LEARNING WITHOUT BOUNDARIES: THE FUTURE OF ADVANCED MILITARY EDUCATION

A MONOGRAPH
BY
Major Randall C. Lane
Armor

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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MAJOR RANDALL C. LANE

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This monograph examines whether the current focus of Classroom XXI provides the adequate advanced military education necessary to prepare company and field grade leaders for the future battlefield. Technology has become the driving factor as the Army enters into the twenty-first century. In line with this focus, the Army has taken a more scientific approach to military education and training while neglecting the human dimension of combat. Technology, and digitization in particular, are an important factor in the composition of tomorrow's force, but it cannot be the sole nor even the central element controlling the education and training in line with the Force XXI initiative.

This monograph first explains the connectivity of Classroom XXI, the institutional classroom education and training, to the Force XXI initiative and the impact on the force. Secondly, this paper discusses the present course of the Warrior XXI and Classroom XXI initiatives, the goals and objectives and desired endstate for the force. This portion is a brief description of TRADOC's campaign plan to support the Force XXI plan from the institutional perspective. Thirdly, this monograph analyzes each designed goal with analysis of the present situational developments under the execution of the Classroom and related Warrior XXI initiatives. As part of this analysis, the successes and shortcomings of the entire Army Training XXI initiatives are addressed, in general, in order to establish a base of reference for recommended solutions in the final chapter. Finally, this paper provides some general recommendations intended to refocus the Classroom and related Warrior XXI initiatives in order to achieve the proposed goals and objectives for the program.

The recommendations proposed in this monograph are centered on de-emphasizing technology and adding emphasis to the human dimension. The suggestions are centered around the leader development in an uncertain and information-based environment in order to replicate the fluidity of future battlefields. The Classroom XXI initiative is designed to maximize the potential of each individual student but not necessarily linked to the complex adaptive environment in which he will operate. This monograph demonstrates that the present course chosen for the educational initiatives, in support of the future military, must be altered to simultaneously develop the leader with the system and the system with the leader.

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Major Randall C. Lane

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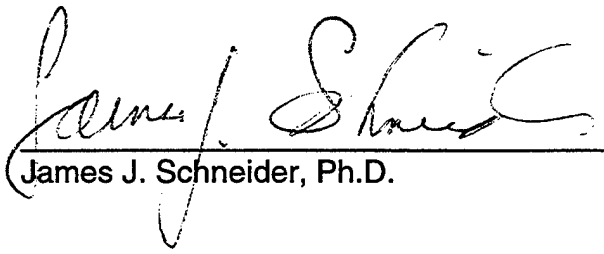
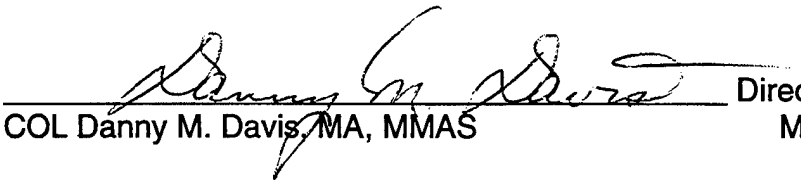
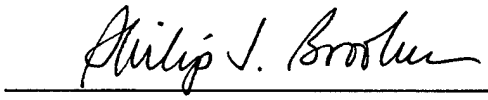


James J. Schneider, Ph.D. — Monograph Director



COL Danny M. Davis, MA, MMAS — Director, School of Advanced Military Studies



Philip J. Brookes, Ph.D. — Director, Graduate Degree Program

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> "What was needed, it was felt, were entirely new techniques for analyzing and understanding war, technology that would take its complexity into account and come up with precise, quantitative answers to replace the qualitative judgments of old. The cure was ultimately part of the disease."[1]
>
> Martin Van Crevald, *Command in War*

Introduction

With all planning and preparation complete on a typical damp misty morning, the commander sits atop a piece of key terrain prepared to observe the battle as it commences on the valley floor below. He will observe, assess and issue orders to his unit as it closes with and engages the enemy. He watches as the lead elements make contact and develop the situation.

He then notices the second echelon enemy forces closing rapidly as they attempt to maneuver to the flank of his forces. He orders a cannon artillery barrage to disrupt enemy movement and the commitment of his reserve to outflank the opposing maneuver. This counterattack smashes into the enemy's flank with great success, routes the enemy from the field; the commander watches his forces seize the initiative and pursue a retreating enemy.

This scenario, despite its historical similarities, is not a typical nineteenth century engagement on the battlefields of Europe. It is, however, a viable scenario encountered by a brigade or division commander on the future battlefield: he watches the engagement transpire on a computer display screen five to twenty-five kilometers away from the battlefield on a "virtual hilltop". The desired ends have not significantly changed over the centuries, but the ways and means have undergone drastic evolutionary transformation.

Problem, Background and Significance

Throughout history a commander's ability or inability to make the appropriate tactical decision in battle has held the key to victory. Few commanders in history, despite being able to stand and witness the entire battle, were capable of making an informed and rapid decision to influence the battle. Force XXI has brought a representation of the battlefield back to within view of the commander, but we still have not figured out how to educate leaders to command on this fluid distributed battlefield. Despite the fact that the human aspect or moral domain of battle remains at the core of the military, we have failed to address adequately a leaders ability or inability to handle the rapidly changing battlefield and subsequent quick decisions required.

The Force XXI Campaign Plan is designed to lead the Army into the twenty-first century and prepare the force for this future fluid battlefield. Warrior XXI, the initiative responsible for the doctrinal development and institutional learning of the individual soldiers and units in support of Force XXI, is centered around the introduction of technology, information gathering and digitization into the learning process. However, the Warrior XXI initiative has not adequately assessed the cognitive needs of the individual leaders, nor how the institution prepares them for leadership challenges on the non-linear battlefield of the future.

Classroom XXI, one of eight sub-initiatives under Warrior XXI, is a manifestation of this initiative in the military advanced schooling that is designed to "take the battlefield to the classroom; and the classroom to the battlefield."[2] This sub-initiative has become primarily technology-focused with little, if any, integration with the advanced leader

development in preparation for command on these battlefields. The emphasis on the future instruction has drifted toward the science of warfare at the expense of the art form.

The significance of studying this problem, simply put, is as TRADOC PAM 525-5 states: "information technology is expected to make a thousand-fold advance over the next twenty years".[3] If this assertion is true, then the advanced educational system must seek to balance the focus for learning before it loses the focus on the human aspect of combat completely. We cannot afford to abandon the quest to enhance the educational process through technology and the linkage to a highly sophisticated battlefield. It becomes apparent that the institutional learning environment must capitalize on the rich resources presented in the form of young innovative military minds. We must then refocus these educational goals to emphasize the military art and need for decisive action on non-linear battlefields hindered by fog or friction.

It is only at the lowest possible tactical levels that both fog and friction can be sufficiently reduced or overcome to accomplish missions. The military leader development programs at company, battalion and even brigade levels are the target audience to help reduce the uncertainty on the battlefield. These leaders comprise the present day institutional body of knowledge for our advanced military education system. It has been summarized very well in Joel Barker's book *Future Edge* when he said:

> The importance of education in the preparation of an army for an unknown future becomes evident when we realize first, that the Army's greatest leverage lies in the future, and second that the lever is the mind itself.[4]

Purpose & Methodology

The purpose of this monograph is to answer the question, "Does the current focus of Classroom XXI provide the adequate advanced military education necessary to prepare company and field grade leaders for the future battlefield?"

This paper will use the following methodology to answer this question. In order to examine fully the primary question, the monograph will answer four secondary questions. First, what is Classroom XXI and what are the objectives and desired endstate for the students in both the advanced courses and the Command and General Staff Officer's Course (CGSOC)? This portion will explain the over-arching educational plan for the twenty-first century and provide a base for comparison later on. It will explain Force XXI, Warrior XXI and the connectivity of the entire initiative. Secondly, what is the present course of the Classroom XXI initiative? This section will discuss the present applications of Classroom XXI in both the Officer Advanced Courses and CGSOC. Third, what are the differences between the present course and the desired endstate and the expected impact on the leaders? This section will analyze the differences and explain the expected impact on the leader development of graduates that prepare to be commanders on the future battlefields. This section will also examine evidence from the Combat Training Centers, Advanced Officer Courses and CGSOC to support the possible need to refocus the learning objectives in the advanced military educational system. Lastly, how can Classroom XXI use the existing leveraged technology and refocus the educational goals to emphasize the art of warfare and leader development to prepare leaders for the future? This section will provide recommendations to shape leaders better

for command on the future non-linear battlefields. The conclusion will answer the research question, summarize the discussion and encapsulate any recommended solutions and alternative learning objectives. First, however, before examining the scope and purpose of Classroom and subsequently Warrior XXI, we must fully understand the Army's master plan for moving the force into the twenty-first century.

Campaign Plan for the Future

U.S. Army manuals and Joint Service publications provide military leaders with doctrine, tactics, techniques and procedures. These references are a compilation of both military and civilian experience, insight and knowledge. The most recent military manuals and papers are, for the first time in history, focused on linking these past experiences with anticipated needs for the future battlefield. This campaign plan is known as Force XXI.

Tomorrow's Army, under Force XXI restructuring, will be the result of an innovative redesign of the force at all echelons, from the foxhole to the industrial base and it will be a force organized around information and information technologies.[5] The Force XXI campaign is the Army's means to identify outmoded ways and means and identify new approaches. Force XXI is comprised of a designed realignment of the institutional, unit and self-developmental training and educational aspects of Army XXI. This portion of the paper will examine this realignment from Force XXI down to the institutional learning organizations under Army Training XXI.

Force XXI has three main components to its strategy: Warfighter XXI, WARNET XXI, and Warrior XXI (*Figure 1*).[6] These three efforts are intertwined, from a macro

perspective, and all are responsible for the training of the entire force under the umbrella termed Army Training XXI.

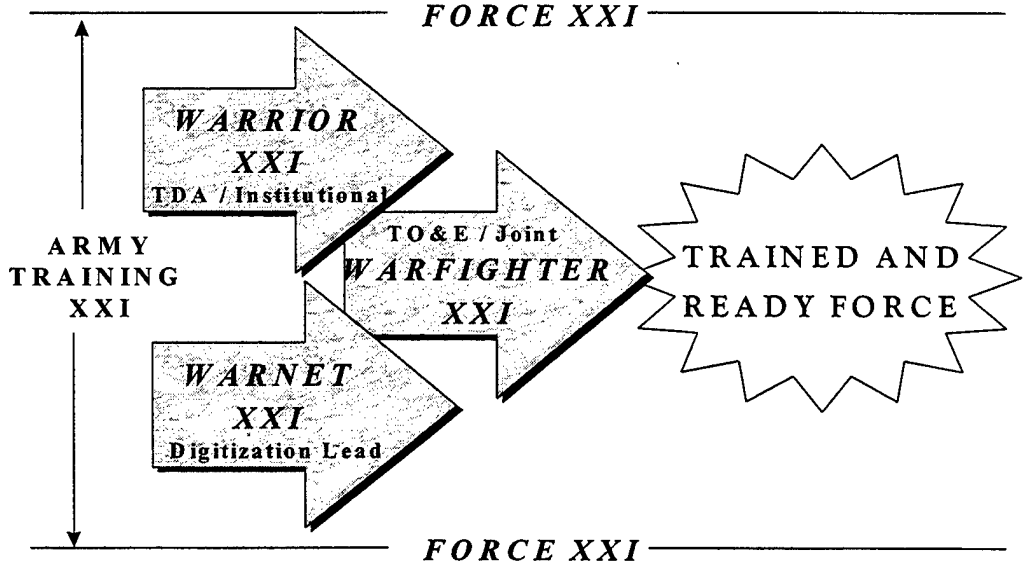

Figure 1. Three Efforts of Force XXI
Source: Warrior XXI Homepage

Warfighter XXI is the unit training component comprised of Joint Venture initiatives and operational training and evaluations. Warfighter XXI is the main effort of the Force XXI realignment for the future and is responsible for the development of the doctrine, tactics, techniques and procedures (TTP) for training and fighting maneuver units. WARNET XXI is charged with horizontally and vertically integrating the Army's diversified systems for both information acquisition and management. Warrior XXI is the institutional education and training component and strategy for the infrastructure from individual soldier through Joint Task Force (JTF) level units.

According to the retired former Chief of Staff of the Army, Gordon R. Sullivan, the synchronization effort is critical to "developing innovative leaders with a versatile

doctrine, tactics, techniques and procedures to exploit the latest technology."[7] Warrior XXI is the undertaking that will allow this versatility and exploitation of technology to take place in an untraditional institutional setting. The 2010 end state envisioned by Training and Doctrine Command (TRADOC) is a networked organization engineered to meet the institutional needs, continue to meet our warrior ethos and maximize diverse technologies to create both synthetic and realistic training environments for individuals and units.[8]

Warrior XXI, the institutional education and literature development effort, is comprised of eight separate, but supporting, initiatives: Distance Learning, Total Army School System, Training Development, Diagnostics, Cluster Concept, Automation / Digitization, Deployable Training and Classroom XXI (*Figure 2*). This institutional education component is founded in technological advancements and must be the critical hinge-pin between the force in the field and the training base for the military of the future. These technological advancements range from actual weaponry for the training soldiers to the introduction of leading edge computer technology and systems for use in both live and simulation training environments.

TRADOC's challenges are threefold: first, to integrate technological advancements into the institution; secondly, adapt instruction to accommodate for necessary doctrinal and TTP changes due to the infusion of technology in the field, and finally to synchronize all of this with the units in the field conducting the fielding training operations in accordance with the Warfighter XXI initiatives. The plan to address and integrate these three challenges into the campaign plan is through the eight initiatives mentioned

previously under Warrior XXI and at the same time causing the least amount of turbulence in the process.

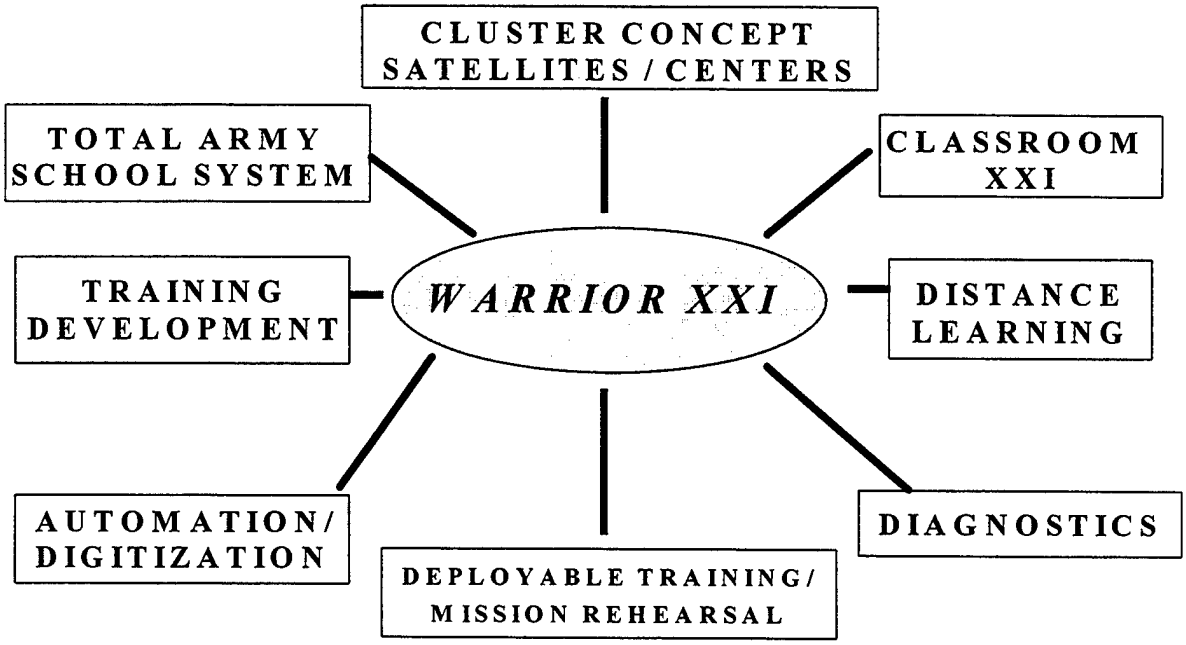

Figure 2. Warrior XXI Inititiatives
Source. Warrior XXI Homepage

One of the critical aspects addressed at all levels of Force XXI is the leader development process. This is the continuity thread that will enable a smooth transition and provide constant guidance to the leaders in both the institution and in the field. The foundations of leadership development will not change drastically but the techniques and means to accomplish this training will.

The leader development piece in this campaign plan, as an example, is distributed between the Distance Learning, Training Development and Classroom XXI initiatives. Because of this distribution between two separate and distinctive commands, TRADOC and Forces Command (FORSCOM), there is presently little or no standardization for the adapting systems under Force XXI. The Classroom XXI initiative is the base program

both to leverage the existing and developing technology and to standardize the leader development at institutional bases to accommodate a highly technological yet rapidly changing environment and military.

The Classroom XXI endstate is focused on the use of technology to leverage information in a variety of ways which will increase the Army's learning and warfighting capabilities in support of the institutional learning component, Warrior XXI. The establishment of this environment is an attempt to create a classroom not bound by previous perceptions and limitations: a classroom without walls. This classroom is designed to help prepare leaders and soldiers to integrate advanced learning and technology onto the future battlefield.

Classroom XXI: Present Course

Modern technology has drastically altered the environment in which men prosecute war. This, therefore, creates new or revised leadership challenges for the tactical commander.[9] The purpose of Classroom XXI, as designed, is to meet this challenge by creating a learning environment that maximizes each individual soldier's and leader's learning potential through the use of diverse technologies. Here the monograph will examine the intended purpose, technical and personnel structure and programs proposed by the Classroom XXI initiative.

The Classroom XXI design is structured to exploit fully the technology and bring an unlimited amount of resources, both physically and virtually, into the classroom. These resources under the Classroom XXI initiative have been incorporated to varying degrees throughout only a select few of the Tier Level 1 educational systems: Officer Advanced

Course, Warrant Officer Staff College, Command and General Staff Officer's Course and the Sergeant Major Course.[10] The priorities for the campaign plan to bring together technology and redesign the institutional learning environment are termed near, mid and long range.

The near term priorities are for the initial technology and cybernetic systems to be established with the desired infrastructure and capabilities by the end of the twentieth century. This includes the Local Area (LAN), Campus Area (CAN) and the Wide Area Networks (WAN) to enable access to information and resources worldwide. Initially this is to support primarily the distance learning initiative under Warrior XXI. The network is, however, critical to information management and distribution for the Classroom XXI programs in their advanced stages.

The mid-term priorities include the critical professional development training piece of the overall campaign plan. The focus for these priorities is placed upon the previously mentioned Tier Level 1 students and is expected to be operational by the year 2005. To accomplish this during the next several years, the Army will begin to transition the leader development programs to accommodate Force XXI operations.[11] The mid-term priorities involve modernization efforts to establish the long term priorities which are anticipated to be in place by the year 2010.

The long range goals under Warrior XXI, and specifically Classroom XXI, have not been identified as of yet due to the uncertainty of technological advancements and force structure past the fifteen year period of time. The long range goals will be determined and adjusted as the experiments and fielding of Warrior XXI initiatives unfold.

As mentioned earlier in this paper, Classroom XXI is intended to create a learning environment for soldiers. The intended audience of soldiers ranges from the Basic Noncommissioned Officers through the Command and General Staff Officer's Course. This diverse military audience will require different strategies to ensure that each individual leader maximizes his or her learning potential.

The advanced military education systems, such as Officer Advanced Courses and CGSOC are particularly diverse given all the branches and combined with different backgrounds and experiences. Each leader is striving to attain "such intuitive skills, vision, innovation, adaptability and creativity" to operate successfully and lead in a stressful environment.[12] Given this learning environment, shared learning, experiences and interaction become critical.

The number of students in each classroom will remain unchanged for the most part. This will not, however, be true in all cases. Some classrooms will be structured to handle forty-six students. Overall in the redesign of the Force XXI and subsequently Warrior XXI structure, the leader to led ratio is expected to drop.[13] Classroom XXI is no different. The instructor to student ratio will rise from the target one to fifteen ratio to a figure almost three times that at approximately one to forty-six. This worst case scenario has one instructor for every forty-six students thus disallowing the vital attention and interaction between our experienced leaders instructing and the senior company and junior field grade students. The future interaction will also encompass a greater amount of digital data and telecommunications interaction between the instructors and students and students with other students producing less physical or face-to-face interaction.

To accomplish this, the classrooms will have monitors throughout the classroom to link with students with instructors operating from a "base terminal," subject matter experts on another installation or even units in the field or at Combat Training Centers (CTCs).[14] The computers are externally linked via a Wide Area Network (WAN) with the capability to access any military data-base for information or resources. The students, both soldiers and leaders, will also have the ability to learn on multi-purpose white boards with drawing capabilities similar to the new military Intervehicular Information Systems (IVIS). In short, the Classroom XXI initiative will provide every leader the technology and resources necessary to learn more rapidly and more thoroughly than ever before.

Video teleconferencing is conducted now which links classrooms to other classrooms and to external sites such as the National Training Center, other TRADOC schools or even National Guard and Reserve Training Centers. This technology enables larger military populations to experience schooling and training from a base instruction location with experienced cadre. Anything from operations orders to classes on the employment of a 120mm mortar system can be viewed, instructed and critiqued all via this system without leaving a given central location at any of the branch advanced courses.[15] This same technology is capable of linking CGSC with the Air Force Staff or even Marine Staff Colleges for joint ventures like the "Prairie Warrior" exercise.

This technology provides the maximum amount of resources to a greater population at a much reduced cost factor. The initial "up-front" cost is high given all the technology and hardwiring systems required but there is virtually no required research and development costs. This is because the civilian schooling systems are already

incorporating similar technology in the classroom and have provided the military an on-going case study of lessons learned. Many universities and college preparatory high schools have taken the lead in these initiatives. In fact, President Clinton's administration is now trying to push legislation to enact a similar "Classroom XXI" concept in grade schools throughout the nation under the title of "Technology Innovation Challenge."[16] They are finding that if the education is not well grounded in basic skills the technological advancements cannot be leveraged to the fullest extent.

This campaign, much like the Warrior XXI campaign, is intended to provide students with an unlimited access to knowledge and systems to enhance our learning capabilities. The United States has committed approximately 1.25 billion dollars to establish these technological innovations with neither clear objectives nor a strong enough educational system to support these advancements. A RAND study into these issues makes the point that "just putting in a computer system and wiring facilities together does not necessarily guarantee any improvement in performance."[17]

Improvements can only be assessed by examining these same students as operators and leaders immersed in a complex adaptive system. That is exactly why the leader development programs are so critical to the entire process. Simply overlaying technology on top of an existing leadership development program, as any program, is a recipe for disaster. The leadership development program under Warrior XXI, however, cannot be called a "recipe for disaster." The general goals are spelled out rather clearly in TRADOC Pamphlet 525-5.

Leaders must combine and use technology with a human dimension characterized by tactical and technical competence. Leaders must be capable of exercising initiative, rapidly grasping changes in situations and remaining versatile to handle any mission from war to support and stability operations. In the future, leaders and soldiers will be exposed more frequently to joint and multinational operations and trained to adapt to a wider range of complex contingency missions.[18] These are the general goals as listed.

The goals mentioned above for leader development under Force XXI are very similar to the Army's traditional views on leadership. The major difference for the future lies in that the Army will not possess the resources: time, money or personnel to provide for leader development in separate environments. Given these barriers, it still remains critical that soldiers, leaders and units sustain training levels in the basics and experience in order to leverage fully the capabilities now and on future digitized battlefields.[19] Force XXI is designed to restructure the force in such a way that will enable a more seamless and cost effective integration of institutional, individual and unit leader development from the inception.

Given the Operational Tempo (OPTEMPO) of the force today, both soldiers and leaders are required to "do more with less" and the educational and training process are no different. As of 1997, nearly 21,500 soldiers are operating in over seventy countries which equates to a three-hundred percent increase in OPTEMPO.[20] Given this dispersion in the military population, it would appear that an integrated approach to leader development is the best solution. The prime matter for concern remains that the training must focus on the motivation of men in conflict and not merely their management.[21] The

Warrior XXI initiative is designed to deliver the necessary individual training to soldiers and units, in the institution, at home station, or deployed throughout the world. The question that still remains, however, is exactly how should the Army accomplish this without losing the moral foundations of its leadership training.

The Warrior XXI plan is to expose soldiers to vast amounts of information and allow them to take the initiative, grasp concepts rapidly and develop solutions to complex situations beyond the traditional scope. This unique approach will combine the individual and institutional elements of leader development to husband valuable resources. The responsibility is therefore placed upon each individual to become more involved in the process and "self-direct" his or her learning and subsequent leader development. The leaders, both in the schools and units, will continue to integrate leader development from a cohesive unit approach. This last aspect has become critical as the Army's global role in the National Military Strategy (NMS) increases.

The Warrior XXI and inherently Classroom XXI campaign plans were designed to exploit technology and adapt to a changing situation that the Army did not even understand fully. Given this situation the next logical step is to examine the present execution of the Classroom XXI campaign and compare it to the designed plan.

Classroom XXI Plan vs. Execution

> "In spite of the advances of technology, the worth of the individual man is still decisive. The open order of combat accentuates his importance. Every individual must be trained to exploit a situation with energy and boldness and must be imbued with the idea that success will depend upon his initiative and action."[22]
>
> *Field Service Regulations, 1944*

Eliot Cohen and John Gooch have described in their book Military Misfortunes that the reasons military institutions often fail is that they fail to learn from the past, to anticipate and adapt to the future.[23] Given these criteria, Classroom XXI has not failed in its attempt to leap into the future and prepare the leaders and the force for our future battlefields. On the contrary, the entire Force XXI initiative is extremely anticipatory and is attempting to evolve simultaneously with technology. An effort that has not been attempted to date.

In comparing the present course to the designed plan for Classroom XXI, this paper will first re-examine the goals under the Classroom XXI initiative and briefly discuss their relevance to the overall Force XXI initiative. This paper will then compare each goal with analysis of the present situational developments under the execution of the initiative. The analysis of the comparison will contain the successes and shortcomings of the entire Army Training XXI initiatives, in general, in order to establish a base of reference for recommended solutions in the following chapter.

Additional emphasis and consideration will be given to the leader development program inside these initiatives given the difficulties discussed previously in this paper. Leader development shortcomings in the Army Training XXI initiative will be analyzed with respect to the basic leadership principles: Be, Know and Do which are expounded in such military documents as Field Manuel 22-100.

As a brief review, the objectives under the Classroom XXI initiative are as follows: create a learning environment that maximizes each soldier's learning potential, establish a technology-based institutional learning system capable of maximizing efficiency without

losing the warrior ethos and the inherent initiative in combat, and, finally, to enhance leader development by providing the soldiers technology and resources to study their profession better than ever before possible.

In examining the overall goals in line with Force XXI initiative, it appears that the learning environment intended to exploit fully the technology and maximize the learning potential, in application, is founded on producing information and systems managers. The original Force XXI initiative envisioned immersing soldiers and leaders in complex adaptive systems and exploiting these systems to produce versatile and initiative-oriented leaders. In retrospect, this goal may have been too ambitious given the amount of new variables introduced into an existing conservative advanced educational system.

The advanced military education system is sub-dividing these initial goals into smaller more attainable goals; however, as of this writing they are not preparing the leaders for a digitized battlefield. Major General Harmeyer, the Commandant at the Armor Center, felt that after closely observing the Advanced Warfighting Experiment (AWE) the "individual and collective training was under resourced ... and that the trend will probably continue."[24] As a result, the focus has been on developing the technological base systems and information gathering via digitized research. The focus has been placed primarily upon how and where students find information, instead of which information is important and how this might effect a leader's ability to assess and react.

In a phone discussion with a small group instructor from the Infantry Officer Advanced Course, it appears that there are few technological advancements incorporated into the curriculum. The Infantry Officer Advanced Course (IOAC) has established a Local Area

Network (LAN) that contains centralized lessons plans and has automated daily lesson presentations with computer aided slides projected in the classroom. The student interaction with any digitized equipment is minimal and is presented merely in a familiarization format. There is no projected change in POI with digital enhancements within the foreseeable future.[25] The Armor Officer Advanced Course, although different in their approach, is likewise limited in its application of digitization in support of the Classroom XXI initiative.

In a similar conversation with Major John Miller, a former Team Leader in charge of small group instruction at the Armor Officer Advanced Course, the integration of advancements for Classroom XXI were vague. The technological advancements had been extended to the existing resource limitations with little or no design as to how the next steps were to proceed in support of the Warrior XXI initiative. The prototype Classroom XXI was part of his team and he as the Team Leader has never received external guidance from TRADOC to coordinate the effort with any other service school.[26]

In sub-dividing the objectives contained in the respective initiatives, the purpose and direction of the overall effort have been diluted. The essence, and ultimately the inherent potential for these initiatives, lies in the fact that they are both interdependent and interactive. Each level of the institutional, individual, and unit level education are essential building blocks. The technology and application of it must be taken in context. They are both part of a complex system.[27] If the overall Warrior XXI campaign has a shortfall in any given area, the Force XXI initiative will not succeed in the long term.

In the simplest of terms, the execution of the desired goals has reduced the advanced instruction down to a mechanical science. Much as a scientist does, the institutions have broken down this complex system into simpler more manageable parts to study and introduce variables. An example of this is seen in the Advanced Officer Course's approach to teaching the deliberate decision making process. There has been no adaptation for digitization taught at the service schools. The institutions are teaching the analog process and assuming that each leader will be able to adapt the process once the separate digitization training has taken place. The subject matter and the context have been separated for ease of instruction and exportability.

Taking this analogy one step further, the scientist is not concerned with how the parts interact until he is ready to draw his hypothesis. There is an inherent belief that breaking a system down to its components allows for greater focus and subsequent analysis. With complex variables such as leadership, morale and the development of cognitive skills this is not always a sound approach. Another shortcoming is that the military does not always have this luxury in time nor resources. The Infantry Officer Advanced Course is responsible for teaching both dismounted and mounted tactics from company through brigade sized elements. It is not feasible, nor desirable, to separate procedural and digital training. The leaders must be exposed to both content and context simultaneously.

This disjointed approach has totally missed the intended purpose behind the Army Training XXI initiative. The intended goal was to immerse the leaders and soldiers and have the learning environment interactive, adaptable and complex. Much as an artist must create or assemble parts to interact and blend together. The reasoning behind this is simple.

The future battlefields will be much more fluid and unpredictable requiring quick decisions, initiative and adaptability in lieu of slow methodical problem solving. According to General (retired) Gordon R. Sullivan's intent at the inception of Force XXI, the system was to develop exercises requiring leaders to experience the ambiguity associated with combat and develop the self-confidence and versatility needed for the information age.[28]

The overall goal of Classroom XXI to involve soldiers and leaders in their advanced education is an attempt to build this self-confidence and provide the necessary tools, in the form of information, to allow adaptability and versatility. Unfortunately, at times "organizations and systems associated with the gathering, storage and transmission of information begin to eat at the inside of the armed forces, so to speak."[29] This simply means that in focusing on the information gathering, dissemination and supporting hardware, there is an inherent loss of analysis or human application in this type of environment. The subsequent loss of the human dimension tears at the core of the military mentioned earlier in the paper -- the moral domain.

The maximum learning potential for each individual is not being attained simply by providing all the information necessary for the students to research and study their profession. The advanced military education system was established upon a cooperative and shared learning model that depends on interaction and a focused effort on group learning. There are obvious pros and cons to this approach, but it is deemed critical in study where the human aspect and team building are key factors. The overall goals were never to produce information managers but to continue to foster leadership and produce

leaders. Only now, these leaders need to be more versatile and have the ability to adapt on a fluid and digitized battlefield.

The information networks, Army Knowledge Network (AKN) and the Combat Training Center (CTC.WIN) sites, are not even being tapped into in the Command and General Staff Officer's Course. As an example, as of spring of 1997, the CGSC students were still using out-dated copies of FM 100-5 (dtd June 1993) as course material when draft versions were available on the network one year prior for discussion purposes. The reasons stated by most instructors was that the draft versions were not doctrine yet. CGSOC is also guilty of incorporating very few lessons learned from the field in the instruction. It is exactly this dogmatic approach to advanced military studies that cannot continue if we, as an armed force, are to integrate technology and new techniques into a learning environment and ultimately anticipate a dynamic battlefield.

Force XXI is attempting to break the existing paradigm created by this 1993 version of FM 100-5. This paper has attempted to show that both training and education cannot be founded solely upon observations of the past. If the Army is to anticipate the future, which is exactly what Force XXI and the Army After Next are attempting to do, the approach must be founded on an inexact mix of observation from history and a heavy reliance on concepts for the future. These concepts for the future have not been the focal point during the experimentation at the National Training Center. The evaluation, to include all the informal writings on the rotation, are discussing the performance against the opposing forces. The official results of the experimentation have been withdrawn from the Center for Army Lessons Learned at the request of TRADOC. It is this paper's speculation that

the results did not reflect as good of results as were anticipated and may have proven that the present operational approach has some basic flaws in application to an existing model.[30]

For years the buzz phrase at levels of advanced military education and training at the training centers has been "it's the process and not the product!" Along with the restructuring, under Force XXI, must come some flexibility in the educational and training approach to live up to this axiom. The military institutions ultimately must teach and train the process of adapting to new and more radical approaches to decision-making and leading, as opposed to, managing soldiers. Because tomorrow's battlefields will be more demanding, faster-paced and more lethal, we must adapt our training and education methodology to encompass a distributed mentality and execution.[31] The observations from the combat training centers and military analysts are that technology has increased the capabilities to obtain and process information, yet commanders are no better equipped today to deal with either a rapid changing environment or a versatile and resourceful enemy than they have been in the past.[32]

In a conversation with Colonel Douglas MacGregor, the author of *Breaking the Phalanx*, following a presentation to the 1997 Applied Military Studies Program students, he expressed a similar view that the Army has equipped the leaders but not trained them properly to handle this new environment. He observed some of the AWE at the National Training Center and commented that we are still making the same old mistakes but at least we can better identify them with the technology. The personnel he encountered in leadership positions during the NTC rotation were uncomfortable with the amount of technology and reverted back to an analog system when able to during a battle.[33]

Through another such interview with Major Mike Albertson at the Center for Army Lessons Learned (CALL), it was determined that there was a great deal of emphasis placed upon the fielding of the technology associated with the AWE. The Combined Arms Assessment Teams (CATTs) assigned to the AWE were observing that, in general, the leadership, from the Brigade Commander down, was uncomfortable with the technology and did not trust the information it provided. The conclusions drawn were simply that operations still depended upon decisive actions by commanders and leaders to enable the capabilities of technology.[34]

Force XXI's main focus is on the overall redesign of the operational forces, and rightly so. This, however, does not justify the lack of attention to the educational and training efforts which generate and sustain the leadership required to ensure that all of these initiatives work. There have been a number of barriers that have disabled the system of systems in the Warrior and Classroom XXI efforts. Some of these barriers include: lack of adequately allocated resources, the priorities for administering the development of new initiatives, the use of proponent-based education and training systems, the lack of joint force integration into the educational base, the instructional techniques, experience level of instructors at appropriate levels and finally the lack of uncertainty introduced to challenge the developing soldiers and leaders.

First, looking at the lack of allocated resources, the budget constraints have slowed the initial proposed timetable of fielding technology and emplacing digitized systems at centralized learning centers. The Command and General Staff Officer's Course is one example. CGSOC has submitted the necessary listing of required funds and resources to

TRADOC on several occasions, but these requests have been denied as of this time.[35] At times its is necessary to adjust the priority of budget to the Warfighter experiments, which are Force XXI's main effort. The only question is at what cost to the Warrior XXI initiative?

TRADOC has no definitive master plan published for each installation to detail the funding and allocation for each central learning facility in line with the Army Training XXI initiatives. There has only been general guidance issued to each TRADOC installation in accordance with TRADOC Pamphlet 5-525 and no technology focus or stated intent for each service school and the Combined Arms Center (CAC). With little or no guidance, each installation commander is approaching the problem from his own perspective and attempting to develop a perceived needs listing along with clearer objectives to support their portion of the overall Warrior XXI campaign plan. This is a significant problem for a "coordinated effort" throughout the force.

Lack of coordination manifests itself in the second barrier. There is a problem with the overall manner in which TRADOC has proposed to approach the Warrior XXI campaign. One example of this is that TRADOC has chosen to establish simultaneously all advanced education facilities with priority to no one in particular. In short, this means that the Transportation Officer Advanced Course, Infantry Officer Advanced Course and the Command and General Staff Officer's Course all have the same priority or focus in the designed campaign plan. In TRADOC's attempt to accomplish everything simultaneously, they are accomplishing very little to standard and managed to ineffectively allocate the limited resources.

Yet another example is found in the similarities between the training approach under Warfighter XXI and the Warrior XXI design methodology. Both Warfighter and Warrior XXI's campaign plans were established to focus on the lower levels first and evolve into the more advanced levels of training and education. This approach has added to three fundamental failures: lack internal coordination amongst services, lack of an over-arching control agency for the entire force, to include Reserve and National Guard, and finally a void in the mid to upper level leadership as this transition takes place. These facts, coupled with a vague set of guidelines issued by TRADOC, have managed to dictate a segmented approach to the education and training of the leaders and soldiers in the Regular Army, the Reserve and National Guard elements.

The segmented approach has impeded the army from transitioning to the desired over-arching combined arms training and education strategy proposed in the initial Warrior XXI campaign plan.[36] Instead, the Army has remained founded in a proponent-based training and education system which is neither synchronized from the TRADOC level nor integrated fully within the force. Each branch is responsible for its own training systems and the TRADOC assigned levels of interest: division, brigade, battalion or company level. In the educational systems, each proponent school is developing its own approach to learning under this new paradigm under a general intent from TRADOC.

Yet another segmented portion of the design is found, under the Warfighter initiative, in the adherence to the battle lab systems. Different service schools are responsible for the different battle labs designed to study the battlefield dynamics and separating them into their respective battlespaces (i.e. mounted and dismounted for Fort Knox and Fort Benning

respectively). The design of these laboratory environments is to create a holistic and horizontal approach through scientific experimentation. In fact these battle labs are extremely vertically connected and not integrated to the point of drawing expertise from across the Army and other Services.[37] This segmented systems approach is not working to its maximum effectiveness in the study of battlefield dynamics. There is very little reason to believe that this same approach will work for advanced education regardless of resource constraints.

The fourth barrier is the segmentation of the approach, but of a different kind. TRADOC has made little effort to integrate fully a joint approach to both training and education under the Force XXI initiative. The Warfighter initiative is considered to be a "Joint Venture", but in actuality, the name is the only joint component. There is even less integration in the educational systems already in place. Other than typical considerations such as close air support (CAS) and coordination with Marines, there exists no standardized joint literature or training guidance issued to the Officer Advanced Courses. The coordination with the Marines is added simply because they attend the different service schools and are integrated into the lesson plans. The Joint Vision 2010 plan is available in Joint Electronic Library format and needs to be incorporated into the advanced military education curriculum as well as considerations for future course objective refinement.

The Command and General Staff Officer's Course integrates joint systems and their planning considerations into the curriculum but not to the necessary extent for future planners and operations officers in the field. Very few exercises are developed to integrate the "full" potential of the Navy and Air Force systems and capabilities into any operation

including Prairie Warrior. The Army cannot allow a segmented approach to joint integration dictate the level of connectivity incorporated into the Force XXI project. This infusion of knowledge and training must be centralized and incorporated into the Warrior and Warfighter XXI initiative campaign plans regardless of resource limitations or cost.

The resource constraints placed upon the environment for the implementation of this campaign comprise the fifth self-imposed barrier discussed here. In the past, instructors were seen as "guardians of institutional memory, who could act like harbor pilots to guide novices toward some solutions because they had once run aground themselves."[38] The potential is high for the restructured design of the educational system to omit the present guidance and mentorship. The institutional learning installations are transitioning and developing simultaneously with the overall initiative and, as a result, the soldiers and future leaders are suffering.

Because of the lack of digitally-experienced instructors, the instructional base remains founded in basic tactics, techniques and procedures at the advanced officer course levels. This is not entirely bad but, for the long term goals, prototype training support packages (TSPs) exist already for the unit training initiatives, and yet no one to date has developed the TSPs for the individual educational initiative in the Warrior XXI campaign. The developers of the educational POIs and the actual instructors must have a common vision to make the connectivity between existing and future systems possible.

The intended design under the Force XXI campaign plan was to allow the Warfighter XXI experiments "to point out the digitized implications for the institutional, self-development and unit" training and education of the force.[39] This operational prototyping

approach to systems solutions is fundamentally sound. Operational prototyping is of particular utility in a system such as Army Training XXI. An example of the priorities and functions initially designed under this approach are seen in figure 3.[40] There are so many questionable areas because there are little or no concrete guidelines or historical references in developing a model which today's soldiers and leaders can follow.

The diagram demonstrates the complex connectivity required to allow this initiative to function. The linked initiatives are building blocks for each other. Without the simultaneous development and fielding of one aspect of the framework, the entire model tends to break down and fails to function in accordance with the design. From the diagram it is apparent that the framework is too complex and that there are too many questionable areas dealing with the institutional learning, self-development and force integration pieces of the Army Training XXI structure.

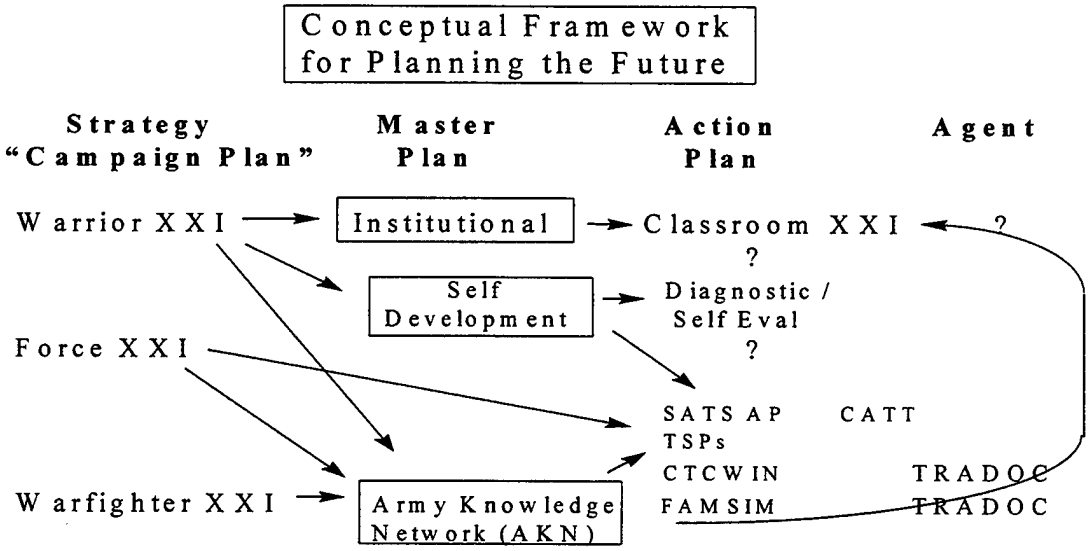

Figure 3. Proponency Chart
Source: Army Training XXI Homepage

The emphasis is clearly seen in the above diagram that Warfighter has received most of

the attention with few, if any, action plans for the Warrior XXI strategy. Also absent from this model is the overarching control plan connected from Force XXI down through the other two components of Army Training XXI. The confusion in this diagram is indicative of the overall confusion in the purpose and direction of the campaign plan. TRADOC is closely monitoring the Warfighter efforts, to include the experiments, but there have been only minor guidance adjustments made since the original intent was published for Warrior XXI. This is a critical shortcoming and deviation from the initial campaign plan.

As is evident from the conceptual framework diagram, this is an extremely complex venture that the Army has endeavored to accomplish. There will always be a certain amount of friction that will prevent or hinder such an endeavor in achieving its final objectives. Clausewitz states that "countless minor incidents combine to lower the general level of performance, so that one always falls short of the intended goal."[41] Because of the required connectivity of all concepts from Force XXI down to Classroom XXI, the potential for minor incidents or ambiguity can have exponential rather than cumulative consequences. The minor incident, by comparison, is an unsuccessful Warrior and Force XXI campaign plan and the exponential effect is the lack of soldier preparation or the development of leaders for future battlefields.

Managing complexity involves a strong ability to deal with ambiguity and maintaining a balance between reliance on systematic approaches and gut feelings.[42] This is the final and probably the most important barrier that must be removed for the Warrior XXI campaign to be successful. The infusion of technology into the classroom has produced an even more systematic approach to both teaching and learning than ever before. There is an

insufficient attention to learning how to handle ambiguous situations in a rapidly developing environment. Uncertainty and friction are the characteristics of tomorrow's battlefield and must therefore be at the center of any preparation for our soldiers and leaders.

Major Jeffrey Lau devotes an entire forty page monograph demonstrating his thesis that there is inadequate synthesis designed into the advanced educational systems in the military.[43] Under Force XXI, and for the Army After Next, the amounts of information involved in digitized warfare will only serve to compound the problem. If the present strategy is not allowing the students to develop skills necessary to synthesize, decide and act under an analog system, the results will be even more difficult to attain in the study and application of future warfare. According to a civilian study in leadership capabilities and shortcomings, it was determined that "efforts to develop conceptual competencies must begin early in an officer's career."[44] The study found that the later these abilities to handle uncertainty and large amounts of information were developed, the greater the impact on not only the leader himself but also the entire system in which he operated. That is why the leader development in the advanced military educational system must be the focal point for the Warrior XXI and Classroom XXI campaigns.

Some of these problem areas cannot be anticipated or even fixed given certain circumstances. The barriers in attaining the Classroom XXI campaign objectives are the focal point the next section. This section will also propose some possible solutions to right the course of Army Training XXI. The proposed solutions are founded in the most basic piece of technology on the battlefield today: man.

> Command cannot be understood in isolation. Data processing technology and weaponry; tactics and strategy; organizational structure and human systems; training, discipline and the ethos of war; politics and social makeup of armies --- all these things and many more impinge on command in war and in turn are affected by it.[45]
>
> Martin Van Crevald, ***Command in War***

World War II and the post-war years were times in the United States Army's history marked by radical technological advancements and critical restructuring. This period in the Army's history marked a large learning curve in the training and education of the entire force. As demonstrated by the Army Field Regulations of 1944, it was feared that the technological advances would become the focal point for the restructuring of the emerging force. The World War II experiences showed that technology could not replace man as the focal point of war. Today as the Army progresses, it cannot allow the institutional goals to produce the same uncertainty and pandemonium that accompanied the force into World War II. The key is to learn from the historical mistakes and apply the lessons learned to focus on the integration of technology into an existing human system. The only difference today is that the Army is faced with even more dynamic global implications and a more diverse mission.

In this section of the paper, recommended solutions are examined in light of the research question. The recommended solutions are an attempt to correct the focus of Warrior XXI campaign objectives. The solutions will concentrate on refocusing the Classroom XXI goals and discuss the subsequent impact on the force.

The first barrier discussed was the lack of allocated resources. The basic problem

with the budget and resources for Army Training XXI is that there is no set plan which allocates resources in detail to each responsible agency. Furthermore, the overall effort is not coordinated. Each installation responsible for advanced military education (Forts Leavenworth, Knox, Benning, Rucker, Lee and Carlisle) are all submitting a necessary resource request to TRADOC. TRADOC then subjectively approves or denies the requests due to an unpublished priorities listing or other higher priority projects such as the Warfighter experiments.

TRADOC needs to take a firm control on the overall advancement of the initiatives and produce the necessary formal documentation to provide needed additional guidance for the Army Training XXI initiative. This document should be an in progress review (IPR) designed to inform the force on the progress of the initiative, shortcomings or adjustments and anticipated effects upon the force as a whole. The purpose for this document would be two-fold: first, it would inform the entire Army as to the initiatives in progress as well as the leadership's confidence in the program; and secondly, it would allow the force to receive critical feedback from soldiers and leaders who are presently experiencing the products of the "system," for better or worse. The Classroom XXI campaign cannot proceed if the resources are not available. At the same time, the initiative itself is not ready to proceed until a better feedback system is in place to examine and assess the priorities and what the implications are for the next century.

The misunderstood prioritization leads back to the second barrier discussed earlier in the paper: the faulty priorities in the administration of the initiatives. The primary priority for Army Training XXI is the Warfighter initiative and the impact on the force.

The only priority stated internal to the Warrior XXI campaign plan is the Classroom XXI initiative, and this guidance is very general in nature. The Classroom XXI Program of Instruction (POI) has been the only focal point to date in the fielding of this new "classroom without walls." The POI itself is primarily focused on technology incorporation into the classroom and has failed to discuss the adaptation of leader development or the educational approach inherent with these advancements.

The Warfighter experiments have produced sufficient lessons learned to warrant both the Warrior XXI and Classroom XXI campaign plans being raised in the priority list and provided with the necessary resources to create a sufficient base to complete the desired operational prototyping. Operational prototyping was designed to examine requirements generated from field studies and adapt training and educational systems to meet the needs of the force.[46] This adaptation must be conducted rapidly because the leader development has suffered due to a lack of internal coordination and an overarching control mechanism provided by TRADOC.

It must be remembered that there is a limit to what digitization can do in the near term. Leadership remains an art form, and as such, requires certain intangible traits that digitization and technology in general cannot replace.[47] The leader development programs in Classroom XXI, and generally in the entire Warrior XXI program, must be the corner-stone of the restructuring process. Technology, to date in the Warrior XXI initiative, has been the enabling factor for the entire program. Technology, however, has manifested itself as the focus for the production of the Classroom XXI POI for each installation. The entire structure is designed around a specific classroom, computer technology and

communication network. The Army has become so enamored with technological advancements that "we have fallen into the old American trap of seeking technological solutions to human problems."[48]

Technology infusion and eventual digitization in Classroom XXI is a sound concept. Technology is rapidly becoming a necessary substitute for the large amounts of soldiers and systems that were once deemed necessary to accomplish the assigned missions. The developing initiative must contain a careful mixture of technological advancement and the wisdom from experience to help maintain a balance between the physical, cybernetic and moral domains of warfare. When considering all of the technological advancements in warfare, one must remember that technology exists to equip man and not vice versa.[49]

The approach in introducing this human dimension is different at each installation responsible for advanced military education. This fact is due to the scope of instruction and desired endstate for the soldiers and leaders. For example, the same physiological and psychological interaction is not required for a transportation company commander at Fort Lee as it is for an infantry company commander at Fort Benning. This is primarily due to the inherent difference in human versus technological dependence in warfare. Therefore the focus must be specifically tailored to the individuals and specific audience and still be centrally controlled by TRADOC. Otherwise, the desired combined arms integrated approach will never fully develop.

When the restructuring process is not centrally controlled, as mentioned earlier in this paper, the present situation of confusion exists and becomes a barrier to the process. Proponent-based education and training systems, given little if any guidance, cannot

conduct a coordinated effort in support of the Warrior XXI initiative. TRADOC must establish a concept based requirements system of sorts for the educational domain. The concepts must be focused enough to provide some detailed instructions to installations with Classroom XXI elements and yet allow for a built-in feedback mechanism to generate requirements from both the field and the classrooms.

In addition being coordinated centrally from the TRADOC perspective, this requirements system must also establish linkage to the joint and multinational arenas. The service schools must possess unity of effort in the initiative along with guiding principles that will allow interoperability with joint forces in future operations. If the Force XXI Army is a complex adaptive system as described in TRADOC Pam 5-525, then the educational and training system must likewise possess the same qualities to ensure an integrated leader and soldier development.[50] The advanced military education system under Classroom XXI should be postured to adapt as the environment and nature of warfare adapt over time.

The Army is somewhat naïve in thinking that such a combination of complex adaptive systems can quickly assimilate a complex battlefield environment without prior training and education. Joint integration into the education and training process must be initiated at the primary military education levels and fully exploited during the advanced education in the advanced courses culminating at CGSOC. Instead, the Army has chosen to introduce joint operations at CGSOC to majors and lieutenant colonels with little or no attention to technological integration except during the annual Prairie Warrior exercise. The techniques to introduce technology into the scenario have only served to continue to

draw the focus away from a study of this integrative art of war and reduced it to the study of a science of technological capabilities and differences. If the instruction is postponed until the CGSOC educational level in any leader's career, there is simply too much to try to learn in one year at Leavenworth.

Lack of available time alone, however, cannot be blamed for the failure of the Warrior XXI initiative. Given the vague guidance from TRADOC, the instructional techniques and POIs are equally ambiguous which results in unprepared leaders. There is a stated and perceived need from the force to incorporate technology into the lesson plans of Classroom XXI. The disconnect is in determining the exact linkage to applications in the field and desired characteristics of a "digitized leader" for the future battlefield. Some analysis of interaction in a complex adaptive system must take place in order for the initiative to be successful.

In the absence of focused guidance, the different service schools have determined to conduct leader development much the same as they have in the past. Although they are being rewritten, the present focus for leadership remains founded in the FM 22-100 series of manuals and basic leadership traits documented throughout history in countless books and manuals. This is extremely important to ensure that leaders are well-versed in basic leadership skills rooted in experience.[51] What is still fundamentally missing, however, is the necessary development in conjunction with the anticipated needs of a leader on the future digitized and fluid battlefield. Right now the educational system does not know what it does not know in the area of futuristic combat leadership. The Classroom XXI POI must specifically address training requirements for the future digital leaders.

One good approach discussed by the TRADOC Commander is the development of such training tools as a "Digital Leader's Reaction Course (DLRC)" to assist in training leaders for a digital environment.[52] This course is a step in the right direction but must still be reinforced with classroom and unit training scenarios comprised of uncertainty and rapidly developing situations for discussion. Some of the general observations, which were actually criticisms, from the Advanced Warfighting Experiment (AWE) are that leaders revert back to voice communications during contact. Perhaps the educational community should not criticize this natural human reliance on basic security needs, already identified in our leadership manuals, but instead build upon it.

In order to build upon the weaknesses and strengths inherent in both today's and tomorrow's leaders, the advanced military education system must be comprised of the best experienced instructors possible. In order to accomplish this goal, a shift in priority is required for the placement of digitally experienced personnel. The potential payoff, in the form of transferred experience in the classroom, far exceeds the initial cost to the Warfighter initiative. The digitally experienced personnel are already being transplanted into positions to write doctrinal manuals, however, the same prioritization is not present for the classroom instruction.

The Advanced Warfighter Experiments (AWE) have been ongoing since early 1994 in the field at different levels. The experiences, tactics, techniques and procedures learned form these experiments must be brought to the forefront in the classrooms now for the future leaders. Current officers at the Advanced Officer Courses now will be the future

battalion commanders in the year 2010 when Force XXI is envisioned to be in place. The Army simply cannot wait another year to start preparing leaders of tomorrow.

Likewise the field grade officers at Fort Leavenworth will be the future brigade commanders and general officers around 2010. For the Army to conduct the transition to Force XXI and the Army After Next smoothly, the time is now to implement fully the Classroom XXI initiatives at all levels of the advanced military education system. A parallel initiative must start at the basic military educational levels to prepare the soldiers for the changing environment as well. The subsequent objectives for Classroom XXI and Warrior XXI must be focused to produce more specific guidelines to transition from the campaign plan into coherent and synchronized operations orders.

In order to achieve both the goal of synchronization and preparation of leaders for the potential future environments, the emerging paradigm of information dominance must be suppressed. Information dominance is much like air supremacy in that it is almost impossible to achieve, and if achieved it is only relevant for a limited area and environment. As mentioned earlier in this paper, an over reliance on detailed information has a paralyzing effect both on units and leaders. Attempting to combat this potentially disastrous situation, both the educational and training environments must introduce uncertainty into situational discussions and training events.

The Marine Corps already has incorporated this factor into their manuals for training and education. For example, in FMFM-1 it states that:

> Exercises should introduce friction in the form of uncertainty, stress, disorder and opposing wills. Dictated scenarios eliminate the element of independent actions and opposing wills which are the essence of combat.[53]

Independent actions and the imposition of will are foundations of warfare since the beginning of time. They are also inherent in the desired flexibility, mobility, connectivity versatility and initiative stated in TRADOC Pam 525-5.[54] The educational and training systems cannot focus on the future without regard to the past and a realization that the future itself is uncertain.

Classroom XXI likewise cannot continue to operate under the same guidelines as the old analog classroom. The educational and training approach must slowly immerse the students into the digitized environment. The immersion technique is an attempt to avoid an appliqué approach to the merger of technology and human systems in the classroom. The program of instruction must then refocus on a more self-directed learning approach that is firmly entrenched in exercising initiative and developing independent thought. Education and training in this environment will produce leaders focused on individual and collective development with the intent of leading on a digitized battlefield instead of gathering information and managing systems.

The general feeling is that to teach an art form, the structure must be unrestrictive and less methodical than teaching a science. Education and training of warfare in the advanced military education system must encompass both. The focus, however, cannot be more on the science than on the art of warfare. Technological proficiency can be achieved

through memorization and repeated manipulation of systems. The art of warfare should be the focus of an "advanced" military education system especially under the modernization of Classroom XXI.

As warfare evolves and the size of national armies continue to decline, technology will continue to become more and more complex.[55] The complexity added by technology only tends to compound exponentially the complexity inherent in a system such as the armed forces. The educational system under Classroom XXI and Warrior XXI must first capitalize on the uncertainty produced with such a program and then seek to lead the students through a reduction of the complexity in its constituent parts.

Conclusion

> The art of warfare is subjected to many modifications by industrial and scientific progress. But one thing does not change, the heart of man. In the last analysis, success in battle is a matter of morale.[56]
>
> *Ardant du Picq, Battle Studies*

The result of what is written in this paper is not an argument for the abandonment of the Classroom and the related Warrior XXI initiatives. Rather this paper merely answers the question of whether Classroom XXI adequately provides the necessary advanced military education to prepare company and field grade leaders for the future battlefield. The answer, although complex in context, is simply that it does not. There were several barriers mentioned, both external and internal, that prevent the initiatives from achieving success.

An inconclusive list of some of the barriers included the lack of adequate resources to achieve the necessary technological advancements without degrading the instruction as

mandated by the TRADOC Commander.[57] Another barrier encountered was the lack of central control from TARDOC and an incorrect allocation of priorities in the advanced educational systems to meet the needs of the force. The third barrier discussed was an outmoded adherence to proponent-based education and training systems. The Warrior XXI campaign plan initially called for an overarching combined arms education and training systems approach.[58] Due to the complexity, the proponent agencies could no longer orchestrate a connected effort of educating and training the emerging force. The fourth barrier encountered was the lack of joint integration into the educational initiatives. General Hartzog has stated that any service was "encouraged" to participate in the battlelabs, warfighting experiments and educational and training components of Force XXI.[59] Joint Venture 2010's campaign plan paralleling Force XXI actually has a more extensive and realistic approach to education and training. It is centered on the human dimension. But the most important barrier encountered is the over-reliance on technology and systematic approaches to solving problems, instead of adapting the leader development programs to account for the modern battlefield.

There are several implications for the advanced educational and training systems that flow from this central impediment. One implication is the leader development cannot be enhanced through large group instruction. Education and training from a central facility is nothing more than the same instruction base provided in the 1970's but simply more technologically advanced. We must, therefore, strive to achieve clarity with the educational goals and accentuate the military art and need for decisive action on the fluid digitized battlefields which will continue to be hindered by fog and friction.

Another implication is the designed need for quality instructors to accomplish the complex and difficult task of combining the technology infusion with an adaptive leader development program. This implies that some of the best staff officers and commanders must be made available to instruct at appropriate educational bases such as CGSOC and the advanced courses. As digitization is fielded in more units, these leaders who become instructors should have digital backgrounds and be founded in the theory that links the technology to the moral domain of combat.

Yet another implication is that reliance on classroom technology, contributes to the loss of intuition by soldiers and leaders. This is due primarily to the expectancies produced from the emerging information gathering and dissemination techniques. There is an inherent risk of paralyzing leaders with too much information and causing them to wait for further or more detailed information before acting upon the data received. The educational foundations must continue to assert the innate value of intuition, risk-taking and creative thought in our advanced military education system.[60] The Army's over reliance on technologically structured systems might tend to inhibit the growth of these natural intellectual capacities.[61]

A reference was made earlier to Joel Barker's book *Future Edge* and the fact that he alludes to the potential center of gravity for our educational institutions: the mind. Classroom XXI should be built around the existing lever of the human mind. The technology should be integrated at a slow rate while modifying the leader development to challenge the leaders of tomorrow with information, uncertainty and the moral dilemmas of warfare. The program of instruction must be designed to introduce technology in the

context which it will be used on future battlefields. The leaders and soldiers must study the integration of technology with the material in order to fully exploit the full potential. A suitable feedback mechanism must also be introduced to allow for mid-course corrections both internally from the students and externally from the force. This will fully enable the use of the proposed operational prototyping system.

As an integral part of the feedback system, TRADOC must still continue to control centrally this venture with updated objectives and guidance synchronized through the FORSCOM Commander and forces in the field. As it stands, the battlefield is not being taken into to the classroom nor the classroom to the battlefield. The forces in the field have very little connectivity with Classroom XXI. TRADOC must ensure that the other Classroom XXI facilities at Fort Leavenworth and the service Advanced Officer Courses must also achieve connectivity to ensure that there is a unity of purpose for the initiative.

ENDNOTES

1. Martin Van Crevald, Command in War, (Cambridge: Harvard University Press, 1985), p.239. Van Crevald proceeds to illustrate that technological advances by themselves cannot answer the entire spectrum of desired results contrived from a given problem set. He illustrates his points with such examples as the introduction of the helicopter in Vietnam.

2. Eliot Cohen and John Gooch, Military Misfortunes, (New York: Free Press, 1990), p. 7.

3. United States, Department of the Army, TRADOC Pamphlet 525-5: Force XXI Operations, (Fort Monroe, VA: Army Training and Doctrine Command, 1 August 1994), p. 1-5.

4. Joel A. Barker, Future Edge, (New York: William and Morrow Co., 1992), p. 18.

5. Internet, www. pica.army.mil/orgs/battlelabs/force21.html, 29 October 1996. FORCE XXI Homepage (Internet), p.2.

6. Internet, www-dcst.monroe.army.mil/warrior, 15 March 1996, p. 1. This diagram is the overview for the entire Force XXI strategy and the major components comprising it.

7. Gordon R. Sullivan, " A Vision for the Future", *Military Review*, May-June 1995, p. 56.

8. Internet, www-dcst.monroe.army.mil/warrior, 15 March 1996. This is a synthesized explanation of the desired intermediate endstate for the Warrior XXI component of Force XXI as explained over several pages on the Warrior XXI Campaign Plan Homepage.

9. Thomas C. Schmidt, "Tactical Information Gathering in the High Technology Command and Control Environment: A Division Commander's Leadership Challenge", (Monograph, School of Advanced Military Studies, 1985), 2.

10. Internet, www-dcst.monroe.army.mil/warrior, 15 March 1996, WARRIOR XXI Campaign Plan Chapter 4; p.4.

11. Ibid.

12. TRADOC Pamphlet 525-5: Force XXI Operations, p. 4-3.

13. Ibid., p. 4-4.

14. Internet, www-dcst.monroe.army.mil/crxxi/chap2, 11 April 1997. Classroom XXI Campaign Plan.

15. Ibid.

16. President William Clinton, State of the Union Address: "Hardwiring the Schools" Associated Press, 23 January 1996.

17. "Technologies that Could Radically Change Performance of the Education and Training", Rand Corporation, URL http://www.rand.org/centers/iet/technology/edtech, 30 May 1996.

18. These goals are a synopsis of the numerically listed objectives for the Leader Development programs under the Force XXI charter. Not all the objectives were listed. Only the objectives pertinent to institutional learning and training were listed in this paper. TRADOC Pamphlet 525-5: Force XXI Operations, pp. 4-4 and 4-5.

19. MG George Harmeyer, "Post AWE Observations", Armor Magazine, (Fort Knox: U.S. Army Armor Center, July-August, 1997), p.5.

20. Margaret J. Wheatley, *Can the US Army become a Learning Organization?* Journal for Quality and Participation, (Cincinnati: University Microfilms International, March 1984), p. 50.

21. Martin Van Crevald, Command in War, (Cambridge: Harvard University Press, 1985), p. 16.

22. United States War Department, Field Service Regulations: FM 100-5, Operations, (Washington,: GPO, 1944), p. 2.

23. Eliot Cohen and John Gooch, Military Misfortunes. This is a summation of their feelings toward why military institutions fail as explained over the first two chapters of the book.

24. MG George Harmeyer, "Post AWE Observations", Armor Magazine, p. 5.

25. Phone interview with CPT (P) Paul O'Conner, Small Group Instructor (SGI) at the Infantry Officer Advanced Course at Fort Benning on 21 September 1997. The conversation was an attempt to see how the IOAC was incorporating the Classroom XXI initiative and determine what the short term objectives were for the institution. The short and long term goals were ambiguous and not intended to be synchronized with any other advanced course.

26. Interview with MAJ John Miller, Team 1 Leader, at the Armor Officer Advanced Course (AOAC) at Fort Knox on 21 June 1997. The conversation was centered around frustration with the lack of external guidance and coordination of the Classroom XXI initiatives. The technological advancements were stopped due to lack of money and unclear focus as to how or why to proceed with the initiative.

27. Christopher Bellamy, The Evolution of Modern Land Warfare: Theory and Practice, (New York: Routledge, Chapman and Hall Inc., 1990), p. 52.

28. Gordon R. Sullivan, " A Vision for the Future", *Military Review*, May-June 1995, p. 55.

29. Martin Van Crevald, Command in War, p. 4.

30. This passage is a summary opinion of the author given limited access to CALL documents, reading the informal E-mails from individuals present at the experimentation and the reluctance of the CALL personnel to disclose the reasoning behind the withdrawal of the lessons learned.

31. David W. Marlin, "The Army's Future Training Strategy", *Military Review*, May-June 1996, p. 46.

32. Ibid., p. 265.

33. Informal Officer Professional discussion group with Col Douglas MacGregor, author of Breaking the Phalanx, in which he expressed his observations of the AWE and Force XXI initiatives in application on 12 August 1997. He is presently working at the Battle Lab on Fort Leavenworth. The summary of his opinion is that the technology is not bad but the Army is simply overlaying it onto an existing structure with little or no regard for the necessary human considerations.

34. Interview with MAJ Mike Albertson, Center for Army Lessons Learned (CALL), Fort Leavenworth, Kansas, 10 October 1997. MAJ Albertson commented on the general observations obtained from the assessment teams visit to the AWE at the NTC. The entry paragraph was a general summary of their conclusions pertaining to the leadership shortcomings during the AWE.

35. Interview with Rick Morse, Deputy Director Army Knowledge Network, Center for Army Lessons Learned (CALL), Fort Leavenworth, Kansas, 22 October 1997. Mr. Morse made these comments during an interview concerning the designed plan for Classroom XXI implementation on Fort Leavenworth.

36. David W. Marlin, "The Army's Future Training Strategy", p. 51.

37. Interview with Scott O'Neil, Dismounted Battle Lab, Fort Benning, Georgia, during the 1996 Infantry Conference, 7 June 1996. Major O'Neil commented on the fact that inter-service connectivity and integration was extremely difficult working in between each lab. Despite organized "working groups" designed to accomplish this integration, there are too many branch parochial issues at stake with studying systems and perspective on training and education.

38. Internet, www-dcst.monroe.army.mil/crxxi/master, 11 April 1997, Classroom XXI Master Plan, p.1.

39. David W. Marlin, "The Army's Future Training Strategy", p. 47.

40. Internet, www-dcst.monroe.army.mil/atxxi/atxxi-hp.html, 11 June 1996, Army Training XXI.

41. Carl von Clausewitz, On War translated by Michael Howard and Peter Paret, (Princeton, New Jersey). P.119.

42. Beckhard and Harris, Organizational Transitions: Managing Complex Change, (Reading, Massachusetts, 1987), 116.

43. Jeffrey D. Lau, "Training Leaders for Force XXI: An Azimuth for CGSOC Tactics Instruction", School of Advanced Military Studies Monograph, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1995. The passage is the central thesis of the entire monograph and the main point of conflict within the present advanced educational system.

44. Emil K Kluever, William L. Lynch, Michael T. Mathias, Thomas L. Owens, and John A. Spears, "Striking a Balance in Leader Development: A Case for Conceptual Competence", (National Security Program Discussion Paper, John F. Kennedy School of Government, Harvard University, 1992), p.16.

45. Martin Van Crevald, Command in War, p. 261.

46. Interview with Mr. Rick Morse concerning the intended purpose behind "operational prototyping" and its utility in the Force XXI campaign plan. He suggested that the priorities also need to be re-examined now that the experiments are complete and the leader execution piece seems to be a weak link in the operations.

47. These comments were taken from an article compiled from various sources and observations by the Army Digitization Office under the auspices of COL Steven A. Emison, Chief of Requirements and Evaluation since August 1994. *Post Task Force (TF) XXI Advanced Warfighting Experiment (AWE), 1 July 1997.* URL http://www.monroe.army.mil/pao/awe1

48. Ralph Peters, "After the Revolution", *Parameters,* Summer 1995, p. 7.

49. Office of the Joint Chiefs of Staff, Joint Vision 2010, (Washington, D.C.: GPO, 1997), JEL, Chapter 3, p. 20.

50. TRADOC Pamphlet 5-525, p. 2-5.

51. MG George Harmeyer, "Post AWE Observations", p.5.

52. Ibid. This idea was explained and expended upon by General George Harmeyer in Armor Magazine in some of the observations noted from the AWE at the National Training Center.

53. United States, Department of the Navy, FMFM-1 Warfighting, (Washington, D.C.: GPO, 1989), p. 48.

54. TRADOC Pamphlet 5-525, p. 3-1.

55. Christopher Bellamy, The Future of Land Warfare, (New York: St. Martin's Press, 1987), p. 61.

56. du Picq, Ardant, *Battle Studies,* Roots of Strategy: Book 2, (Harrisburg, Pennsylvania: Stackpole Books, 1987), p. 135.

57. William H. Hartzog, "Introductory Remarks", TRADOC Homepage, URL http://www-dcst. monroe.army.mil/tradoc, 13 August 1997, p.1.

58. David W. Marlin, "The Army's Future Training Strategy", p. 51.

59. William H. Hartzog, "Introductory Remarks", URL http://www-dcst.monroe.army.mil/tradoc, 13 August 1997, p.2.

60. Paul T. Harig, "The Digital General: Reflections on Leadership in the Post-Information Age", *Parameters*, Autumn 1996, p.140.

61. Ibid., p. 137.

Bibliography

Books

Barker, Joel A. Future Edge. New York: William Morrow and Co., 1992.

Beckhard and Harris. Organizational Transitions: Managing Complex Change. Reading, Massachusetts: Addison-Wesley Publishing Company, 1987.

Bellamy, Christopher. The Evolution of Modern Warfare: Theory and Practice. New York: Routledge, 1990.

Bellamy, Christopher. The Future of Land Warfare. New York: St. Martin's Press, 1987.

Bloom, Benjamin S. ed. Taxonomy of Educational Objectives, Handbook 1: Cognitive Domain. New York: David McKay Co. Inc., 1956.

Cohen, Eliot and John Gooch. Military Misfortunes. New York: Free Press, 1990.

Clausewitz, Carl von. On War. Edited and translated by Michael Howard and Peter Paret, Princeton: Princeton University Press, 1976.

du Picq, Ardant, *Battle Studies,* Roots of Strategy: Book 2. Harrisburg, Pennsylvania: Stackpole Books, 1987.

Rothwell, William J. and Kanzanas, H.C. Mastering the Instructional Design Process: A Systematic Approach. San Francisco: Josey-Bass Publishers, 1992.

Senge, Peter M. The Fifth Discipline: The Art and Practice of the Learning Organization. New York: Doubleday, 1990.

Shannon, Robert E. Systems Simulation: the Art and Science, Englewood Cliffs, NJ: Prentice Hall, Inc., 1975.

Sun Tzu. The Art of War. Translated by Samuel B. Griffith, New York: Oxford University Press, 1971.

Toffler, Alvin. The Third Wave. New York: Bantam Books, 1980.

Van Crevald, Martin. Command in War. Cambridge: Harvard University Press, 1985.

Waldrop, M. Mitchell. Complexity: The Emerging Science at the Edge of Order and Chaos. New York: Simon and Schuster, 1992.

Wheatley, Margaret J. Leadership and the new Science. San Francisco: Berret-Koehler Publishers, 1992.

Military Publications

Office of the Joint Chiefs of Staff. Joint Vision 2010. Washington, D.C.: GPO, JEL, May 1997.

United States, Department of the Army. TRADOC Pamphlet 525-5: Force XXI Operations, Fort Monroe, VA: Army Training and Doctrine Command, 1 August 1994.

United States, Department of the Army. Student Text 101-5: Command and Staff Decision Processes, Ft. Leavenworth, Ks: U.S. Command and General Staff College Press, Feb. 1995.

United States, Department of the Army. Newsletter 95-12: Tactical Decision Making: "Abbreviated Planning." Ft Leavenworth, Ks: Center for Army Lessons Learned, 1995.

United States, Department of the Army. DA Pamphlet 600-32, Leader Development for the Total Army. Washington, D.C.: GPO, 31 May 199.

United States, Department of the Army. Field Manual 25-100 Training the Force. Washington, D.C.: GPO, November 1988.

United States, Department of the Army. Field Manual 25-101 Battle Focused Training. Washington, D.C.: GPO, September, 1990.

United States, Department of the Army. Field Manual 100-5: Operations. Washington, D.C.: GPO, 1996.

United States, Department of the Army. Battle Command: Leadership and Decision Making for War and Operations Other Than War. Fort Leavenworth, Ks: Battle Command Laboratory, 22 April 1994.

United States, Department of the Navy. FMFM-1 Warfighting. Washington, D.C.: GPO, 6 March 1989.

United States, War Department, Field Service Regulations: FM 100-5, Operations, Washington, D.C.: GPO, 15 June 1944.

Papers

Bozek, Gregory. "Battalion Level Tactical Decision Making: Can Automation Make a Difference?" School of Advanced Military Studies Monograph, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1992.

Blasche, Theodore R. and Lickteig, Carl W. Utilization of a Vehicle Integrated Intelligence System in Armor Units. Research Project, U.S. Army Institute of the Behavioral and Social Sciences, Fort Knox, Kentucky: 1984.

Donahue, Kevin S. Developing Initiative in Junior Officers. Fort Leavenworth, KS: U.S. Army Command and General Staff School, 4 June 1993.

Hodges, Frederick B. Training For Uncertainty. Fort Leavenworth, KS: School of Advanced Military Studies. 4 February 1993.

Kluever, Emil K., William L. Lynch, Michael T. Mathias, Thomas L. Owens, and John A Spears. "Striking a Balance in Leader Development: A Case for Conceptual Competence." National Security Program Discussion Paper, John F. Kennedy School of Government, Harvard University, 1992.

Lau, Jeffrey D. "Training Leaders for Force XXI: An Azimuth for CGSOC Tactics Instruction" School of Advanced Military Studies Monograph, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1995.

Livsey, Timothy D. "Teaching Tactical Decision Making: What is Important?" School of Advanced Military Studies Monograph, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1992.

Schmidt, Thomas C. "Tactical Information Gathering in the High Technology Command and Control Environment: A Division Commander's Leadership Challenge," School of Advanced Military Studies Monograph, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1985.

Schneider, James J. "What if We Fight Tonite?" Association of Advanced Operational Studies Net Call. Fall-Winter 1994-95.

Stewart, Steven R. Leader Development Training Needs Assessment of US Army Battalion Commanders. Alexandria, VA: ARI, June 1988.

Stewart, Steven R. and Jack M. Hicks. Leader Development Training Assessment of US Army Training and Doctrine Command (TRADOC) Brigade Commanders. Alexandria, VA: ARI, October 1987.

Williams, Darryl A. Beyond Be, Know, Do: Leadership Implications for the Force XXI Leader. School of Advanced Military Studies Monograph, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1996.

Articles

Anderson, Dean R., "Modernizing Army Command and Control", *Military Review*, Vol. 70, No.7, July 1990, 2-10.

Dupont, Daniel G. and Richard Lardner. "Force XXI: The Long and Windy Road to the Army of the Future." *Armed Forces Journal.* (October 1994): 45-51.

Harback, Herbert F. and Ulrich H. Keller, "Learning Leader XXI." *Military Review*, May-June 1995.

Harig, Paul T. "The Digital General: Reflections on Leadership in the Post-Information Age." *Parameters*, Autumn 1996: 133-140.

Harmeyer, MG George "Post AWE Observations", Armor Magazine, (Fort Knox: U.S. Army Armor Center, July-August, 1997), pp.5-6.

Hinton, Geoffrey E. and Steven J. Nowlan. "How Learning Can Guide Evolution." Complex Systems no. 1 (1987): 495-502.

Iselin, Errol. "The Impact of Information Diversity on Information Overload Effects in Unstructured Managerial Decision Making," *Journal of Information Science.* 15 (July 1989): 163-173.

Marlin, David W. "The Army's Future Training Strategy." *Military Review*, Vol. 76, No.3, May-June 1996, pp. 46-51.

McGinnis, Michael L. and George F. Stone. "Decision Support Technology." *Military Review*, November 1994, pp. 62-75.

Miller, John E. "Force XXI - Vision for Change." *Military Review,* May-June 1995.

Ohle, David H. and John M. Spiszer. "Providing Coherence for Training Force XXI." *Military Review* VLXXVI, no. 4 (July-August 1996):63-69.

Peters, Ralph. "After the Revolution." *Parameters.* Vol. XXV, No. 5 (Summer 1995), pp. 7-14.

Steele, William. "Army Leaders: How You Build Them; How You Grow Them." *Military Review*, (August 1992), pp. 14-20.

Sullivan, Gordon R. " A Vision for the Future." *Military Review*, May-June 1995.

Sullivan, Gordon R. and James M. Dubik. *Envisioning Future Warfare.* Fort Leavenworth, KS: US Army Command and General Staff College Press, 1995, pp. 43-62.

Wailand, Christine B. "Evolutionary Systems Management." *World Futures* v36 (1993): 138-157.

Wheatley, Margaret J. *Can the US Army become a Learning Organization?* Journal for Quality and Participation, (Cincinnati: University Microfilms International, March 1984), pp. 49-51.

Other References

Albertson, Michael. Interview 10 October 1997.

"Army Training XXI", URL www-dcst.monroe.army.mil/atxxi/atxxi-hp.html, 11 June 1996.

"Classroom XXI Campaign Plan", URL www-dcst.monroe.army.mil/crxxi, 11 April 1997.

Clinton, President William. State of the Union Address "Hardwiring the Schools" Associated Press, 23 January 1996.

"Draft Classroom XXI Master Plan", URL www-dcst.monroe.army.mil/crxxi/master, 11 April 1997.

Emison , COL Steven A., Chief of Requirements and Evaluation since August 1994, *Post Task Force (TF) XXI Advanced Warfighting Experiment (AWE),* URL http://www.monroe.army.mil/pao/awe1.htm, 1 July 1997.

"Force XXI Homepage", URL www.pica.army.mil/orgs/battlelabs/force21.html, 29 October 1996.

Macgregor, Douglas A. Interview 12 August 1997.

Miller, John W. Interview 21 June 1997.

Morse, Rick . Interview 22 October 1997.

O'Conner, Paul. Phone Interview 21 September 1997.

O'Neil, Scott. Interview 7 June 1996.

"Technologies that Could Radically Change Performance of the Education and Training". Rand Corporation, URL http://www.rand.org/centers/iet/technology/edtech, 30 May 1996.

"TRADOC Homepage", URL http://www-dcst.monroe.army.mil/tradoc, 13 August 1997.

"Warrior XXI Campaign Plan", URL www-dcst.monroe.army.mil/warrior, 15 March 1996.