Training Tactical Behavior Profiling Skills for Irregular Warfare

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ABSTRACT

In 2008, the Department of Defense placed the mission of Irregular Warfare (IW) on an equal footing with conventional warfare in future military planning and operations. IW objectives are to provide a continuum of capabilities for dealing with complex and increasingly asymmetrical challenges to US military and geo-political interests, including new approaches for dealing with counter-terrorism, counter-insurgency, stabilization, and reconstruction / rehabilitation of adversary states. The focus on the human terrain and the nature of the adversaries has led to greater demand for small infantry units operating in a distributed manner throughout large operational areas. A significant challenge is that each individual in a squad must become an expert in "acting as a sensor" to develop an accurate, *and actionable*, common operational picture. Past research has demonstrated that to enable a team of experts to become an expert team an integrated set of training tools, methods, and strategies must be provided (Salas & Cannon-Bowers, 2000). Consequently, the Joint Forces Command (JFCOM) has collaborated with the services to increase IW training capability, availability and trainee throughput. In this paper we report on findings from a JFCOM-sponsored workshop and three field studies to provide recommendations for delivering tactical behavior profiling training to a broader audience employing a learning environment that prepares, solidifies and reinforces critical skills for IW.

ABOUT THE AUTHORS

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INTRODUCTION

Released in December 2008, Department of Defense Directive 3000.07 placed the mission of Irregular Warfare (IW) on an equal footing with conventional warfare in future military planning and operations. IW objectives are to provide a continuum of capabilities for dealing with complex and increasingly asymmetrical challenges to US military and geo-political interests, including new approaches for dealing with counter-terrorism, counter-insurgency, stabilization and reconstruction / rehabilitation of adversary states. The focus on the human terrain and the nature of the adversaries has led to greater demand for small infantry units operating in a distributed manner throughout large operational areas. A significant challenge is that each individual in a squad must become an expert in "acting as a sensor" to develop an accurate, *and actionable*, common operational picture. Past research has demonstrated that to enable a team of experts to become an expert team an integrated set of training tools, methods, and strategies must be provided (Salas & Cannon-Bowers, 2000). Consequently, the Joint Forces Command (JFCOM) has collaborated with the services to increase IW training capability, availability and trainee throughput (e.g., advanced immersive training technologies). In this paper we report on findings from four field studies that provide recommendations for the design of IW training strategies that can accelerate learning from individual to unit level readiness, improve retention, and reach a wider audience.

APPROACH

In their seminal paper on *The Anatomy of Team Training*, Salas and Cannon-Bowers (2000) provide an extensive set of guidelines for developing effective teams. We adopted their recommended approach by employing task analysis tools to define small unit competencies (Studies 1 and 2), and used theory, empirical research, and evaluation tools to define effective learning methods and team training strategies (Studies 3 and 4).

Study 1 – Small Unit Competencies

In the fall of 2009, TEAM Orlando, which is a collaborative organization representing the training systems acquisition systems commands, sponsored the IW Training Symposium. Hosted by JFCOM, the symposium focused on conducting workshop sessions with Subject Matter Experts (SMEs) to establish the critical skills thought to be fundamental to small units in successfully conducting IW (The Irregular Warfare Training Symposium, September 2009). Facilitators worked with approximately 40 SMEs during two half-day sessions to identify small unit skill areas and learning requirements. The second author compiled them into the categories listed in Table 1: decision making, teamwork, stress resilience, and culture. The final list indicated that decision-making skills had the most requirements; therefore, JFCOM sponsored Studies 2, 3, and 4 to identify performance requirements for tactical Profiling and Cue Recognition (PCR) skills, and effective training strategies for apprentice level training. PCR is a set of skills and techniques that team members use (e.g., cues and indicators of behaviors) to spot people and events before the situation becomes lethal (Kobus & Williams, 2010).

Study 2: Small Unit PCR Skill Requirements

Study 2 was conducted in two phases to establish an initial validation of behaviorally-based PCR skills. Phase 1 was conducted at the Marine School of Infantry-West (SOI-W) because it has been at the forefront of training Marine infantry units at pre-deployment in PCR.

Table 1. Small Unit Competencies for IW

Skill Area	Performance Requirements
Decision Making	• Use effective observation, tracking, pattern recognition (e.g., analysis of atmospheric cues, body language cues) • Use all senses (e.g., hearing, seeing, touching, feeling, smelling) • Demonstrate comfort with information ambiguity (e.g., partial information) • Understand when to act and when not to act • Consider positive and negative consequences of moral, legal, and ethical decisions in terms of 2nd and 3rd order effects
Team	• Participate in a team decision making process-like a radar system every individual in the squad is a sensor coordinating and passing information to create a common operational picture • Be proactive and adaptive in order to make rapid shifts in missions
Stress	• Use effective attention and energy management in order to be resilient to stress • Recognize when unit members need to rest so they can recharge their "batteries"
Culture	• Understand the impact of cultural differences and how the enemy exploits that to their own advantage • Employ survival language skills • Work with interpreters • Use effective negotiation strategies • Recognize cultural and language competencies in subordinates and assign duties accordingly

A critical skill is objectively assessing hostile intent based on piecing together patterns of information collected on human physiological and social behaviors, and social indicators in the physical terrain (e.g., human heat signatures, familiarity in social interactions, types of body language, and signs or symbology). Staying "left of bang" by constructing these behavior profiles in a proactive fashion is considered by the USMC to be a protective element for small units, as important as body armor and weaponry (Kobus & Williams, 2010). As a result, PCR techniques have become an invaluable addition to the small unit's tactics, techniques, and procedures.

During this initial phase, five SMEs were interviewed by the first author at SOI-W. The interviews were conducted before and after classroom lessons, during observations of the field scenarios, and several weeks following the course. An interview protocol was developed based on prior reviews of course materials, and then adapted, once in the field, based on issues that were identified from naturalistic observation. The concept of a behavioral profile that characterizes persons of interest (e.g., high value targets (HVTs) and body bombers) is based on years of subject matter expertise from undercover police work and social sciences research. Specifically, SMEs confirmed principles of Naturalistic Decision Making (NDM) (Zsambok & Klein, 1997) had been adapted to guide learning objectives. As defined by NDM, the behavior profiles generated are essentially prototypes of what to look for, are less rigid than a feature-listing of templates, and thus can be updated readily as an insurgent's own tactics, techniques, and procedures change (e.g., how improvised explosive devices are placed).

An initial PCR skills list was compiled based on interviews with SMEs, observations of the PCR course, and a review of the NDM literature (e.g., Zsambok & Klein, 1997). The skills list was refined through additional SME interviews and observations during unit training in the second phase of the study which took place in April 2010 during a JFCOM-sponsored joint exercise. Because this training audience was a highly experienced cohort, the SOI-W PCR curriculum was adapted to emphasize the importance of team decision making in developing journeyman to mastery level expertise.

After reviewing the final skill list, a rationale was identified in the NDM literature for separating the list into three cognitive skill areas: identification, elaboration, and cognitive-monitoring (Cohen, Freeman, & Thompson, 1998; Marshall, 1995; Paris, Johnston, & Reeves, 2000). Table 2 presents 14 "Identification" PCR skills and performance objectives.

Table 2. Identification Skills and Example Performance Objectives

#	Identification Skills	Example Performance Objective
1	Establish a geometry of fires to create an interlocking network of optics, intelligence, and communications	Team members triangulate their communication, optics, and intelligence data to ensure comprehensive coverage of an event, individual, vehicle, anchor point, or habitual area.
2	Utilize organic assets and natural light to make positive identification	Team members use optics (e.g., binoculars and thermals) as effective substitutes in determining, for example, what part of a body was shot and how bad the wound is based on the color of the blood on the ground.
3	Make innovative use of optics (and other organic assets) to help construct a baseline or profile	Team members use range estimation capability in their optics to determine opposing forces social status indicators (e.g., to determine if a person of interest is a leader).
4	Shift field of view – from wide to narrow and back – and thereby avoiding focus lock	Team members watch a distant target for awhile with binoculars and then switch to naked eye in order to better interpret the context surrounding the specific action they are watching.
5	Efficiently refocus observation scan to include both near and far objects in the scene	Team members keep all parts of their viewing sector, both near and far, within their visual field scan and in their focal attention so that no important cues are missed.
6	Orient observation or tracking toward potentially hostile players or good guys and ignore neutrals	Team members economize their profiling by concentrating observations on potential hostiles (insurgents, informants) and potential friendlies (police, security), while reducing attention to the neutrals (regular population).
7	Make effective and efficient identification of anchor points and indications of anti-tracking	Team members economize their observations by localizing their viewing on areas–anchor points–where hostiles tend to concentrate their illicit activities, such as specific parts of town or a building.
8	Make effective and efficient identification of habitual areas and action indicators	Team members economize their observations by localizing their viewing on areas–habitual areas–where townspeople congregate and which might represent a “soft target” for hostile activity, such as a market or mosque.
9	Make effective and efficient identification of opposing force leaders	Team members determine who the leader is in a village by using the four key indicators (entourage, direction, mimicry, adoration) of leadership.
10	Adopt appropriate criteria based on objective cues observed to make timely, accurate decisions	Team members use clue clusters to collect three pieces of evidence, such as three indicators of a leader or a terrorist planning cycle, before taking action.
11	Induce or generalizes a pattern from a few individual cues	Team members infer the presence of a larger event–such as a Vehicle Borne Improvised Explosive Device (VBIED) or a complex ambush–by generalizing from the presence of a few cues (e.g., how a car is parked, or how a sniper team has been deployed).
12	Look for prototypes (vs. template matching)	Team members look for signature behaviors (e.g., insurgent, HVT, vehicle, or a track) and signature locations (e.g., habitual area, anchor point, or aerial spoor) through a cluster of cues.
13	Establish an observation baseline to extract normalcy	Team members make a systematic, sustained observation on a person, event, location, or vehicle to determine what behavioral profile constitutes “normal,” where this normal is used as the baseline against which deviations are noted. A baseline, for example, might be established for market behavior when insurgents are not present.
14	Look for anomalies – above and below baseline (including the absence of something)	Team members look at the elements to note anything out of place or anomalous, either something there that should not be or something missing. As an example, team members should observe a group of people to see if someone seems out of place based on biometrics (e.g., they are sweating from running) or if a vehicle is parked in an unusual location (possible VBIED).

Identification processes involve strategies for employing and manipulating one's own cognitive resources and available assets to orient, observe, recognize, and identify important contacts based on a particular configuration of features (Paris et al., 2000). Such configurations tap an individual's knowledge of cues in the environment, thereby enabling identification of hostile intent, projecting future actions of contacts, and ultimately assigning threat potential (e.g., friendly, hostile, unknown) to them. Effective identification requires exchanging timely and accurate reporting of the ongoing state of those features to team members, within and beyond their individual units. For example, Identification Skill #1 is establishing a "geometry of fires" to create an interlocking network of optics, intelligence, and communications among team members. An example performance objective is for team members to triangulate these assets to ensure comprehensive coverage of HVTs (events, individuals, or vehicles). PCR skill #9 is making effective and efficient identification of opposing forces leaders. The example performance objective is for team members to work together to determine who a leader or HVT is in a village by using the four key indicators (i.e., entourage, direction, mimicry, and adoration).

Table 3 lists the "Elaboration" PCR skills and example performance objectives. Elaboration involves tapping into one's background store of information that summarizes what has been learned previously about similar situations; it enables the team members to create a shared mental model of the situation (Paris et al., 2000). Effective elaboration involves applying and discussing previous knowledge (e.g., of mission profiles) about the current situation, such that the most reliable and acceptable hypothesis may be found with regard to the intent of a specific contact. In effect, team members map their current experiences onto a cognitive template they had developed from previous experiences, and then will attempt to match each part of this template with some aspect of the current situation. For example, skill #15 is taking an evidence-based approach to identifying hostiles using hard data to confirm or disconfirm a hypothesis about hostile intent. An example performance objective is for team members to take the time to list three reasons why an individual is a body bomber or a HVT, rather than going with a hunch to save time.

Table 3. Elaboration PCR Skills and Example Performance Objectives

#	Elaboration Skills	Example Performance Objective
15	Take evidence-based approach to identifying hostiles using hard data to confirm or disconfirm a hypothesis	Team members take the time to list three reasons why an individual is a body bomber or an HVT, rather than going with a hunch to save time.
16	Generate explanatory storylines that tie individual items of information together	Team members construct alternative explanations for how individual events or pieces of evidence might be related and part of a larger whole.
17	Imagine alternative courses of action or alternative event outcomes by what-if mental simulations	Team members attempt to "think through" what might be happening in an unfolding event (e.g., a possible complex ambush) by rapidly reviewing different, but plausible, alternative outcomes.
18	Detect an unfolding event or activity by identifying a piece of it and inferring the rest	Team members view a sequence of events as being tied together by some underlying process-unfolding like a movie- such as the steps to create and plant a bomb or the cycle of planning a terrorist attack.

Table 4 lists the "Cognitive monitoring" PCR skills which involve the ability to monitor one's own cognitive states and biases, and taking the initiative to counter one's own and other's assumptions about the problem. For example, skill #19 is having the confidence in one's own skill set to overcome obstacles in the problem itself. An example performance indicator is that team members do not give up or exhibit excessive frustration when encountering an unexplained event, and continue looking for at least one indication or signature behavior that might help solve the puzzle. Skill #24 involves recognizing when one's own situation awareness is behind the power curve and does what is needed to catch up.

Table 4. Cognitive Monitoring Skills

#	Cognitive Monitoring Skills	Example Performance Objective
19	Demonstrate confidence that skill set will overcome obstacles such as an unexplained event in the situation	Team members do not give up or exhibit excessive frustration when encountering an unexplained event (where an Improvised Explosive Device (IED) might be placed), and continue looking for at least one indication or signature behavior that might help solve the puzzle.
20	Anticipate what will happen next, i.e., be proactive rather than reactive	Team members view a series of actions as a "process" that can be identified and unpacked, where subsequent steps can be predicted, such as identifying one step in the seven-step terrorist planning cycle or one of the steps in planting an IED or "activating" a body bomber.
21	Keep an open mind to the unexpected by recognizing the unknown variables in the situation	Team members consider the possibility that insurgents might use totally new tactics (e.g., different IED emplacing) or attempt something that is completely different than anything that has been tried before.
22	Use tactical patience to avoid committing too soon or going to kinetics unnecessarily	Team members exhibit a mindset to wait before committing firepower too soon so that information of even greater value–such as who planted the IED rather than exploding the car outright–can be obtained.
23	Take someone else's perspective, i.e., getting away from an egocentric view	Team members anticipate where an insurgent might plant an IED, for example, asking "Where would I put it if I were them?" Or, "Where would I position myself within the ville to get a clear shot or do a clandestine recon?"
24	Recognize when own situation awareness is behind the power curve and does what is needed to catch up	Team members ask for help or request additional information from team members when they feel their awareness of the current situation has broken down.
25	Do not accept unexplained events or evidence	Team members look for causal explanations or antecedents of puzzling events (e.g., people do not appear out of nowhere and signs do not vanish into thin air), such as trying to find where a mysterious vehicle came from or where a potential hostile might have gone.
26	Develop an internal sense of time to know when their situation judgment needs to be updated	Team members have a reasonably accurate "internal clock" that tells them when it is time to look for alternative cues (e.g., an IED) or when it is time to switch optics.

An example performance objective is asking for help or requesting additional information from team members when one feels their awareness of the situation they are currently viewing has broken down.

Study 3. Training Strategies for PCR

The large number and complexity of effective PCR behaviors identified in Study 2 clearly demand a systematic approach to the education and training of such skills. Therefore, in Study 3, the authors conducted an assessment of the PCR training practices at SOI-W in October 2009. The first author observed two successive course offerings in their entirety, including all academic lessons and every field scenario. Besides taking extensive field notes, a structured observation form was developed in advance in which twenty-five Instructional Behavior Observation Criteria (I-BOC) were drawn from the research on decision making, teamwork, and stress resilience (Cohen et al., 1998; Driskell & Johnston, 1998; Fischer, Spiker, & Reidel, 2009; Smith-Jentsch, Zeisig, R. L., Acton, B., & McPherson, 1998). Specifically, the I-BOC list was compiled from a review of the cited documents that had derived guidelines from training effectiveness experiments. Table 5 presents an abbreviated sample of the I-BOC for decision skills training. It lists four guidelines with related criteria to look for as the training is being designed and implemented. Guideline 1.1 recommends using critical incident interviews as part of a cognitive task analysis to establish learning requirements. Eleven guidelines are provided that define how training should be implemented to foster critical thinking skills in novices.

Table 5. Instructional Behavior Observation Criteria (I-BOC)

Training Guidelines	#	Observation Criteria
1.0 Cognitive task analysis should be used to establish training requirements.	1.1	Critical incident interviews were used to identify learning requirements.
	1.2	Critical incidents were used for generating demonstration, practice, and test materials for training.
	1.3	Cognitive tasks were identified, either formally or informally, and used as the basis for terminal or enabling objectives.
	1.4	Cognitive skills or meta-skills formed the basis for the instruction.
2.0 Critical thinking training helps in-experienced decision makers learn important skills and helps experienced decision makers handle uncertainty effectively without abandoning the recognition abilities they have built up. Training teaches and encourages trainees how to:	2.1	Create plausible stories for novel situations.
	2.2	Notice conflicts between observations and a conclusion.
	2.3	Elaborate on a story to explain a conflicting cue rather than simply disregarding or discounting it.
	2.4	React to implausible assumptions in explaining away too much conflicting data.
	2.5	Generate alternative stories.
	2.6	Plan against the possibility that the current assessment is wrong.
	2.7	Pay careful attention to the time available for decision making.
	2.8	Frame problems in order to identify the essential elements in a situation.
	2.9	Generalize from specific instances to broader classes of situations.
	2.10	Challenge one's own personal biases and consistently reevaluate the situation as new information is received.
	2.11	View and interpret the situation from the perspective of someone else, such as an adversary or a neutral entity.
3.0 Training should combine instruction with realistic practice.	3.1	The training combines information-based instruction on critical thinking concepts, demonstrates critical thinking processes, and provides guided practice in realistic problems.
	3.2	Instruction sensitizes trainees to the concepts to be learned and help them assimilate lessons during practice.
	3.3	Simulation exercises provide an opportunity to demonstrate critical thinking skills and provide feedback in real-time.
4.0 Training may be taught in segments. Greater benefits are realized with more training time, but some benefits can be obtained within a shorter period, e.g., 2 to 3 hours (Cohen et al., 1998)	4.1	The first segment provides an overview of critical thinking processes and introduces the concept of building, testing, and evaluating a story, and planning against its weaknesses.
	4.2	The second segment provides practice in how to create specific kinds of stories, such as the hostile-intent story.
	4.3	The third segment provides practice in using a devil's advocate strategy for evaluating a story and generating alternative interpretations of observations.
	4.4	A fourth segment provides practice in using strategies for deciding when to think critically and when to act immediately (e.g., Quick Test).
	4.5	Training should provide enough time (at least 2 or 3 hours) for trainees to learn and demonstrate skills

Guideline 2.3 recommends that trainees should be taught how to elaborate on a story to explain a conflicting cue rather than simply disregarding or discounting it. The third guideline is that training should foster realistic practice in decision skills. Guideline 3.3 recommends that simulation exercises should provide an opportunity to demonstrate skills and give feedback in real-time. The fourth guideline recommends that training should be segmented to enable systematic acquisition of decision strategies.

Cohen et al. (1998) had reported that the segmented method should begin with information presentation, and then build up to providing practice through simulation to develop specific skills. For example, Guideline 4.3 recommends practice in using the devil's advocate strategy for evaluating a story and generating alternative interpretations of observations.

Next, an I-BOC checklist was created to rate whether the PCR training had addressed each criterion using a 3-point scale: the training did not cover it at all (score 0), the training covered it partially (score 1), or the training covered it completely (score 2). Then, the first author systematically observed and rated the PCR training at SOI-W. Follow-up interviews were conducted with the two lead instructors to ensure that the researcher understood the application criteria in the context of the course curriculum and that the SME observations were recorded accurately. Some changes in wording and scoring criteria were made based on these discussions. Results showed that a majority of the criteria were rated as having been completely satisfied, with an overall I-BOC score of 88% (a future plan is to validate the checklist by correlating results with trainee performance in field training exercises).

Table 6 presents a selected sample of the criteria ratings.

Table 6. Examples from Study 3 - I-BOC Example Ratings
(Rating: 0 = not covered at all; 1 = covered it partially; 2 = covered it thoroughly)

#	Criteria	SME Observations During Training	Rating
1.1	Critical Incident (CI) interviews were used to identify critical thinking training requirements.	Requirements came from a mix of CI's that happened but also from less formal considerations of what was needed through extrapolation from police undercover work to IW missions.	1
1.2	Critical incidents were used for generating demonstration, practice, and test materials for training.	Class materials (i.e., photos, videos, and stories) were all drawn from interviews with active duty Marines, soldiers and undercover police. Laminated job aids were provided.	2
2.3	Trainees are taught how to elaborate on a story to explain a conflicting cue rather than simply disregarding or discounting it.	Students were taught to predict what will happen next while watching events unfold and look for what else it could be, with the guidance that the "scenario" not bias their observations or facts, and to consider lower probability options when employing heuristics.	2
2.10	Trainees are taught how to challenge one's own personal biases and consistently reevaluate the situation as new information is received.	The instructors challenged trainees to drop their own perspective and take the OPFOR perspective.	2
3.1	The training employs information-based instruction on critical thinking concepts, demonstrates critical thinking processes, and provides guided practice in realistic problems.	Photo practical apps through 30-minute exercises forced students to look for indications, combine evidence, and generate conclusions that are then compared to "ground truth." Instructors increased problem difficulty by increasing information ambiguity (i.e., giving students fewer pieces of information about the context of the problem).	2
4.3	Trainees are taught to use a devil's advocate strategy for evaluating a story and generating alternative interpretations of observations.	Although no systematic approach was used to train a "devil's advocate" approach, it did employ scenarios that challenged student assumptions about and interpretations of scenario events.	1
Summed Rating			
Max Possible Rating			
Percent			

For example, Criteria 1.1 was rated as partially covered because the rater determined training requirements had come from a mix of critical incidents that had actually happened, but had also been derived from less formal considerations of what was needed through extrapolation from police undercover work to IW missions. Under Criteria 2.3, the PCR training provided thorough coverage in helping trainees develop skills in elaborating on a story to explain a conflicting cue, rather than simply disregarding or discounting it. The trainees were taught: how to predict "what will happen next," while watching events unfold; to look for other explanations for the event; to not allow the "scenario" to bias their observations or facts; and to consider lower probability options when employing decision heuristics.

Study 4: Expanding Access to PCR training

Perhaps the greatest challenge is designing the training to accelerate team member skills in working together to optimize effective PCR strategies and reaching a wider trainee audience. A fourth study was conducted based on interviews with five PCR SMEs following our Study 3 observations of PCR training at SOI-W. The interviews were structured around two themes that had emerged from these observations: the need for skill maintenance and the benefits of simulation-based training exercises. The following recommendations for expanding the availability of PCR training are presented based on the results of these interviews and our first-hand observations of the PCR course.

Skill Maintenance

Cultivate Profiling Naturals
During observation of the PCR classes, it was noted that in each class one or two individuals were especially adept at profiling, as demonstrated by volunteering questions and answers during class and field scenarios. The regularity of such standout individuals in each PCR training class was confirmed in our interviews with the SMEs. These individuals could be singled out for advanced PCR training and, when sent back to their units, would have a force-multiplying effect through "bridge training" in which one attempts to maintain the skills acquired in initial training so they have not perished before reaching final pre-deployment training.

Encourage Student-Built Job Aids
Another effective form of bridge training would entail having the students build a job aid as they complete both the academics and field exercises portions of the course. This interactive learning activity would result in a tool they can take back to their home units, and to help train others in PCR skills. The job aids should contain explanatory details on each of the six combat domains and would include tips in such key areas as identifying HVTs and stages of the terrorist planning cycle.

Employ Training on DVD/Online
A natural extension of the course would involve video-taping the academic lectures and distributing them on a DVD throughout the services. While the emotional impact of being physically present in the course would be diminished through DVD viewing, the digital format has the advantage of being augmented such as by including clips from multiple classes where a variety of questions have been asked and answered. As well, it would be feasible to incorporate some interactivity with the DVD by having the video available on-line, where students could ask questions of the SMEs via a discussion forum or some other form of electronic information sharing or social networking. The expanded reach of PCR training through the digital medium would certainly be cost effective, though its learning impact would require further study.

An interesting possibility would be to attempt to capture the behaviors of the ville role-players in the field scenarios on video and distribute via DVD. While offering an intriguing potential for observational learning, there are technical challenges concerning distance, viewing point, and field of view that would have to be addressed. However, creation of carefully structured scenarios, where role-players engage in the full gamut of PCR behaviors, has the potential to result in a powerful set of learning stimuli that would be accessible to a wide trainee audience.

Another recommendation would entail creating a series of role-player vignette videos that would be packaged as an on-line learning system. These videos would be recreations of various aspects of the scenarios, where different camera angles corresponding to the observation posts would be provided. The videos would be shot using special role-players, mostly drawn from the instructor cadre, who would be acting out particular scenarios that would then be followed by a series of questions the student would have to answer. For example, in one vignette, the student might be shown a series of frames of a ville (with bustling activity) and asked to identify the anchor points or habitual areas. In another, say a crowd scene, they would have to identify a particular HVT such as a leader by using the cues of mimicry, adoration, giving directions, and

proximity. In essence, the vignettes would be carefully constructed to highlight particular aspects of a combat domain.

Once the basic series of vignettes had been filmed, it could be packaged in a variety of different ways, depending on the audience and the intended level of training. For example, it could be implemented as part of Army Knowledge Online, Navy Knowledge Online, MarineNet, or Joint Forces Knowledge Online, where students could take it for course credit on their own time. Alternatively, it could be made as part of a blended learning system where students would take part of the course online and part in an instructor-led classroom. The vignettes could be viewed multiple times, where the goal might be to reduce the time it takes to identify the critical domain cues or improve the time needed to make a positive identification. It could also be linked to a student workbook that students might complete in advance of taking the course, in essence serving as spin-up training for an advanced profiling course. There are clearly a large number of possible uses for this approach, where the ultimate goal is to make the learning relevant and exciting for students so they embrace the opportunity to improve their PCR skills.

Employ Game-Based Training

An exciting opportunity to provide supplemental training for PCR skill maintenance once the beginner's course is completed would involve using Game-Based Training (GBT). GBT is a burgeoning area within DOD to use games as the vehicle to promote learning for students using their inherent interest and prior use of games to instill motivation and engage in repetitive practice during leisure time (Conkey, 2009). The flexibility of GBT for use in multiple settings makes it an attractive candidate for bridge training. While a number of meta-skills could be facilitated using a bridge training approach, four stand out based on our recent observations:

(1) Switching between wide field of view and near field of view with binoculars;
(2) Combat reporting, that is, articulating the cues that one sees to establish some explanation for what is unfolding;
(3) Providing evidence necessary for a positive identification; and
(4) Developing shared understanding among units.

Importantly, these meta-skills will have synergistic effects on a variety of PCR skills. Providing skill maintenance training for students should yield considerable return on investment. In this regard, a web-based training game is currently under development for promoting the attention management skills necessary to control switching between wide and narrow field of view (Mautone, Spiker, & Karp, & Conkey, 2010). Not only are these meta-skills widely applicable across PCR skills, they also underlie other important domains where cognitive processes are essential for tactical success. For example, we have found parallels in the PCR skill set to another important domain element of Irregular Warfare, combat tracking.

Employ Simulation-Based Unit Training

While live field exercises, like the ones used in PCR scenarios, give students invaluable exposure to complex situations requiring stressful problem-solving, Simulation-Based Training (SBT) systems are essential to developing unit level readiness. Recently, JFCOM has implemented the Future Immersive Training Environment Joint Concept Technology Demonstration (FITE JCTD) to bridge the capability gap that exists for training infantry squads in unit level decision making, team, and stress resilience skills. It is a mixed-reality training system that leverages advances in immersive simulation, simulation-generated objects, and advanced after-action review (Wilkinson, Giesey, & Holness, 2010). The goal of FITE JCTD is for small units to experience realistic problem-solving in operational contexts like those that make up stability operations and counter-insurgency environments. Small units can rapidly develop their ability to adapt efficiently through guided practice in tactical and meta-cognitive skills, based on receiving performance-based feedback from team leaders/facilitators. Mission scenarios can be rapidly developed and adapted to address changing mission requirements, and units can practice skills until they have reached an established performance criterion set by their own units. Importantly, some of the role-playing behaviors that stimulate the learning in the PCR scenarios could be reproduced in the FITE JCTD environment to further maintain the PCR skillset before students deploy to their operational environment. Thus, we see that following initial PCR training, we have several skill sustainment-bridge training environments–in the form of online DVD, GBT, and SBT–that could be utilized in varying mixes and combinations that would be cost-effective and would promote training effectiveness.

CONCLUSIONS

The purpose of this paper was to present results of a series of field studies that identified effective training approaches for developing decision skills applied to IW. These observations afforded a rare opportunity

to establish individual and unit level requirements for PCR skills. Although such training development is challenging, the findings presented in this paper indicate it can be accomplished using previously validated tools (e.g., cognitive task analyses), methods (e.g., information, demonstration, practice, and feedback), and strategies (e.g., critical thinking training).

While the present methods of training PCR skills using a combination of highly expert SMEs, compelling narratives, and intense live scenarios are effective, initiatives are needed to provide the training to a larger audience of warfighters using the most efficient means possible. Enabling technologies for this effort can include GBT, "captured" PCR behaviors on DVD, "train the trainer" offerings, and immersive SBT, among others.

From the studies described herein, we now have a handle on *what* PCR skills should be trained; the next step is to determine *how* best to train them given time and resource demands. The focus of future analyses should address the remaining skill areas noted in Table 1. Teamwork, stress resilience, and cultural awareness/survival language skills play a significant role in IW mission effectiveness, which underscores the need to rapidly advance the state of the art of training small units.

ACKNOWLEDGEMENTS

We acknowledge JFCOM and the Joint Training Integration and Evaluation Center – Orlando for sponsoring the studies, and the USMC SOI-W for their enthusiastic support and guidance in support of the field studies.

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