U.S. Army Research Institute for the Behavioral & Social Sciences

FACT SHEET

# Cognitive Methods for the Design of Digital Training

## Summary

*Advanced technologies can provide the U.S. Army with the capability to collect, process, and disseminate an uninterrupted flow of information to support situational awareness, decision making, and war fighting. Understanding how to train soldiers to use these evolving digital systems under high levels of mission uncertainty is a primary focus of the Army's research program.*

The Army is greatly increasing its use of digital weapons, equipment, and technologies that demand soldiers and commanders with information-age skills. There is a need to identify how best to train and sustain the skills required for digitized operations and procedures.

This effort (FY 1999-2003) has produced a comprehensive ARI-wide plan of training research needed to help the Army maximize the benefits of "going digital." The plan addresses critical research about training soldiers to: (1) adapt to frequent system changes and upgrades, (2) cope with extensive quantities of data and ambiguous information, (3) operate as components in network-centric environments, and (4) integrate training of digital systems with Army tactics, techniques, and procedures.

Based on the plan, one specific research area is to design and test cognitive methods that help individual soldiers maximize the acquisition, transfer, generalization, and retention of skills. The focus is on operators and staff in digital environments. In one specific project, we compared groups of entry-level, enlisted soldiers on two methods of training for digital proficiency. These methods were (1) traditional, lecture-based instruction, focusing on system operating procedures and (2) minimal lecture, scenario-based problem-solving focusing on cooperative learning with the instructor's role as mentor/coach. The primary goal of this second group was to have

users accomplish mission-related tasks using the digital system. Situational awareness is emphasized, particularly in scenario-based learning, as it is essential for system users to determine what cues are relevant, what information is missing, and what responses are justified. Terminal learning objectives (TLOs) established to identify essential course knowledge remained the same for all groups and all training incorporated practical exercises to reinforce skills.

Evaluation of the terminal learning objectives indicated no performance differences on the end-of-course exercise developed by the school to document mastery of these TLOs. However, differences were found on performance-based measures that required soldiers to apply what they had learned to unfamiliar maps, data, and mission goals. Trainees who learned digital systems using scenario-based problem-solving, combined with peer collaboration and instructor mentoring, could apply learning to novel situations as demonstrated by: (1) comprehension of both the basic knowledge of the course and the digital system (i.e., situational awareness) and, (2) application of that understanding to original problems.

In FY 2001, we will provide:

- Research findings on the training, transfer, and adaptability of digital skills as a function of training method.
- Guidelines on assessing digital skill decay that

improves prediction of which tasks need the most sustainment training, resulting in a 20% saving in training load.

- Lessons learned about adapting to different versions of digital equipment.

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