Managing Global Training Utilizing Distance Learning Technologies and Techniques: The United States Army Readiness Training

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Distance learning (e-learning) is expanding at a very rapid pace as organizations throughout the world search for economical, responsive, and effective means to train workers to meet the challenges of the information age workplace. The Army Distance Learning Program (TADLP) model is discussed in the context of the global e-learning environment. Both e-learning infrastructure and management issues are identified, with emphasis on: (1) developing policy, (2) measuring performance, (3) managing resources, (4) maintaining standards, and (5) satisfying users. The TADLP program is challenging to manage effectively, and difficult to accurately assess program outcomes.

The TADLP program is shown to have a well-executed infrastructure plan, quality management of both facilities and services by contractor-supplied staff, and well-designed classrooms. However, the program suffers from limited courseware, creating a bottleneck for full program utilization. A discussion follows relating the Army program to public and private e-learning programs and expectations.

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Introduction

The US Army shows many similarities to a large multinational business enterprise: locations throughout the world, a workforce that requires ongoing training, finite budgets, and constantly changing training requirements. The Army has put in place a number of different training programs to address these needs. The program we will examine is The Army Distance Learning Program (TADLP), a computer and telecommunications technology-driven initiative to bring training to the soldier. The program is available to personnel in the active Army, the Army Reserve, the Army National Guard, and Department of the Army civilian employees. The mission statement for the program is 'Delivery of standardized individual, collective, and self development training for soldiers and units anywhere and anytime through the application of information technologies.' According to Army Chief of Staff General Eric C. Shinseki, 'The Army Distance Learning Program is a technological enabler that supports the Army vision-people, readiness, and transformation-by expanding training opportunities and providing leaders a greater flexibility in developing soldiers and growing leaders' (TADLP 2002).

While there may be differences in overall mission, there are numerous similarities in meeting the training requirements for individuals within the TADLP program and other private and public distance learning programs. Learning content will be unique for each application, therefore the focus of this study will be on the management and delivery of training, especially as it relates to infrastructure and computer and telecommunications technology. Before discussing the TADLP program specifics, it would be useful to review some of the basics of distance learning, often referred to as e-learning when used in the corporate context.

Distance Learning (E-Learning) Overview

The Internet is perhaps the most transforming technology in history, reshaping business, media, entertainment, and society in astonishing ways, and is bringing us closer to making learning of all kinds a practical reality for everyone. While there has been much publicity about innovative programs, it is important to understand that Internet-supported distance learning is not without pitfalls. Experts are divided over the question of the learning effectiveness of e-learning programs versus face-to-face classroom programs; however, there is growing evidence that e-learning is an effective means for learning in most applications (Kearsley 1998). Also, there are a number of fundamental policy and general infrastruc-

ture concerns requiring attention before e-learning applications can be maximized.

The Web-Based Education Commission of the United States Congress (Kerrey and Isakson 2000) has identified a number of important e-learning issues that need Congressional action, including making Internet resources more available and affordable, protecting user privacy, revising outdated telecommunications and other relevant regulations, and promoting private and public sector collaboration. While these issues represent initiatives for the United States, the call to action is equally relevant for all global e-learning applications. With or without action on these and other relevant initiatives, e-learning is rapidly assuming a prominent role in educating individuals at all levels. Along with traditional educational institutions such as colleges and universities, business and industry has become a significant champion of e-learning.

Corporate America is faced with training and retraining 50 million workers, and is turning to e-learning for all aspects of their training requirements (The Telemedicine Center 2001). The US corporate e-learning market was estimated at $1.1 billion in 2000, and is expected to grow to $11.4 billion by 2003. The total global market for e-learning is estimated to grow to an astounding $365 billion (corporate, college and university, government, and elementary and secondary schools) by 2003 (Kerrey and Isakson 2001). While there are many factors causing the dramatic growth, the ability to reach a wide and diversified student population and overcome geographic boundaries with communications technology is clearly one of the driving forces. A pent-up demand for all types of training in a convenient and personalized format is also an important factor. When viewed from the technology perspective, the pervasive use of the World Wide Web (WWW) has presented educational institutions, business and industry, and the military with a platform for a wide variety of learning programs and activities. Nucleus Research reports that a study of several thousand global corporations found that e-learning initiatives led all information technology applications when measured by return on investment (ROI), far surpassing the more traditional information technology (IT) applications found in industry (Europemedia.net 2002).

The Army Distance Learning Program Model

As the Army moved into the information age, commanders understood they needed to change their training procedures. Training programs were

generally residential institutional programs, very personnel and facility intensive. They required the soldier to come to them, thus making the programs expensive to operate. Training budgets faced peacetime reductions and were not sufficient to train and sustain the skills soldiers needed to perform their required tasks. Many Army schools implemented distance learning on a small scale; however, they generally developed unique programs that could not communicate or interoperate with other programs or schools. A substantial added training concern for the Army is the reserve corps, part time soldiers who have limited flexibility to travel to training classes while maintaining their full time job. With reduced training, readiness is negatively impacted, and the Army needed a coordinated, responsive, effective, and less costly way to deliver training.

The Army Distance Learning Program (TADLP) is the Army's innovative approach to training soldiers, making use of leading edge computer and communications technology to bring the instructor and all the training related resources to the student rather than requiring the student to travel to a central location for training (TADLP 2002). The program emphasizes and supports development of standardized courses for the Army. TADLP provides an environment that supports student/instructor interaction in both real time and non-real time as well as self-paced student instruction without the need for an instructor.

The mission of TADLP is to deliver standardized, individual, collective and self-development training to soldiers and units anywhere and at any time through multiple means and technologies. This includes providing telecommunications and data processing systems, as well as associated equipment worldwide. The program will perform the enterprise management of these systems through one Training Access Center (TAC) and several Regional Training Access Centers (RTACs) and multiple Digital Training Facilities (DTFs). The TAC and one RTAC are located at Fort Eustis, Virginia. To date, about 150 DTFs have been fielded to sites within the continental United States and locations in other parts of the world. Additional RTACs and DTFs are planned for fielding to worldwide military locations over the next several years.

The TADLP will provide up to 400 DTFs, the infrastructure, and the software needed to manage the distance learning enterprise, including students, classrooms, courseware, and facilities management. This is being accomplished through block upgrades and modular contracting. Each block will satisfy a set of requirements and will provide additional functionality. Each new block will be integrated into the existing system.

Block 1, which has been completed, concentrated on deploying modern Digital Training Facilities that incorporated automation and two-way audio/video teletraining (VTT) products into all Army components. Block 2, building on this functionality, allowed the Army to network the DTFs, manage them centrally, and link them to Department of Defense intranets and the Internet. Implementation of Block 2 is well underway. Block 3 will provide the hardware and software for automated student administration, management, and scheduling. Block 3 implementation has been started. Blocks 4 through 6 will provide video on demand and desktop video teleconferencing, along with simulation capabilities.

The following is a list of the more important objectives of the TADLP system architecture.

- Scalability to accommodate the multitude of courseware applications as well as a large number of digital training facilities and locations.
- A user friendly system, featuring simple user interfaces and single logon protocols.
- A system that minimizes operating and maintenance costs.
- A secure system.
- An interoperable system based on standards and uniform solutions.
- A system that reduces risk by using off-the-shelf technology.

It should be noted that – as with many large scale government programs – budgeting, bidding, and implementation activities are measured in years, and while the technologies and resources utilized are current technologies, they are seldom if ever state-of-the-art. The TADLP program has an overall budget for infrastructure and courseware that approaches $500 million, and it is anticipated that the blocks will require between five and ten years to implement. Program concerns for security, interoperability and field support preclude chasing technology, something which smaller and more individualized programs may be better able to accomplish.

From the soldier's perspective, along with courseware available, the most important component of the TADLP program is the on-base facilities, management of those facilities, and overall system support. The contract calls for standardization of each learning site along with trained on-site management and centralized help-desk support. A brief description of each follows.

DIGITAL TRAINING FACILITIES (DTF)

Each DTF will consist of 16 student work stations, 1 manager workstation, 1 office jet multifunction machine (printing, faxing, copying and scanning), a laser printer, a VTT system to allow two-way training between and among other sites, and networking capabilities to the NIPRnet government intranet for access to web-based training resources. Facilities can be utilized in synchronous, asynchronous, active and passive modes, depending on the training requirements. Enterprise management will be provided by the TAC center, including network monitoring, patches, anti-virus software, updates and other upgrades required by the program manager.

Networking resources allow for DTF interoperability and access to external resources through the Web. However, e-learning support also includes classroom instruction resources such as a document camera, VCR, personal computer, and student microphones.

Courseware is a critical component with any e-learning application. The TADLP program is unique in that a separate command is responsible for managing the contracts. Courseware development and maintenance is outside the TADLP program, utilizing a different project management team and different courseware contractors. Because of security considerations and overall management control, only approved courseware is authorized for use in the DTF. At times the lack of unified program management can cause confusion or friction among the various project managers and responsible parties.

THE DIGITAL TRAINING FACILITY MANAGER (DTFM)

The DTFMs manage and administer the classrooms, and are under the operational control of the distance learning point-of-contact (POC) individual on each site, and under the administrative and managerial control of the DTFM project manager. A contracting firm, ACS Systems and Engineering, Virginia Beach, Virginia provides project management. The DTFM is responsible for daily DTF operation under the direction of the installation POC. The DTFM will: (1) operate the DTF in accordance with the schedule and availability restrictions established by the local POC; (2) implement procedures to identify, account for, and secure assigned equipment; (3) ensure that sufficient classroom seats are available for both incoming students and students currently in training; (4) perform preventative maintenance on the equipment in the DTF; (5) troubleshoot system and network problems, printer and computer problems; and (6) prepare and submit trouble tickets and/or implement repairs.

The DTMF is also responsible for performing orientation briefings, which include information about operating hours, resources available, equipment operating requirements and restrictions, and details about the facilities. Each student must also have an annual video briefing covering security procedures, scheduled and monitored by the DTFM and logged into the student's record. Tools available for performing their duties include Microsoft Exchange for e-mail and calendaring, and Army-Knowledge Online to submit usage reports, help desk service requests, student registrations and other required reports.

THE TRAINING ACCESS CENTER (TAC)

The overall function of the TAC is to provide help desk services to the TADLP students, DTFMs, and instructors. Telephone, fax and ARweb all serve as access points of entry for TAC service calls. The help desk is the central contact point for information technology support at TAC. It is also the portal through which the DTFMs, instructors and students form opinions about TAC functions. TAC services are available around the clock, every day of the year, and are centralized in Fort Eustis, Virginia. The core values of the help desk are based on six essential principles: (1) integrity, (2) knowledge, (3) respect, (4) professionalism, (5) trust, and (6) customer empathy. It is the responsibility of the help desk to ensure that productivity through the use of technology is maintained at the highest possible levels. Because team members are dispersed throughout the world (especially DTF Managers), a well defined charter or set of objectives, complemented by collaborative tools and the Internet, enhances team development. There is also a Network Control Center located at Fort Eustis, which is responsible for connection, operation, and repair of the video training and administrative systems.

CONTROLLING RISK

System backup is a primary risk control activity. The objective of the backup plan is to ensure that in the event of a complete or partial system failure, there is a workable plan for continued operation of TADLP. Relevant emergency situations to plan for include: fire, flood, civil disorder, natural disaster, bomb threats and other evacuation threats, and other potential incidents that risk lives or damage. Contingencies planned for include: (1) loss of functionality of individual servers and processors, (2) temporary or permanent hardware loss in the DTF, (3) loss or degradation of service caused by malicious attacks or computer viruses, (4) temporary or permanent loss of hardware within TADLP, and (5) student

workstation software failure. These risks are not unique to military or government programs, and similar planning is equally relevant to business and industry technology applications.

Once the risk factors and contingencies are identified and analyzed, a plan is prepared to mitigate the risk. The Disaster Recovery Plan includes: (1) adequate contingency sites; (2) backup plans and schedules; (3) off site storage for tape and other backups; (4) annual testing of the contingency plan; and (5) a recovery plan listing necessary actions and procedures to recover from interrupted operations at the DTF, TAC and RTAC sites, including contractor contact people and phone numbers. Because the TADLP program relies heavily on contractors for all aspects of development and management, a brief discussion of contractor support and services follows.

CONTRACTOR SUPPORT AND SERVICES

As e-learning becomes an inevitable, integral part of meeting the needs for continuous learning, it has fueled a remarkable growth in service providers that help migrate programs from traditional classroom to web-based training, as well as providing for technology platform development and support (Lau 2000). When firms are contracted to develop, field, and support e-learning programs, it is important for them to fully understand the program requirements and objectives. The following list describes some of the more important questions that need to be answered before contractors can effectively assist the Army in meeting e-learning goals.

- What is the current Army training environment?
- What is the current training format being utilized?
- How does the Army currently monitor, measure quality and track training?
- Why is e-learning being launched?
- Can off-the-shelf products be utilized in the new e-learning system?
- What are the e-learning program objectives?
- What geographical and personal characteristics are associated with the learners utilizing the new e-learning system?
- How will the Army monitor and measure quality and track e-learning training?
- What budget constraints should the contractor be aware of?

- What time constraints should the contractor be aware of?

Because the majority of the TADLP program is supported by contractors, it is essential that good communications be maintained between the contractors and the program manager. Program success is possible only when both groups work with the same objectives in mind. The contractor (in the case of TADLP, ACS Systems and Engineering and other contractors) provides help desk support; core services such as network management, support of fielding activities, including classroom construction and setup; program management and staff training; and support of DTF managers, systems development, and software.

To accomplish these activities ACS Systems and Engineering has built a contractor administration organization dedicated to supporting the TADLP program. The basic organizational chart is shown in Figure 1.

Technical reviews and audits provide verification of the system's development process and contracted management activities. These activities are event driven throughout the life cycle of the development activities and the fielding and operation of the Digital Training Facilities. Policies and procedures for these reviews have been developed by ACS Systems and Engineering and approved by the TADLP Program Manager.

Internal reviews provide a means for periodic examination during systems development phases, and provide a basis for baseline growth and expansion. Maintenance reviews provide means for determining the impact of changes on the safety, operability, and reliability of the TADLP system. Configuration audits examine the functional and physical characteristics of the systems and support documentation, which include review of test results, compliance with standards, and configuration control activities. The contractor is responsible for maintaining and control-

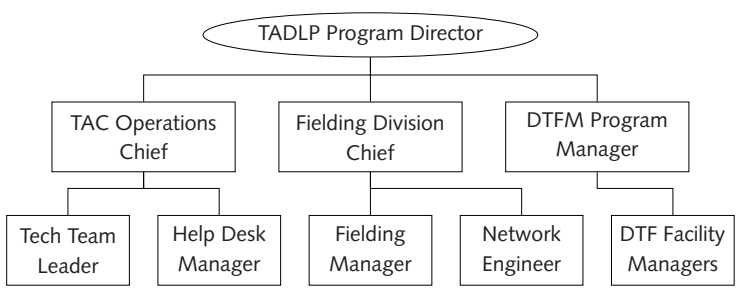

Figure 1: ACS Systems and Engineering Organizational Chart

ling records of all applicable technical reviews and audits and making them available to the TADLP Program Manager.

TADLP CRITICAL SYSTEM DESIGN CONCERNS AND OPERATIONAL ISSUES

The scope of the TADLP program causes considerable complex problems for administrators, developers, and contractors. Numerous government standards and protocols must be incorporated into contract specifications for the networks, facilities, software, and other products and services developed and implemented. Because technology is off-the-shelf, procedures to evaluate various technologies must satisfy both the contractor and the TADLP Program Manager, and must lead to the acquisition of equipment and services that will be compatible and functional.

The following list describes some of the more important system design concerns.

- Bandwidth limitations and variations for the various technologies and locations.
- Firewalls – the IP router network is non-secure, as are some commercial networks being utilized, requiring the use of Virtual Private Network (NIPRNET) encapsulating packets for secure data transmission.
- Maintaining all Department of Defense and other government standards and policies.
- Maintaining a current release Windows operating environment at all DTF sites.
- Incorporating required security levels and procedures into the systems.
- Maintaining system integrity and accuracy.
- Safeguarding confidentiality.
- Following object development/reuse protocols for information use and reallocation.
- Providing adequate system audit points and trails.

Once hardware and software are in place, the program needs to meet operational objectives. By identifying critical operational issues early in the block implementation plan, systems can be designed with these in mind, which determine the basic design specifications. Critical operational issues are to:

- Deliver standardized training courses where and when needed.
- Provide accessibility throughout the duty day and provide timely transfer and downloading of training materials to students.
- Provide means for instructors to communicate with students at remote sites through real time (synchronous) technologies.
- Provide capability to manage classroom and student schedules, enrollment, and tracking.
- Provide interoperability and data exchange with appropriate internal and external systems and networks.
- Manage the TADLP system, including contracted services such as hardware maintenance, facility management and support services.
- Meet and maintain established standards for courseware, training materials, logistics and operations.
- Protect sensitive data and provide adequate security.
- Meet soldier training needs through courseware and other training materials suitable for distance learning applications.

Once the technology, facilities and management are in place and implementation begins, the next critical step in delivering and maintaining a quality program is measuring performance.

MEASURING PERFORMANCE

Performance measurements in government programs are used for three basic purposes: (1) providing measurable results so the agency can demonstrate progress towards goals and objectives; (2) determining effectiveness by measuring how well the agency is meeting its mission, vision and goals, and identifying areas that need attention; and (3) process improvement. The Department of Energy measures performance based on relevance (the degree to which a program adds value and is responsible, timely, and pertinent to the needs of customers), productivity (the degree to which work yields useful results compared to resources consumed), and quality (the degree to which work is considered to be technically excellent). Assessment measures are both qualitative and quantitative, and include peer review, numerical assessments, and customer evaluations.

Challenges for effective performance measurement are many. Some functions are difficult to measure due to the subjective nature of the information. Programs may be initiated with both short and long range

goals and as the program evolves, objectives may change, making measurement of performance trends difficult to establish, maintain, and revise as mission objectives become refined over time. It is also important to note that performance measurement, especially when it is quantitative in nature, will not guarantee successful programs.

When measuring performance:

- The cause and effect of outcomes are not easily established.
- Poor results do not necessarily point to poor execution.
- Numerical quotas do not fix defective processes.
- Measurement can only approximate the actual system.
- Performance measurement does not ensure compliance with laws and regulations.

To work effectively, performance measures require clearly understood expectations, objectives, and definitions so that everyone is working toward the same end. Presently the performance measurements for the TADLP program are very basic, consisting of logging various activities such as hours of system use, technical problems and solutions, soldiers enrolled, and courses delivered. While this data is useful for operational planning, it gives little insight into the effectiveness of the program. More sophisticated performance metrics need to be developed and implemented to help measure how well the program is meeting learning objectives as well as monitoring the overall program effectiveness.

MANAGING RESOURCES

E-learning programs deploy computer and communications technologies in place of humans and bricks and mortar to deliver learning throughout the organization. Efficiencies are gained, but many of the traditional methods and procedures for managing resources and keeping records are no longer viable. Artificial neural network technology can be used in various e-learning environments to manage stored information, filter content, and enable better knowledge adoption on behalf of the users (Kostas, Psarras, and Papastefanatos 2002). The TADLP project management team utilizes a variety of computerized systems to manage software, networks and computer and telecommunications resources, but has not yet incorporated the more sophisticated Artificial Intelligence tools into their management scheme.

Successful implementation of e-learning requires the same level of management commitment as other mission-critical, organization-wide

programs (Henry 2002). Effective operations management is the underpinning for program success. Maintaining a functioning system, facility, learning program and infrastructure is the foundation for student achievement. Understanding and managing the dynamics of technology change, courseware, and system privacy and security are significant challenges. E-learning is not a program that can be designed, installed, and ignored. If it is to be effective, e-learning must be continually managed. By developing the overall plan in the Block format, there is an evolutionary approach to development and implementation. TADLP depends on various contractors to perform necessary services as they initiate new activities in each Block of the overall plan.

MAINTAINING STANDARDS

When standards are not given appropriate concern by people designing and implementing e-learning programs, they may find that the e-learning activities are less convenient and more fragmented than they should be. By being concerned with maintaining standards from the inception of the program, e-learning flexibility and consistent delivery systems are more easily maintained (Singh and Reed 2002). TADLP standards start with system access. Student interfaces, navigation tools, and administrative record keeping are consistent throughout the system. Hardware standards are important, as programs cross national and international boundaries. Utilizing standardized commercial products rather than custom designed hardware and software keeps costs under control and makes documentation and access much easier for TADLP management.

Discussion

Change is the common denominator in today's organizations, and the Army is no exception. Technologies, knowledge and procedures are evolving at a very rapid pace, requiring a workforce with ever-increasing education and skills. When both public and private organizations look at developing strategies for effective workforce training, e-learning is seen as a way to economically and effectively address many of the major training issues. Some of the more important issues identified include:

- Increased demand for skilled workers. Skilled jobs now represent 85% of all jobs in the United States. By 2006 nearly half of all workers will be employed in industries that produce or intensively use information technology products and services.

- Shortage of skilled workers. In 1999 nearly 720,000 IT positions went unfilled in the United States.
- Need for continuous training. It is estimated that 50% of all employees' skills become outdated within 3 to 5 years.
- Shift to use of web-based training for workers. Classroom use in corporate training is expected to decrease and the market for web-based corporate learning is expected to grow from $550 million in 1998 to $11.4 billion by 2003.
- Growth in Corporate Universities. 40% of the Fortune 500 companies have established corporate universities, and at the current rate the number of corporate universities will exceed the number of traditional universities in the United States by the year 2010 (adapted from Kerrey and Isakson 2000).

It should be noted that these same issues have an impact on military training programs. More sophisticated weapons, vehicles, support technologies and battlefield strategies put pressure on military commands to maintain well trained soldiers in the field. The Army views e-learning as an effective means to meet many of their training needs.

While there are many different reasons for public and private organizations to embrace e-learning, three that are relevant to almost any organization would be: (1) the desire to customize learning environments to the changing needs of the learners; (2) the need to improve training-related administrative tasks such as how and when training is delivered; and (3) the desire to pare down the cost of training. The Army has done a good job of defining their training objectives; planning the program implementation utilizing the block approach; effectively communicating the plan to developers and Army personnel; implementing the technology-driven components on or ahead of schedule; and monitoring the network, faults, system access and program utilization. The TADLP program has deployed current technologies in the classrooms, has sophisticated networking and communications facilities (with centralized management and software support) to link various training sites, and is able to function in synchronous, asynchronous, active and passive modes with multimedia, video, and voice transmissions for single or linked classrooms. The current constraints found in the program are with limited courseware deployment rather than with technology and facilities. The technology development, deployment, and management

systems are currently ahead of the courseware development and system monitoring and evaluation systems. When compared with business and commercial e-learning applications, the TADLP program planning, resource and management activities look to be comparable with all but the most leading edge applications.

As one might expect, policies and procedures play a significant role in operating and managing the TADLP program. Integrating the Department of Defense, Army, government, and individual privacy requirements has been a challenge for both program planners and program contractors. The program development and operational activities are almost completely outsourced, requiring clearly written and comprehensive specifications, policies and procedures. Privacy and security have been major concerns, and have received a great deal of program management attention. Specifications and requirements have been clearly described, and TADLP administrators have had almost no problems in either of these areas. Complaints have generally been directed at the cumbersome and time consuming procedures required by soldiers to access and utilize the systems, which are a function of program management concern for security and privacy.

TADLP management made the decision to utilize off-the-shelf hardware components, operating systems, networking, and video and voice technologies. This has standardized the design and configuration of the classrooms being built. There has been some variation in the furniture and fixtures; however, there has been an effort to standardize these as well. The objective is to provide a consistent experience for the soldiers wherever they are when they access e-learning utilizing the TADLP system. It also makes updating and modifying of hardware and systems easier to support and justify.

To be successful, online education needs good quality, well-delivered course material supported by tutorials, advice, counselling and an overall support system which will effectively manage the program. The quality of student-to-student and student-to-instructor interaction may be less than is found in a face-to-face classroom setting, where prompting by the instructor, body language, and social interaction come into play. To mitigate this, instructors need to organize and deliver their courses in ways that are very different from traditional classroom lecture formats. With any online course, the danger is that students will become spectators rather than participants (Healy 2001). Courseware development has been a significant challenge for TADLP. Development is contractor

Table 1: Issues with Online Course Delivery

Pros	Cons
• Flexibility of scheduling and communicating – any time and any place access • Eliminates or reduces travel time and classroom construction • Provides a format for self-paced learning, tracking and assessment • Instruction can be more customized and personal to meet individual needs • Economies of scale providing uniform training and applications • Improves training related administrative tasks	• Very capital intensive for delivery systems and resources • Courseware development is more difficult and expensive • Requires added instructor technical skills, course development and preparation time, software updates • Traditional content may be difficult to move online • Requires learners to have minimum technical skills • Cheating, fraud, and virus risks may increase in the online environment • Lacks social environment for students and instructors • Can be difficult to structure assignments and provide clear and explicit instructions

driven, and to date has not met completion targets. Table 1 outlines some of the more important issues with online course delivery.

Distance education can be a very powerful tool. However, to make these programs as effective as face-to-face traditional courses the technology needs to be constantly updated to take advantage of the new technology. This includes more interactive activities, modified lectures, more discussion sessions, and a chat room and bulletin board for student-to-student and student-to-instructor communications (Nelson 2001). Developing these activities and tools for the TADLP program has gone slowly, and specifications have been much more difficult to prepare than specifications for communications technology, classroom resources and network and enterprise management software. Because both the infrastructure and the courseware are contractor supplied, program managers need to be particularly sensitive to getting their specifications right the first time.

Moe, Bailey, and Lau (1999) report that corporations often find it more efficient and expedient to focus on what they do best, and develop outsourcing partnerships with firms who are capable of providing other resources and expertise when needed. Our rapidly changing technology environment may be the catalyst for organizations to consider outsourc-

ing e-learning to control costs and utilize the most current technologies. TADLP has chosen to outsource all but project management activities.

Three general models of outsourcing are often utilized. The first is for the organizations to establish their own e-learning center, either by themselves or via a joint consortium with other organizations. This is the approach TADLP has chosen to take. A second approach partners a group of organizations with technology and/or e-learning companies to develop joint ventures into distance learning. A third alternative is to form alliances with not-for-profit organizations such as colleges and universities, trade associations, and professional associations. The Army does some partnering with colleges and universities under other programs that complement TADLP.

Supporting e-learning activities are a wide variety of commercial software products and network services. Two major companies that support online education are Blackboard and WebCT. These and other similar software tools provide a means for educators to create and manage their online learning activities. The focus has been on providing an environment suitable for university e-learning activities, but these tools are often also appropriate for a much wider application in the business and industry training arena. To date they have not been incorporated into the TADLP suite of software, but do offer unique opportunities for more effective system utilization once the courseware selection becomes more robust. In addition to managing student learning activities, TADLP management must also provide for various system management activities.

There are many significant management and operational issues to be considered with any e-learning implementation. Five critical issues are: (1) developing policy, (2) measuring performance, (3) managing resources, (4) maintaining standards, and (5) satisfying users. The introduction of e-learning is requiring many organizations to review, modify, amend, or rewrite their existing policies covering training and educational programs from the perspective of both the student and the instructor. The Division of Government and Public Affairs has produced a white paper *Developing a Distance Education Policy for the 21st Century* (American Council on Education 2000) which addresses some of the more relevant issues. Of primary concern are intellectual property policies and procedures. Patent, copyright, and software licensing are a few of the issues that need to be addressed. As we move from traditional classroom training to distance learning and e-learning we have an opportunity to: (1) clarify what is intellectual property and the circumstances

under which the institution will assume the costs of protecting intellectual property; (2) define inventor and author rights, including rights of revision and adaptation, reproduction, and ownership; (3) identify when and how the organization can use intellectual property generated by instructors; (4) clarify how instructors will be compensated for the development and preparation of distance learning courses; and (5) identify who will administer the organization's intellectual property policies. Because the training materials utilized by the Army TADLP program are often unique and not generally created or used by the general public, intellectual property rights are not a major concern.

Policies directed at student issues include: (1) describing and defining access rights and responsibilities; (2) fees and financial responsibility; (3) privacy issues; and (4) liability. Limiting liability, especially copyright infringement, requires development of policies that cover the types of materials incorporated into distance learning courses and procedures for clearances or releases for use and distribution. In addition to relevant and carefully crafted policies, E-learning needs to be compelling to the targeted audience, offering resources that are seen as valuable and appealing to the learner (Henry 2002). Thompson et al. (2001) suggests that a tension is often created between the endless technologies available for deployment in e-learning programs and the need for the human dimension in learning. Successful organizations are able to manage the tension and deliver an acceptable balance for their learner population. TADLP students experience this tension most often with the security and cumbersome access procedures that are incorporated into the system. The natural outcome of tension is frustration and dissatisfied system users.

Steve McGrath (2002), a Department of Energy performance management specialist, discussed performance metrics with the authors. He believes that customer satisfaction is the basic building block of any performance management system. He states that you need to focus on what the customers really want (not what you think they need) and work to do what you do faster, better, and cheaper. The rest takes care of itself.

When we look at satisfying users, the glaring deficiency in the program is the availability of a rich and robust course offering list. Courseware development has been lagging, and from the soldier's perspective, this defeats the purpose of the program. Program managers may be more satisfied than soldiers, because they have been able to develop the infrastructure and training sites within budget and on time. Standardization has kept technical problems to a minimum, and the programs that

have been delivered are considered to be successful. Because a different training command manages the courseware development and deployment, TADLP administrators have found themselves at a disadvantage when they measure user satisfaction. After four years of operation, it has become very clear that it is much easier to develop, manage and control the e-learning infrastructure than it is to develop and deploy quality courseware. Optimistic and unmet courseware development schedules have been the bottleneck for the program, and courseware design and development has proven to be much more time-consuming and expensive than was expected when the program was launched. We believe that it is safe to say that effective courseware is the Achilles heel of any e-learning program, and unless adequate resources and management attention are directed at courseware, the e-learning program will fail to fully meet training expectations. The infrastructure is only able to deliver the learning materials that are available and appropriate to meet program objectives.

REFLECTIONS ON TADLP

While the ultimate overall success of TADLP is still possible, it is clear that success, if it comes, will not be quick. The authors are not privy to the reasons why the Army chose to have the courseware development and the technology to be delivered in separate commands. It is clear to the authors that was a mistake, and only time will tell if it was a fatal mistake.

The result of this decision was the lack of an overall manager for TADLP. Management literature is filled with examples of what happens when two or more people are in charge – no one is in charge. It also resulted in the project manager for the development and deployment of the delivery mechanisms for the distance learning being severely handicapped because of the lack of suitable courseware.

Careful planning utilizing the Block approach makes TADLP systems implementation an evolutionary activity, with opportunities to remain technologically current, while continuing with implementation activities for more sophisticated applications and activities. Standardizing technologies and deploying off-the-shelf hardware and software keeps costs down, makes sites very compatible, and provides a common look and feel throughout the locations. A great deal of thought and planning went into designing the TADLP infrastructure, and the reward is a smooth running group of Digital Training Facilities and Training Access Centers support-

ing the DTFS. The planning and development activities could serve as the basis for any large global training program.

The weakness in the TADLP program continues to be courseware availability. Developers and contractors have experienced a great deal of frustration in meeting goals and deadlines, and all but the simplest training activities are not yet available through TADLP. The lack of suitable courseware for TADLP is not a unique problem for it has plagued e-learning in general from the very beginning. The lack of courseware also makes the measurement of user satisfaction with TADLP difficult, if not impossible. While the operational issue of the user friendliness of TADLP needs to be addressed, the ultimate satisfaction of the user will depend on the quality and availability of the courseware.

The success of the eArmyU program reinforces the value of having suitable courseware. This program designed by the Army to improve retention provides the technology for e-learning, but the courseware is provided by the participating colleges and universities. While the goal of eArmyU is different, its success points out the importance of a robust variety of suitable courseware.

Additional frustration is experienced because there is no overall project manager, and separate command structures and project managers control the infrastructure and courseware development. While having an overall project manager for TADLP would not guarantee the appropriate courseware, it would make the overall evaluation of TADLP easier and more meaningful.

TADLP to date reinforces the idea that while the management of computer and telecommunications technology is complex, it is still easier to manage than people intensive activities such as courseware development. Any organization developing a global program needs to be aware of this problem and find ways to coordinate and meet planning objectives.

A key component to the management of an effort of this magnitude and type is to effectively coordinate and manage contractor support functions and activities. Organizations need to assess their strengths and weaknesses to determine in-house capabilities and identify potential contractor supplied services. While there does not appear to be a hierarchy for contractor supported activities, there are critical 'choke points' for any application. Core services such as network management include some of the more critical systems for program success. Because the entire distance learning project is dependent on the electronic distribution system, network failures will quickly choke the entire system. Another pos-

sible choke point lies in the systems and software development efforts. Failure or delays may not cause the system to crash, but may cause limitations and restrictions on activities that can be performed. In the case of the TADLP program, one primary contractor provided the majority of the support services (exclusive of courseware), making communications and management easier than if there were multiple contractors.

From an operational perspective, fielding activities such as classroom construction, furniture design and configuration, and technology setup may be best handled by a contractor familiar with construction requirements and codes. Issues such as ergonomic design, lighting, furniture placement and layout, and power and cable requirements require specialized knowledge, and are often less expensive when utilizing a contractor.

The risk that must be assumed with any contractor is timely delivery of the needed services at the desired level and quality. When a contractor is unable to meet commitments, the organizational exposure for failure is much greater than when the activities are being done in-house. Contractor documentation is often limited and inadequate to allow the client to pick up the project at some point along the way. Organizations will generally lack the technical staff to step in and effectively take over, and the investment in the project can be lost, requiring a fresh start. Therefore, care in selecting a contractor is a critical management issue, requiring demonstrations of competence, reference checking and evidence of past project success. Selection of the contractor may be the single most important activity after careful definition of the project planning and requirements. While price is certainly important, the organization needs to be assured that the contractor selected can meet the needs of the organization and deliver the desired services and products.

A second component necessary for a successful client/vendor relationship is the establishment of a set of procedures to periodically examine and review progress during the systems development and other contracted activities. This would include a regular review of systems characteristics, documentation, testing and test results, standards compliance, audit and control issues, and operational and management issues. Regular communications need to be maintained between the contractor and client, usually through both written memos and reports and client/contractor meetings. A well informed client is critical to ensuring a satisfied customer.

When we look at the TADLP infrastructure planning details, program

success is closely linked to the full understanding by the Army of their training requirements and future needs before they begin any program development activities or let any contracts. Understanding the need for managing change and standardization drove the TADLP planning efforts, and ultimately contributed to the contractors meeting and satisfying the Army with respect to the implementation of the delivery mechanisms for the e-learning.

While not a perfect program, TADLP planning, development and implementation activities can serve as a guide for organizations developing global training programs utilizing the World Wide Web, other networking technologies, and E-learning for personnel training and education programs.

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