



**U.S. Army Research Institute
for the Behavioral and Social Sciences**

Research Report 1805

**Training the Troops: What Today's Soldiers
Tell Us About Training For Information-Age
Digital Competency**

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May 2003

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**U.S. Army Research Institute
for the Behavioral and Social Sciences**

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Research Report 1805

**Training the Troops: What Today's Soldiers Tell Us About
Training For Information-Age Digital Competency**

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FOREWORD

Soldiers of the “digital” Army will be confronted by both enemies and information in many forms. Digital technologies will help the soldiers to cope with whatever current situation they face. Knowing how to apply the digital equipment is a matter of training. What are good approaches to digital training? What approaches are used in units today? What do soldiers think about today’s training for tomorrow’s conflicts?

The research reported here attempts to answer these questions as part of the U.S. Army Research Institute for the Behavioral and Social Science Work Package 209, “Principles and Strategies for Training Digital Skills.” Results were briefed to Mr. Robert Seger, Assistant Deputy Chief of Staff, Training for the U.S. Army Training and Doctrine Command (TRADOC) and COL Steven L. Bailey, Commander, 3rd Brigade, 2nd Infantry Division. A partial report of the results was published as an article titled *Interim Brigade Combat Team: Training TOC Operators* in the U.S. Army’s *A, L, & T* magazine, Jan-Feb 2003.

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TRAINING THE TROOPS: WHAT TODAY'S SOLDIERS TELL US ABOUT TRAINING FOR INFORMATION-AGE DIGITAL COMPETENCY

EXECUTIVE SUMMARY

Requirement:

The U.S. Army is continuing its ambitious transformation where soldiers will be required to use digital technologies in an information-rich environment to gain tactical advantage over the enemy.

To help accomplish that goal, research was done to identify training methods and practices for soldiers to competently incorporate digital technology into accomplishing their Army missions.

Procedure:

Researchers administered questionnaires and interviewed 62 soldiers trained on the Army's most advanced digital technologies at three U.S. Army posts. The questionnaire addressed the soldier's training background, types of training environments, and preferences. Open-ended questions dealt with digital training practices they had experienced directly. Small-group interviews focused on training practices, training preferences, and suggested improvements.

Findings:

Soldiers expressed a desire and need for more training using digital technology. They wanted training to be hands on, more scenario based, and in a full job flow sequence. Soldiers noted difficulties with different digital systems communicating with each other; a problem that seriously thwarts shared situational awareness. Another concern was the dependence upon contract personnel to maintain and troubleshoot their equipment.

Utilization of Findings:

This research is a snapshot of the current state of digital training in U.S. Army units. It provides insights from the users' perspective of the successes and difficulties experienced in training how to maximize technological advantages in the current Army environment. Recommendations provide training managers with preferred and advantageous training practices.

TRAINING THE TROOPS: WHAT TODAY’S SOLDIERS TELL US ABOUT
TRAINING FOR INFORMATION-AGE DIGITAL COMPETENCY

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Training the Troops: What today's soldiers tell us about training for Information-age digital competency

Introduction

When even the infantry-long characterized as grunts and mud soldiers- is focused on moving digits, it is clear a major shift is underway in the way the U.S. military fights.

Washington Post (February 2, 2002) interviewing a Staff Sgt from Fort Lewis

The Army is continuing its transition to weapons, equipment, and technologies that require soldiers and commanders who can use information-age, digital skills to fight directly, remotely, and through robotic systems. Accompanying this transition is an expected shift toward decentralized, fluid, fast-paced operational strategies and tactics that may need to be applied to increasingly novel, ambiguous, and unpredictable situations not fully addressed by doctrine or archived intelligence. To improve the soldier's ability to perform effectively in this information rich and changing environment, the Army needs to train soldiers at all levels to use digital skills to accomplish tasks and to do essential coordination with others across horizontal and vertical networks.

How do we train mid- and junior-level soldiers in the information technology (IT) skills needed for operational units? How can we maximize the acquisition, transfer, adaptability, and retention of these skills necessary for transformation to the future force? To help answer these questions, researchers from the U.S. Army Research Institute (ARI) administered questionnaires and conducted interviews with operators of Army Battle Command System (ABCS) at Fort Lewis, Fort Hood, and Fort Bragg during the spring of 2002.

Findings in this report are part of a larger endeavor that addresses training requirements for ensuring digitally competent soldiers. Initially, entry-level soldiers participating in Advanced Individual Training (AIT) were examined to see how soldiers learn to operate their digital systems (Schaab & Dressel, 2001). This research demonstrated that training was more efficient and effective when instructors incorporated realistic vignettes that required soldiers to become actively engaged in their own learning.

Following this, another group of soldiers was observed periodically for one year as they moved from AIT to their first duty station (Schaab & Moses, 2001). Training over this year included New Equipment Training and unit training that covered one major hardware/software change and three software upgrades.

Soldiers experienced only minor disruptions with these changes. It was found that soldiers' skills did not perish, rather they had difficulty transferring what they had learned to unfamiliar situations because their training tended to focus on basic operating tasks with little connection to their functional use.

This report continues the effort to gain insights on best practices for training by interviewing soldiers currently trained on and using the Army's most advanced digital technology.

Objectives

Soldiers currently using Army digital systems gave their perspective on current and future training needs for the "digital soldier." Findings from questionnaires and interviews provide insight into the type of training the soldiers view as most productive in developing the expertise to take full advantage of new technologies. This report summarizes soldier perspectives about:

- How will successful current training practices prepare them to perform in units supported by digitization;
- Learning preferences for new technologies, noting opportunities presently available to capitalize on training;
- Collaboration and cooperation within and between units employing digital systems;
- Frustrations with current digital Training;
- Current support for the Army's digital technical systems;
- How digital systems change the roles or the tasks that soldiers perform.

Method

Researchers met with groups of four to eight soldiers to gather information on current digital training practices. The purpose of the research was explained to the soldiers prior to beginning data collection.

First, we administered the Digital Task Proficiency Questionnaire (see Appendix A). This questionnaire sought information on the soldiers' training background, training environment, training preferences, computer experience and digital team performance. The soldiers took about 15 minutes to complete this questionnaire.

Next, each soldier was given the first of a series of four questions (see Appendix B) concerning digital training. The soldiers had 10 minutes to write their answers. Then the soldiers passed their question sheets counter-clockwise to

the next soldier who would answer this new question. The soldier could expand upon the previous answer or give a different response; they were instructed to write whatever they thought was appropriate. This rotation of questions and additional responses was continued until each soldier answered each of the four questions.

Following this, a similar rotation approach was taken by which each soldier ranked the top two responses to each question. This resulted in each of the four questions having four sets of responses and four sets of rankings. This information gathering approach is described in detail in Brassard & Ritter, 1994.

Finally, researchers conducted an interview with each group of soldiers, which generally took 45-60 minutes. The interviews were audio-recorded for later examination. Soldiers were asked to speak freely, and give their full and complete impressions of digital training practices that would be valuable to the Army. Comments were not for individual attribution. The soldiers did not seem to be constrained or inhibited by the tape recording of the session. The interviews were based on the soldiers' previous questionnaire and written responses in addition to topics selected from the list of interview topics found in Appendix C.

No significant differences were found on responses to the questionnaire among the three posts. Therefore, responses were compiled together.

Demographics of Soldiers

Researchers from ARI administered questionnaires and conducted interviews with operators of the ABCS. Sixty-two soldiers, 25 posted at Fort Hood, 25 at Fort Lewis, and 12 from Fort Bragg participated. Soldiers' ranks ranged from E2 to E7, with approximately seventy-five percent of the soldiers being E3-to-E5 (see Table 1). Eighty-four percent of these soldiers were at skill level 1 or skill level 2, with 64% at skill level 1.

Table 1
Percent of soldiers by rank

Rank	Percent
E2	8.2
E3	19.7
E4	41.0
E5	14.8
E6	11.5
E7	4.9

These soldiers operated a variety of digital systems, with the majority, 77 percent, operating either the Force XXI Battle Command Brigade and Below

(FBCB2) or the Advanced Field Artillery Tactical Data System (AFATDS) (see Table 2).

Table 2

Number of soldiers operating each digital system by Military Occupational Specialty (MOS)

MOS	FBCB2	AFATDS	ASAS*	MCS*	AMDWS*	CSSCS*
13A		1				
13B	21					
13D	1	10				
13E		8				
13F	2	2				
14J					2	
31U	1					
34B				1		
54B				1		
63S	1					
75H				1		
75B						1
88M				1		
96B			4			
Total	26	21	4	4	2	1

Note: 4 participants operated systems other than those that comprise the ABCS

*ASAS-All Source Analysis System; MCS-Maneuver Control System; AMDWS-Air Missile Defense Warning System; CSSCS- Combat Services Support Control System

Findings and Implications

“Our biggest problem is that we need more training.”

The most pervasive and consistent finding is that junior-level enlisted soldiers need and want additional training to become proficient at their jobs.

- “Learning the system is crucial to a combat situation.”
- “My unit needs to do more training on how to do our job using the digital systems.”
- “Training should be done more frequently so that soldiers can realize all of the systems functions.”
- “Not enough people actually know the system. We really haven’t trained on them that much.”

Nowhere is the need for continuous learning more evident than for digital systems operators. Army digital systems are a never-ending work in progress: build a little, try it out, modify, and build it again. Soldiers must continuously update their knowledge and adapt to new, changed, or absent functionality. More important, they must understand how these changes influence their ability to do their Army job. This type of training goes beyond the content in New Equipment Training (NET), which focuses on how to operate the system.

- “We have a 4.3 ASAS that has to send messages to a 6.0 MCS light. We had to get a Structured Query Language (SQL) server so that the two systems would work. But, none of the soldiers knows how to troubleshoot the SQL server so when something goes wrong we’re screwed.”
- “AFATDS A99 software was never fully implemented. Problems were found between the AFATDS and Artillery Fire Control System needed for firing data. Nothing was done about the problem. We’re still using the old system.”
- “When working fire missions in the AFATDS system, it is not possible to do two or more fire missions at once. The system will let you input the information, but other than that, you can do nothing with it until the prior mission has been ended. Also, in that situation, the computer will choose whichever mission it wants. It is not always going in the order in which the missions were processed.”
- “We need more training to troubleshoot problems. Our unit expects us to know the ins and outs of the system but we don’t have proper guidance to learn.”

Training can be difficult to perform while in garrison. Although training time and Sergeants’ time are allocated, necessary post details frequently pre-empt training. Most soldiers look forward to field exercises where they train for their “real” military jobs.

“A lot of hands on, that’s important for today’s up and coming Army.”

Soldiers tell us what kind of training they find successful. “Give us hands-on training, using a full job flow sequence.” Here, they receive the inputs they’d receive in an actual mission and produce/transmit the required outputs. Soldiers tell us that field experiences and interacting with their peers are the “best” ways to learn the systems. Field exercises should include setting up and connecting the digital systems as well as operating the systems in various situations. Soldiers complain that without connectivity, an all too common occurrence, training does not happen. There appears to be a disconnect between training to use the system

and training to set up and troubleshoot interconnectivity, with some digital system training including both and others only system use.

- “Make training seem more like it would on the battlefield.”
- “Give soldiers time to get their hands on and use the program to learn for themselves.”
- “Learning with my peers at the battery, teaching each other, we learned at our own pace.”
- “We have done no scenario-based training, only digital.”

In other words, soldiers want to learn Army digital systems the same way that they have acquired much of their non-military digital expertise: by exploring the software and equipment to solve real problems. (see Figure 1).

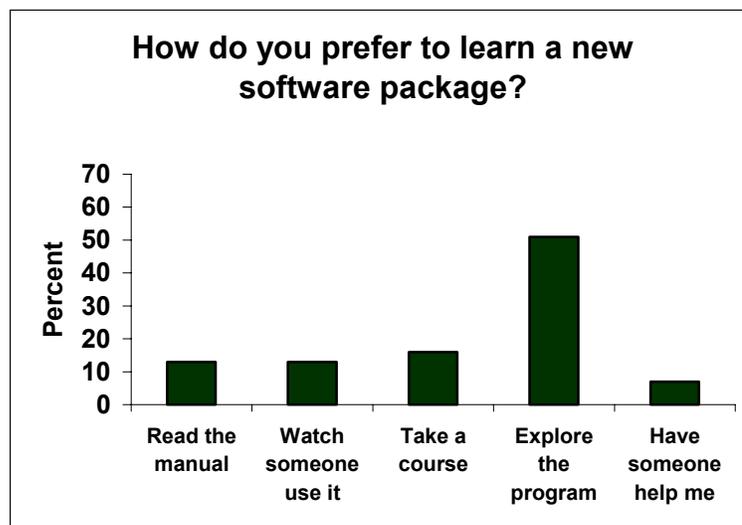


Figure 1. Preferred method of learning new software

Exploring ways to supplement or support training, soldiers were queried about their familiarity with using technology aids for training. Most soldiers report a great deal of experience with the internet and instant messaging, but limited experience with distance learning (DL), web-based gaming, or hardware installation (see Figure 2). This suggests that training delivered via distance learning or web-based gaming might require added support to implement, at least until soldiers become familiar with these techniques. Recent research with junior officers supports on-line training to learn complex skills. When troops are able to critique and share information and knowledge with each other, the performance of junior level officers is indistinguishable from senior officers (Wardell & Paschetto, 2001).

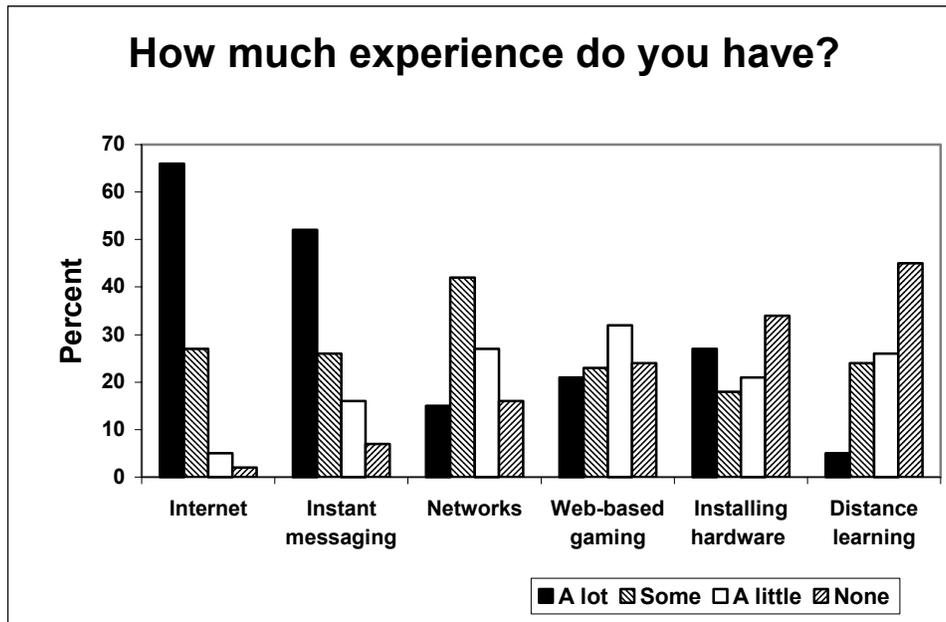


Figure 2. Computer experience reported by soldiers

Do soldiers have the time and resources available to take advantage of DL support if it were more readily available? Two statements that soldiers disagreed with strongly were:

- Training on our digital systems takes time away from other important training activities.
- Lack of equipment that the team would normally use is not available.

Additional support for DL opportunities for training digital systems is found as soldiers report:

- Ninety-two percent (92%) have their ABCS digital systems available in their unit for training.
- Fifty-eight percent (58%) have time to train during their work hours if training resources were available (e.g., CD ROM, manuals, on-line help, practice vignettes/scenarios).
- Seventy-four percent (74%) would train on their own time if computer systems and training resources were available.

Today's high-caliber soldier is both well educated and, for the most part, computer literate. Although many prefer to learn computer technology on their own or with their peers, the complexity of integrating this new technology with

their military activities requires assistance. In the near term, too many leaders, although proficient in military knowledge, lack the expertise in digital technology necessary to assist with training. Separate schoolhouse and NET training are costly and time consuming.

“Communication is always a problem. Our unit has lots of problems talking digitally with other systems.”

Netcentric warfare requires complex collaboration where soldiers must rapidly switch between different duties, settings, and personnel. Current collaboration with ABCS provides guidance for future development. One re-occurring concern is the role and responsibility of the digital-system operator. It is becoming evident that the operator’s role is pivotal, not just in operating the knobology of the system, but in detecting, recognizing, diagnosing, processing, and disseminating information in a timely fashion.

Units differ in who operates their digital systems and the responsibilities of that operator. For example, one company has junior enlisted personnel operating the systems. These soldiers are included in their unit training of the military decision-making process to ensure they understand their role. These young soldiers obtain the knowledge and assume the responsibilities of more advanced soldiers. Yet, in another company, the NCO operates the digital equipment and provides little training support for his personnel to develop their skills.

When Battlestaff NCOs are asked (Felton, Schaab, & Dressel, 2003, in press), who the primary operators of the digital systems are in the Tactical Operations Center (TOC), the majority respond that lower-ranking enlisted personnel assume this responsibility. One reason given was that these soldiers had received training and were comfortable using the systems. Technology is flattening the hierarchy of command and control. Commanders tend to select the most capable personnel to operate systems, particularly digital systems, irrespective of rank.

Interoperability continues to be a problem with only 34 percent of the soldiers interviewed ever having exchanged information with another Army digital system. The most frequent exchanges were between AFATDS and ASAS or AFATDS and FBCB2.

- “We should do something on the battery level between FBCB2 and AFATDS. The only time we have those two systems talking is in the field”
- “Communications is always a problem. We play with the system and eventually get it to work. It is time consuming.”

- “We have entire exercises on using and integrating systems. The push is digital. The problem with this is that if the digital isn’t working-we go no further. None of our new soldiers has the fundamentals of what really goes on in the TOC. We have done no scenario-based training, only digital.”
- “The problem we face is that when systems are working together and attempt to share data, systems fail. Answers are found by accident and experimentation.”
- “Our units kept repeating steps and hoping that the networks would connect.”
- “Our system will not receive sent messages from other systems if the system is turned off. The messages will not be stored and received after the system is turned on. The problem hasn’t been solved yet.”
- “I work the help desk so I know about the problems. Messaging with MCS-L and some of the other systems has been a major problem. Connectivity between routers and switches is another problem. During the last exercise, the major problem was that none of the upgrades seemed to work. The brigade’s typical way to solve the problem was to call the help desk.”

Concern over collaboration was expressed in responses on the questionnaire where most soldiers were in strong agreement with statements such as:

- Successful task/mission performance requires team members to coordinate their activities directly with each other.
- Successful task/mission performance requires team members to obtain information about the work situation and pass it on to other team members.
- Task performance by team members is dependent on timing, quality, or completeness of the performance of other team members.

How to train soldiers using ABCS to collaborate remains unanswered because interconnectivity difficulties prevent systematic observations and lessons learned about how soldiers perform.

“Provide us training on the whole digital piece.”

Information technology results in soldiers looking to contractors rather than to their NCOs for support and training. NCOs often are not introduced to digital technology as they progressed in the Army, frequently have less formal and unit experience than the soldiers they supervise.

Most soldiers (66 percent) received their system training via the New Equipment Training team (see Figure 3).

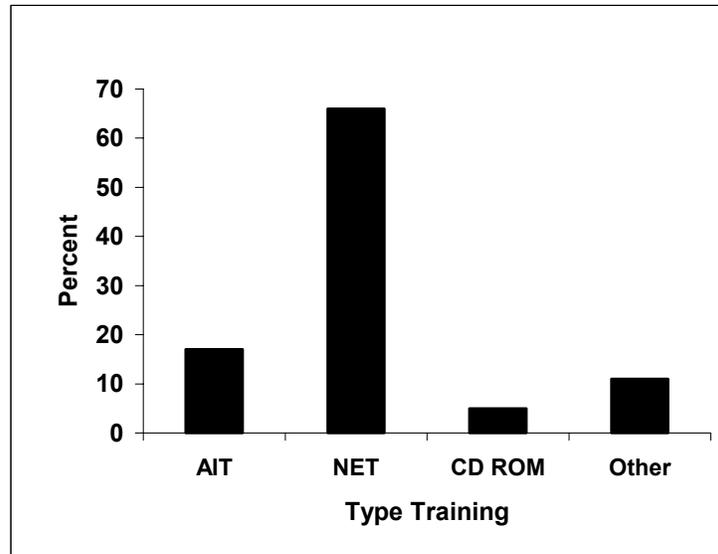


Figure 3. How soldiers were trained on their digital systems

Soldiers view NET training as more beneficial for learning the “knobology” of the system rather than for learning how to use the system to do their Army job. In both cases, soldiers reported that field exercises were the most valuable for learning to use digital systems (see Figures 4 & 5).

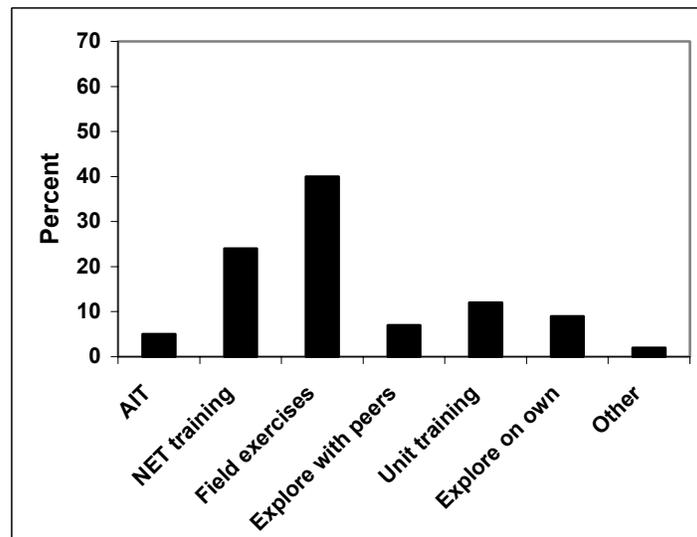


Figure 4. Soldier's response to: What method was most valuable for you to learn the knobology?

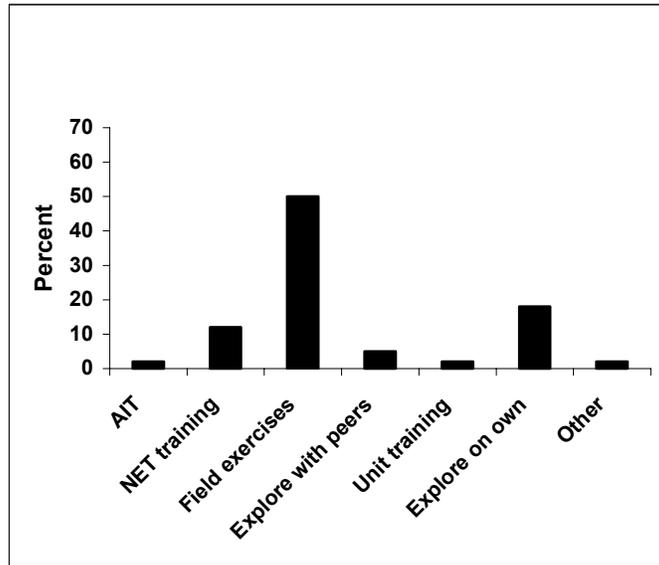


Figure 5. Soldier's response to: What method has been most valuable for you to learn to use your digital system to perform your Army job?

NET training serves a variety of needs. Some soldiers have no previous exposure to the system that is being trained, while others currently are using the system and attend NET training to learn the delta between system upgrades. This can result in the training moving too fast for the novice and too slowly for the more experienced user. Soldiers report that there are sufficient numbers of NET trainers so that the class could be trained according to its needs. Additionally, soldiers recommend that the NET team should, “Train the tasks we need to perform rather than show the knobology of everything of which the machine is capable.”

DL can be a partial solution. It must be interactive and adjustable to the experience level of the trainee, both in knowledge of the system and in military experience.

“Contractors do all the fixes and work arounds.”

Soldiers are disturbed by the influence that contractors have on military missions. Contractors assume responsibility for setting up systems in the field, establishing/maintaining interoperability between systems, troubleshooting problems, overriding software problems, and so on. As technology plays an ever increasing role in military operations, uniformed personnel will need to assume the roles that contractors now hold or the systems must become much more reliable.

- “The FBCB2 is very fragile. When problems occur, most operators are not trained to deal with these problems.”
- “The system is good but needs more work. Anytime a system has a hard time coming up, you might need that time in combat. I prefer degraded operations”!
- “We had hard drives that weren’t burnt with the correct addresses so we had to have the contractors re-burn the bricks.”
- “Contractors can be slow to respond to problems and the soldiers are the ones who should be learning the fixes.”

Technology allows for agility that can replace heavy armor. Troops know that their life depends on this technology. Clearly, they want the knowledge to keep their equipment up and operating.

“Technology Changes the Way We Fight”

Troops at all levels are just beginning to understand how information technology changes their duties and responsibilities. One major potential of digital systems is enhanced situational awareness. Situational awareness entails (1) perceiving important information is available; (2) comprehension or interpreting information and its relevance to the mission; and (3) projection or forecasting future events or decisions based on the information (Ensley, 2000). Soldiers may have difficulty moving beyond the first phase of situational awareness, perceiving information, without continued and varied training in both their MOS and in digital systems. For example, one platoon leader said that soldiers were adept in sending and receiving messages and in manipulating entities on the computer screen. Yet, when they saw three tanks on the screen, they did not recognize that it was a platoon with its consequent dangers.

Both the quantity and quality of information available raises important training questions such as: What type of crosstraining, both horizontally and vertically, is necessary for maintaining situational awareness and understanding? Do soldiers understand how to get information, deploy it, and act on it in a timely manner? How do soldiers learn use technology to deter their adversary?

- “The system is a good thing because you can give and receive messages instead of walking far across the firing point or using a radio because the enemy may intercept the channels.”
- “With the FBCB2, I can send messages to the commander when I am lost or in a dangerous situation. I can tell what’s going on where I am, or set up an attack, or plan where to go next.”

- “It is my belief that field training is the best training that an analyst can benefit from. It is valuable because it gave me an understanding of what the other ABCS components provided me within the Army.”

One commander enthusiastically recounted a recent field exercise where soldiers left from dispersed points to converge at a common location at the designated time. Soldiers did not communicate with each other, but used their digital system to track themselves and their allies. “This would have been impossible without our digital systems,” reported the commander.

Soldiers agreed with statements such as:

- Digital systems make it much safer for troop movement in enemy territory.
- Once we understood the limitations and capabilities of the digital systems, we were able to use them in new and better ways.
- Planning and preparation is much faster when we can collaborate using our digital systems.

“Changes are Underway.”

The Army is listening. One of the most influential changes in training digital systems has taken place at Fort Huachuca under the leadership of LTG Richard Quirk and LTC Thomas Kelley. Instructors integrate the Army digital system with their job responsibilities beginning the first week of a soldier’s Advanced Individual Training. This training simulates realistic missions as much as possible. In other words, soldiers receive hands-on training in a realistic setting. Recent feedback from the field suggests that this approach is working. One Battle Staff NCO noted that her soldiers continue to experience a “steep learning curve” in operating digital systems, “except for our military intelligence analysts from Fort Huachuca. They are confident in using the system.”

Training at Fort Sill concludes with trainees receiving a set of CDs to reinforce and sustain training on their digital system. In addition, Fort Sill is developing distributed learning to use as a pre-requisite for resident training. Soldiers will come to the schoolhouse with basic knowledge so that onsite training is more productive. Distributed training materials also are being developed for CSSCS and the FBCB2 for delivery over the Internet.

Master analyst courses now train NCOs on the skills needed to provide oversight and instruction to their subordinates, as well ensure smooth operations for commanders within the TOC.

U.S. Army training facilities understand that Army transformation will place even greater emphasis on troops being able to leverage technology. They are moving forward to address major training needs.

In summary, what did we learn?

- Soldiers want more training to integrate their knowledge of their digital system with their Army role.
- Soldiers see opportunities available now for additional training at their home station. Although unfamiliar with distributed learning methods, they express a willingness to use technology to advance their training.
- Soldiers see a need to interact with their colleagues in simulated military settings. Successful collaboration between units will become even more important as technology advances throughout the Army. Training collaboration goes beyond successful connection of the systems.
- Soldiers and NCOs want to know how to maintain and troubleshoot their systems.

References

Brassard, M., and Ritter, D. (1994). *The memory jogger: A pocket guide of tools for continuous improvement and effective planning*. Methuen, MA: GOAL/QPC.

Ensley, M. R. (2000). Theoretical underpinnings of situational awareness: A critical review. In M. R. Ensley & D. J. Garland (Eds.) *Situational awareness analysis and measurement*. Mahwah, NJ: Lawrence Erlbaum Associates.

Felton, R. J., Schaab, B., & Dressel, J. D. (2003, in press). *Training requirements of Battle Staff NCOs in digital units*. (Study Report) U. S. Army Research Institute for the Behavioral and Social Sciences: Alexandria, VA.

Loeb, V., and Ricks, T. E. (February 2, 2002). *1's and 0's Replacing Bullets in U.S. Arsenal*, Washington Post, DC.

Schaab, B., & Dressel, J. D. (2001). *Training for adaptability and transfer on digital systems*. (Research Report 1782). U. S. Army Research Institute for the Behavioral and Social Sciences: Alexandria, VA.

Schaab, B. & Moses, F. L. (2001). *Six myths about digital skills training*. (Research Report 1774). U. S. Army Research Institute for the Behavioral and Social Sciences: Alexandria, VA.

Wardell, C. S., and Paschetto, G. (2001). *Small group instruction in real-time over the web*. Proceedings of the Interservice Industry Training Simulation and Equipment Conference, Orlando, FL.

Appendix A

Results from questionnaire

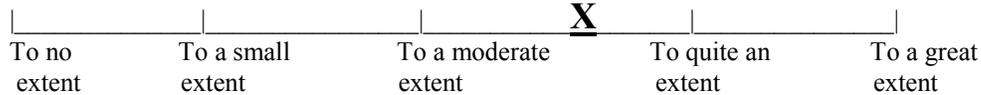
X notes the mean score for each item.

Digital Team

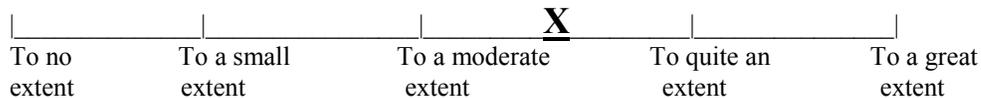
A digital team is a group of soldiers who are digitally connected and whose input you need in order to successfully do your job. This may be within a unit (e.g., ASAS operators sharing information with other ASAS operators) or between units (e.g., ASAS and AFATDS interfacing for target nominations and acquisition).

To what extent do each of the following task descriptions apply to your digital team?

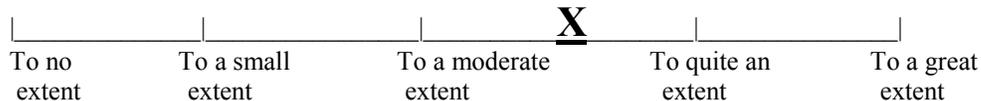
Successful task/mission performance requires team members to coordinate their activities directly with each other.



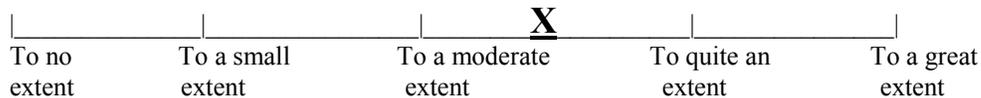
A team member needs to know his buddies and know how they will react in certain situations.



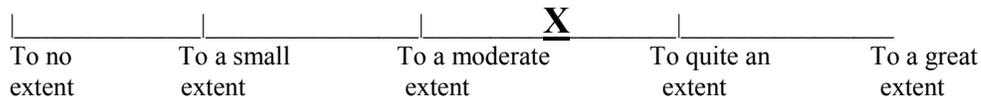
Successful task/mission performance requires team members to obtain information about the work situation and pass it on to other team members.



My leader places a high priority on our using our digital equipment.



Task performance by team members is dependent of timing, quality, or completeness of the performance of other team members.



Digit systems make it much safer for troop movement in enemy territory.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

Successful task/mission performance is dependent on a leader to closely coordinate the activities of all team members.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
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Once we understood the limitations and capabilities of the digital systems we were able to use them in new and better ways.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

Planning and preparation is much faster when we can collaborate using our digital systems.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

Inadequate amount of team training is a frequent/critical problem.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

The team's tasks are mainly composed of the activities needed to operate the digital equipment (knobology).

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

Lack of team spirit is a frequent/critical problem.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

Poor design of equipment the team uses to operate is a frequent/critical problem.

_____X_____

To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent
--------------	-------------------	----------------------	--------------------	-------------------

Team training is not realistic is a frequent/critical problem.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

The current composition of the team is inadequate (e.g., more or fewer members are needed or different types of personnel are needed) is a frequent/critical problem.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

Team is not given the opportunity to train with other units is a frequent/critical problem .

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

Digital systems provide more time for us to think and develop multiple COAs.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

The tasks are such that if one member cannot perform adequately (e.g., fast enough) another member can "make up for " that performance.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

Frequent turnover in team members is a frequent/critical problem.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

Lack of coordination between team members is a frequent/critical problem.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

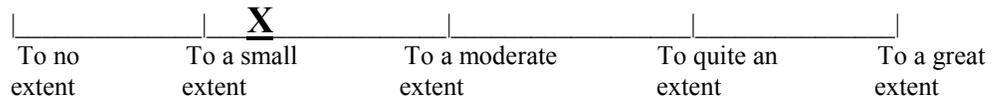
Team is tasked using inappropriate tactics is a frequent/critical problem.

		<u>X</u>		
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

Training on our digital system takes time away from other important training activities.

	<u>X</u>			
To no extent	To a small extent	To a moderate extent	To quite an extent	To a great extent

Lack of equipment that the team would normally use.



Appendix B
Four questions concerning digital training

Soldiers provided individual written responses to each question then selected the best 2 responses

How do you sustain your digital skills or your unit's digital skills? How is it determined when training is needed? Is this method successful? If not, what would you recommend?

What was the most valuable training that you received? Why? How would you improve it?

What problems did your unit face in using digital systems? What changes did your unit make to address these problems?

What new training techniques or events has your unit developed or adopted?

Appendix C
Interview Questions
Interview Topics
Fort Lewis-April 2002

I. **General background and experience in using Army digital systems.**

- What systems are you using?
- What training did you receive?
- How do you use your systems? (within unit, across unit)
- If you had only five minutes to tell your replacement what he or she needs to know about operating your digital system in this environment, what would you say?

II. **Training Methods** What works? Best? Worst? Training aids used?

- What was the most valuable training you received? Why? How would you improve it? Consider: Training within digital cells and training across digital systems
- What was the least effective training you received? Why? If it needs to be continued, how would you improve it?
- After knobology, what are the primary/basic digital training tasks for your unit to use its system? To interact with other systems?
- What *new* training techniques or events has your unit developed or adopted? Consider: Training within digital cells and training across digital systems
- How is sustainment training conducted for individual operators? Who determines when this training is necessary? Is this method successful?
- How is training conducted within the unit for system operators who interact to perform their tasks? How effective is this training?
- How is training conducted across units that must interact to perform their tasks? How effective is this training?
- What training aids were available? How effective?

III. **Learning to do the job:** Conflict/scenario situation
(War stories during exercises: with own system, interacting with other systems or Imagine using it for real)

- What problems did your unit face in using digital systems? What changes did your unit make to address these problems?

- What specific skills are necessary to exploit the advantages of digitization?
- How do you know if a unit or soldiers in a unit are “digitally” better? How is this assessed?
- Do you think that digitization gives you greater access or less access to the commander, other BOS, and higher and lower echelons?
- Do you use digital systems during mission planning/execution or, do you rely more on voice or face-to-face communication?
- Do digital systems help the process of analyzing data? If so, how? Do they make it easier to obtain data and to disseminate the results?
- What shortfalls in digital capability exist as far as you are concerned?
- How do you overcome these flaws?
- What skills are important in maintaining situational awareness?
- What new digital sub-tasks are required to control enemy contact?

IV. Future Promise

- Can you give an example, in general terms, of a task that will need to be performed in the future by system operators?
- What difficulties do you expect to encounter in performing such future tasks?
- How do these tasks relate to the TTPs you expect to be perform?
- How do these tasks relate to changes in equipment or tactics, or other types of anticipated changes?

This is an opportunity for you to use your knowledge of the Army and the current use of digital systems to suggest what will make them better. Be creative, think outside the box. Money is no object!

Imagine what the Army will look like in 10 years. Select one type of mission. What tasks must entry-level enlisted soldiers be trained on to accomplish this mission?

What training have you received in the Army or elsewhere that you would recommend for training soldiers in the Objective Force?

What changes are fundamental to becoming a digitally-trained soldier?