual capital well beyond the industrial age paradigms, not only in terms of money, but also in terms of time, and particularly, visionary leadership. The Army now has the opportunity to capitalize on its wealth of intellectual capital and lessons learned from digitization by making intellectual preparation its top priority for the future. This will reduce the resources programmed for platforms, weapons and systems, but will catapult America's Army into the new millennium with the skills, knowledge, and adaptability required in an uncertain future. This gives great cause for optimism.

My optimism is not fueled by an anticipated invention or discovery. Finding a cure for cancer and AIDS, finding an acceptable way to control population, or inventing a machine that can breathe our air and drink our oceans and excrete unpolluted forms of each are dreams that may or may not come about. Being digital is different. We are not waiting on any invention. It is here. It is now. It is almost genetic in its nature, in that each generation will become more digital than the preceding one. The control bits of that digital future are more than ever before in the hands of the young. Nothing could make me happier.⁶⁴

Yes, digital leadership is a concept in its infancy, but as mentioned in the quote above, it is also a concept, like being digital, that is here and now. As all of the components of the Information Age materialize, we will have an incredible opportunity to positively influence the emergence of sound policies and practices. As we have so proudly in the past, America's Army can lead by example in adopting priorities that build a stronger, smarter, and more secure society, for generations to come. We can lead the way in developing our nation's most precious resource, our people, and our intellectual capital. And in so doing, we can secure a safer future by promoting broader understanding, shared knowledge, and collaboration with those who share our values.

Word Count: 8,717

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⁴ Money, 3.

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