COGNITIVE TRAINING CHALLENGES
IN OPERATIONS OTHER THAN WAR

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Abstract

The U.S. military is increasingly participating in Operations Other Than War (OOTW). There is growing pressure to train for leading these operations, which include humanitarian crises, non-combat evacuations, humanitarian assistance, and peacekeeping. OOTW requires a different mindset than the military has generally trained for in the past. Understanding this mindset is a key factor to successful operations. We conceive of this mindset as a successful response to the variety of cognitive challenges in the OOTW environment. To support the development of OOTW familiarization training for the U. S. Air Force, 3rd Air Force, Mildenhall, England, we used Cognitive Task Analysis (CTA) methods to uncover the cognitive challenges operators face, specifically in humanitarian assistance missions. We conducted 42 CTA interviews with members of the Army, Air Force (including Special Forces), and representatives of Non-Governmental Organizations (NGOs). We interviewed them regarding their experiences with humanitarian missions as well as humanitarian tasks within OOTW missions that were not purely humanitarian. We analyzed the data to uncover specific cues, factors, and strategies that experienced operators had used to maintain situation awareness, maintain mission focus, and envision exit strategies, as well as to meet the cognitive challenges that working with inter-agency and multinational forces presents. We are currently developing a low fidelity, web-based vignette training product. Given the multi-national and multi-agency nature of these missions, the training is designed for use by multiple personnel in multiple locations to encourage learning about how each organization may approach a variety of situations. Users will log on to the training site; under the tutelage of an instructor they can build an experientially-based understanding of the cognitive challenges in humanitarian operations. User testing will be conducted in August 2002, and the product will be implemented late 2002.

Author s Biographies

Thomas E. Miller, Ph.D. is a Senior Research Associate at Klein Associates. He has performed research and developed applications in the field of cognitive engineering and decision support. He was the principal researcher on projects to design and build a prototype decision aid to support use of conventional weapons against hardened targets for the Defense Special Weapons Agency. He served as principal investigator of a project funded by the National Defense University to identify cognitive demands of commander of Operations Other Than War (OOTW) missions. Dr. Miller received his Ph.D. from The Ohio State University, Department of Industrial and Systems Engineering, Cognitive Systems Engineering Laboratory.

Deborah Battaglia is a Research Associate at Klein Associates. She has assisted in the development of decision skills training programs for soldiers operating in urban environments and for fighter, transport, and helicopter pilots. In addition to studying cognitive challenges of conducting Operations Other Than War, she is also examining the nature and process of sensemaking with Army information operations officers. Her research interests include understanding skilled performance and the nature of expertise and issues in organizational behavior and leadership. Ms. Battaglia holds a B.A. in Psychology from the University of Dayton.

Jennifer K. Phillips is a Research Associate at Klein Associates. Her research interests include the nature and acquisition of expertise, and decision-centered training.°Ms. Phillips served as project lead on an Army-sponsored effort to develop decision skills training for small unit leaders in military operations in urban terrain. She is working on a similar effort to provide decision skills training to Air Force personnel for Operations Other Than War. Ms. Phillips has worked on several USMC-sponsored efforts to re-engineer existing command posts and design experimental combat operations centers. She is currently leading°an Army-sponsored program of research to identify the process by which°individuals make sense of situations as they unfold, and to develop training, which will bolster sensemaking skills. Ms. Phillips received a B.A. in Psychology from Kenyon College.

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THE NEW MISSION:
OPERATIONS OTHER THAN WAR

In the post cold-war era, the US Armed Forces are no longer relegated to their traditional training and preparation for warfighting; they are increasingly participating in a category of missions classified as Operations Other Than War (OOTW). These missions include humanitarian crisis, non-combat evacuations, humanitarian assistance, and peacekeeping and peace enforcement. In the past, preparation for OOTW missions has not been a major focus of Air Force training since the Air Force has not had a lead role in OOTW missions. Traditionally, the Air Force has served a more logistic role in that it supplied air transportation, supplies, and goods to others. However, during Operation Shining Hope that changed. In April 1999, an Air Force General was appointed the Joint Task Force Commander in charge of the humanitarian effort that was tasked with providing relief to 450,000 Albanian refugees fleeing Kosovo. This mission was a joint effort that included other military branches, as well as several non-governmental organizations (NGOs). Under an Air Force contract, Camp Hope was constructed to shelter up to 20,000 refugees, accepting 500 per day. The Air Force's role was completed when they turned over Camp Hope to the United Nations High Commissioner for Refugees (UNHCR).

Military doctrine and training have focused primarily on traditional combat operations, which differ fundamentally from peace operations and other OOTW. To address this shortfall, the military has initiated several efforts to identify the issues unique to peace operations by comparing OOTWs with other OOTWs, and with combat operations (Chayes & Raach, 1995; Hayes & Sands, 1998; Wentz, 1997). These efforts are a necessary and important foundation for future OOTW research, but they do not address training for OOTW.

The work in OOTW training was motivated in part by our understanding of decision making in OOTW environments, and by our increased visibility in the OOTW community. Our understanding of OOTW builds on a key OOTW project we conducted for the National Defense University (Miller & Zsambok, 1997; Miller, Zsambok, & Klein, 1997). We analyzed the way Joint Task Force and Coalition Joint Task Force commanders of OOTW actually experience their command, from both an event-based and a cognitive perspective. This study produced an in-depth account of the issues faced by eight U.S. commanders of OOTW, and uncovered many cognitive requirements that are unique to the command of OOTW. The findings from this study are that 1) commanders' goals in OOTW tend to center on empowering rather than de-powering a nation or group of people; 2) intelligence and data-gathering nodes within the command often employ a distinct set of techniques to perform their functions; and 3) the staffing and organization of a command must break from the traditional structure due to unique desired end states that characterize OOTW. These and other findings from the study of OOTW have implications for the way the military should train for this type of mission.

With the Air Force's ever-increasing involvement in OOTW operations, it is essential to begin looking at training and readiness for OOTW operations. The OOTW training that currently exists within the Air Force is limited in scope, depth, and breadth and tends to be mission specific, region specific, and occur pre-deployment instead of throughout Air Force training. The goal of the research described here was to help the U.S. Air Force understand and meet the unique training needs that OOTW impose, specifically, humanitarian assistance (HA) missions. Building on the results of previous OOTW work, researchers expanded the understanding of issues surrounding HA training requirements to use an emerging training approach called Decision Net to address changing training needs. This paper builds on this previous research and describes the current research effort in developing and delivering decision-centered training in the HA environment.

UNPACKING THE COGNITIVE CHALLENGES IN OOTW MISSIONS

The Naturalistic Decision Making (NDM) theoretical perspective guides our work in HA training research. Researchers in this community study how people use their experience to make decisions in field settings (Klein, 1998). The NDM perspective investigates the strategies people use in performing complex, ill-structured, and high-stakes tasks under time pressure and uncertainty, and in the context of team and organizational constraints (Klein, Orasanu, Calderwood, & Zsambok, 1993; Miller et al., 1997). In many dynamic, uncertain, and fast-paced environments, there is no single right way to make decisions. Thus, NDM researchers typically study experts to define quality decision-making and describe good decision-making processes. Researchers using the NDM framework have examined expert performance with a wide variety of professionals in hundreds of studies. By studying the cognitive aspects of expert performance in a broad array of domains, NDM researchers have been able to make recommendations on how to improve training and system support to facilitate performance of non-experts.

The approach to training in the current effort was to develop decision making exercises that are of high cognitive fidelity and challenge participants in the kinds of judgments and assessments requisite of HA missions. The development of effective, *cognitively authentic* (Ross, Halterman, Pierce, & Ross, 1998; Ross & Pierce, 2000) training is dependent upon a body of incidents, reflections, stories, and lessons learned gathered from experienced operators in HA environments. We approached the data collection process by investigating sources of expertise in the Air Force for operating in HA missions. This section describes the subject-matter experts (SMEs) and users for the training product, the Cognitive Task Analysis (CTA) methodology employed, analysis of findings, and the development of decision making exercises.

Subject-Matter Experts

The research team used three military populations as the sources for the data collection effort. They include personnel at the United States Joint Special Operations University (JSOU) located at Hurlburt Field, Florida; personnel stationed at the 3rd Air Force in Mildenhall, England, and Special Operations Forces (SOF) at the Special Operations Command, Pacific (SOCPAC) headquarters at Camp H.M. Smith, Hawaii. The research staff conducted forty-two CTA interviews across these three groups.

These three populations were targeted as sources of expertise in missions classified as HA, or in OOTW missions that had a humanitarian relief component. The Air Force personnel interviewed at JSOU has expertise in civil affairs and special operations, and were instructors at the school. The 3rd Air Force at Mildenhall, England, was an ideal population to interview due to their experience in some of the first Air Force led joint task forces (JTFs). We interviewed personnel who served in key JTF positions in both Operation Shining Hope, the humanitarian mission of aiding Kosovar refugees, and Operation Atlas Response, a humanitarian relief mission in response to flooding in Mozambique. Finally, data collection included CTA interviews with SMEs at SOCPAC including Army SOF, Navy SEALs, Marine, and Army intelligence officers, and Air Force Special Operations personnel. This population was viewed as holding particular expertise in OOTW missions such as peacekeeping, non-combatant evacuations, and interagency missions.

CTA Methodology

CTA is the process of understanding the cognitive complexities of a task. It provides a set of tools for eliciting and representing general and specific knowledge pertaining to a particular activity. The CTA goes beyond collecting procedural knowledge for how to operate in an HA environment. The purpose is to get inside the soldier's head, and try to understand the "cognitive map" that guides his/her decision-making processes. The CTA uncovered cognitive aspects involved in the judgment, decision making, and problem solving skills that are so critical in the uncertain and ever-changing operational environment. Specifically, the interviews uncovered the critical cues, expectancies and goals required to make good assessments and decisions in the HA environment.

Knowledge Elicitation. The knowledge elicitation piece of the CTA process utilized the Critical Decision Method (CDM), an incident-based approach for understanding cognitive challenges in a given domain. CDM interviews were organized around an initial, unstructured account of a specific incident the interviewee experienced on an HA or other OOTW deployment. The incident account was generated by the interviewee in response to a specific open-ended question posed by the interviewers, and it provided the structure for the interview that followed. Examples of the nature and content of the opening queries are presented in Figure 1.

Once the interviewee recounted an appropriate incident, the interviewers began systematic, in depth sweeps of that incident that included documenting a timeline of the account, identifying critical decision points, and probing for cognitive cues, factors and contingencies that influenced how the decision maker assessed the situation and acted on a particular course of action.

Interviewer: Can you think of examples that involved difficult situations, poor coordination, or exceptionally great coordination that you didn t expect? For example, a time when

§ A civilian or group of civilians acted out and you had to find ways to appease them?
§ A time when you had to coordinate closely with an NGO and ran into trouble? Or when an interaction went especially smoothly and you didn t expect it to?
§ A time when you had to interact with local officials over a particular issue or problem?
§ A time when the CMOC operations weren t running well? Or, it was operating especially well and you didn t expect it to?

Figure 1. Opening queries used in CDM interviews.

Knowledge Representation. The knowledge representation phase of the project involved coding and analyzing the interview data. Two main methods were used: a thematic analysis and a decision requirements analysis. Both analyses were conducted in order to provide input for the development of the decision-making exercises and the Decision Net training materials.

Thematic Analysis. The purpose of the thematic analysis was to create a condensed archive of the salient lessons learned that the SMEs recounted in their interviews. It captured the overarching issues and challenges that emerged from the data set, and utilized a cataloguing system by which synopses of hundreds of events were grouped by the themes or categories with which each event was most strongly associated. The thematic analysis also included protocol for looking up the raw interview data and cross-references to incidents also documented under related thematic category headings.

The development of the categories and subsequent assignment of incidents to groupings was an iterative process. A group of researchers read a set of interview notes looking for important lessons or insights the SME gained through a deployment or experience. We were particularly interested in lessons that require a different mindset than the military is used to training for e.g., having to work with civilians or NGOs to facilitate the

accomplishment of the mission. Then, the researchers convened to compare their coding of incidents in the data. Each coded incident either was assigned to a pre-existing category of similar incidents or became justification for a new grouping. The final analysis contains 35 themes or categories which each contain between 3 and 15 synopses of various incidents. Figure 2 lists examples of these category headings.

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§ Leveraging other operators in the mission
§ Flexible problem solving
§ Filling the gap
§ What it means to be an American
§ How not to create an incident with the locals
§ Avoiding mission creep
§ Consequences of political promises or agendas

Figure 2. Example categories from the Thematic Analysis.

Decision Requirements Analysis. The decision requirements analysis was a method for organizing the details of the incidents recounted in the interviews with SMEs. This analysis utilized Decision Requirements Tables (DRTs) (see Table 1) as a way of categorizing data to highlight the decisions or assessments in a given arena. DRTs incorporate features that show why a decision is difficult and potential errors that can be made, along with the cues, factors, and strategies that are used in making that decision. The individual decisions within the table can be used as focus points for creating decision making exercises (DMXs) and the accompanying information (i.e., why difficult, cues, and factors) can be used to develop a relevant and realistic background and scenario for the DMX.

The process of creating DRTs began with two researchers analyzing each set of notes from the interviews with SMEs. The researchers searched for information in seven pre-specified categories of the DRT: decisions/assessments; why difficult/challenges; potential errors, cues; factors; strategies; and goals. Each researcher developed a DRT for each interview using these seven categories.

After individual analysis was completed, DRTs for each interview data set were combined into a single DRT. Then, looking across the DRTs for each interview, high level focus areas that captured all the different decisions and assessments described in the DRTs were created: *Maintain Mission Focus; Support a Request for Assistance; Understand Host Nation; Manage Presence; Interact with NGOs; OOTW Situation Awareness; Understand Multinational Forces; Work to Get Out*. Researchers then reviewed each individual

interview DRT to organize the decisions from the tables into the eight high-level focus areas. The data from each of the decisions listed under the high-level focus areas were reframed as necessary to best represent the decisions and judgments and their associated requirements related to each category.

The DRTs were sent to two SMEs at JSOU. The SMEs reviewed the materials and made suggestions for improvement. The SME comments were then
Table 1

Sample Decision Requirements Table

High Level Focus Area: *Maintain Mission Focus* Decision/Judgment: Determine whether to support a request for assistance (RFA)	
Why difficult	§ Requests can be outside the parameters of the mission. § Political figures may attempt to commandeer US assets. § Appropriate response is unknown.
Potential errors	§ Coming off as the ugly American or initiating a rude confrontation. § Being manipulated by a story of desperation. § Making military assets, available to the civilian populace.
Cues	§ The source and nature of the request. § UN or NGO relief supplies that have already been delivered.
Factors	§ Other options available to you and/or the person making the request. § International commerce regulations. § Ability to work within host nation procedures and regulations.
Strategies	§ Give UN responsibility for determining which requests to accommodate by placing US assets at disposal of UN system. § Maintain focus on the mission and ROE. § Request CMO staff personnel to assess the actual need.
Goals	§ Employ military assets and personnel to relieve human suffering without affecting mission accomplishment.

incorporated into the tables creating eight final DRTs arranged by high level focus area, broken down into

decisions/assessments and populated by information about difficulties, potential errors, cues, factors, strategies and goals related to each.

Development of Decision Exercises

At the core of the training program for HA are the Decision Making Exercises, or DMXs. A DMX is a low-fidelity, context-rich vignette that requires the student or "player" to make decisions, judgments, or assessments in response to the situation described. DMXs are based on the Tactical Decision Games (TDGs) originally conceived by Maj. John Schmitt (USMCR) (Schmitt, 1994, 1996). The purpose of a DMX is to give participants the opportunity to deliberately practice assessing and responding to a situation, to reflect on the courses of action that they and other participants have chosen, and to receive feedback pertaining to the advantages and disadvantages of their decisions and judgments. To enable reflection and useful feedback, the DMXs are accompanied by a decision-centered debrief format called the Decision Making Critique. The Decision Making Critique focuses on why participants made particular choices in determining a course of action: how they interpreted the cues and factors in the scenario; how they perceived the situation to have developed, and how they believe the situation will play out; and why they believe their course of action will successfully tackle the situation. When a DMX session is successful, the participants glean new insights and a richer understanding of the decisions they make. As they build up experiences through playing DMXs, they develop more decision-making expertise.

Developing a DMX that generates good learning is not a trivial matter. The CTA identifies aspects of expert knowledge, in this case, how people experienced in humanitarian assistance have learned to approach the mission. From this we are able to derive teaching points—the lessons deemed critical to address in the training vignettes. The CTA data also provide a wealth of information as to characteristics of the humanitarian assistance-operating environment, which enables us to detail a realistic situation in each DMX.

Developing Teaching Points. Teaching points were derived from the findings of the decision requirements analysis and the thematic analysis. Our first step was to synthesize the findings from the two analyses. We performed a card sort, using the decisions (which fall under high level focus areas) from the decision requirements analysis as the groups and placing each theme or category from the thematic analysis into one or more of the decisions. Of the 25 decisions in the decision requirements analysis, all of them linked to

one or more categories from the thematic analysis. Of the 35 thematic analysis categories, nine categories did not directly address one of the decisions from the decision requirements analysis. Generally speaking, these nine categories failed to mesh with a particular decision due to their all-inclusive nature. For example, "Attitude Control" and "Being Overwhelmed," categories from the thematic analysis, apply to most all aspects of the HA mission and therefore do not link neatly to one or two specific decisions. However, because they tended to be central aspects of the HA operating environment, we found that our decision requirements analysis data as a whole sufficiently represented each of those categories; the cues, factors, why difficult, and potential errors columns under several of the decisions contained bullets that directly addressed those thematic analysis categories as part of what goes into making the decision. As such, we were not concerned with being unable to associate the nine categories with a particular decision.

Linking the two analyses afforded us a more comprehensive set of data from which to identify teaching points. The thematic analysis contributed rich, hard-driving stories about the issues and demands unique to humanitarian assistance missions, and the decision requirements analysis contributed thorough lists of all the cues, factors, potential errors, and challenges that can come into play for each judgment or decision. Synthesized, they capture the essence and depth of humanitarian assistance missions, and the breadth of circumstances that can occur in these missions.

After linking the two analyses we articulated teaching points for each of the eight high-level focus areas. Two researchers independently reviewed the decision requirements data and the corresponding thematic analysis categories and data for each high-level focus area. Looking across the data, each individual identified key issues—those issues that were woven through the data and central to the decision or judgment, or those issues that were critical lessons learned or insights about the humanitarian assistance-operating environment. The two researchers compared lists of key issues, written as teaching points, and together developed a refined list of teaching points. This process was followed for all the high-level focus areas. Then, a researcher who had not been involved in initially describing teaching points reviewed all the teaching points across all the focus areas. This review produced revisions to the teaching points to ensure that they were comparable in terms of level, that they were stated as concisely as possible, and that they indeed represented the information contained in the data set. Seventy-four teaching points were generated. Table 2 below is an

excerpt from the list of teaching points, showing how the teaching points, decisions, and thematic analysis categories are related. The last column of the table indicates DMXs that were generated to address the teaching point. The process of DMX generation will be discussed in the section to follow.

Generating Vignettes. We set out to develop approximately ten DMXs. Given the large number of teaching points, we were unable to address every one in the set of DMXs—each DMX can realistically contain between one and four teaching points. Instead, we decided to evenly represent the high-level focus areas , within which the teaching points are delineated, in the set of DMXs (see Tables 2 and 3).

DMXs contain certain pieces that are universal across all exercises. Every DMX must present the participant with an *uncertain situation* or *dilemma*. The uncertainty within the vignette is what makes room for the participant to make decisions and assessments. In some instances, the developers either based the DMX scenario on an incident from the CTA data. In other cases, the DMX scenario was created by combining elements of multiple CDM incidents.

Another critical piece is the *endgame*. The endgame is the specific situation in the scenario about which the participant has to make a decision or assessment during the DMX. The endgame plus the requirement (directing the student to develop a plan or course of action) for the exercise is what moves the participant from passive reader of the vignette to active decision maker, and allows the student to wrestle with the teaching points. Without a well-stated endgame, it will be unclear what kind of action is to be taken by the participant and what the focus of learning is for the vignette. Without the endgame, the DMX becomes just an interesting story to read.

Creating a *requirement* for the scenario is necessary to encourage participant interaction. Simply put, the requirement states what decisions or assessments the DMX participant should make and the subsequent actions they should take. The requirement needs to set at a level consonant with the teaching point. The keys here are that the requirement clearly states what the developer wants the participant to do and that the DMX affords them the opportunity to do it.

Four researchers generated and reviewed the DMXs. The development process was quite iterative. Each individual began by selecting a small set of teaching points that seemed capable of cohabitating in an HA vignette. Then the researcher generated an endgame for the vignette. With the endgame as a guide, he/she

drafted a DMX and iterated it to ensure that the teaching points were addressed and that the situation was realistic. In drafting each DMX, the researcher referred back to the corresponding portions of both the decision requirements analysis and the thematic analysis for inspiration as well as concrete cues, factors, and circumstances that could potentially cause errors. For example, in developing the DMX "Abandoned Supplies" which contains teaching points 27 and 32, (see Table 2) the researcher would refer to the decisions to Interact with Local Authorities and Understand Local Citizens within the *Understand Host Nation* high-level focus area. He or she would also refer to the thematic analysis categories associated with the teaching points:

Table 2

Teaching Points Captured Under the Understand Host Nation High Level Focus Area

	Teaching Point	HLFA + Decision	Thematic Analysis Categories	Associated DMX
24	Identify any local regulations or procedures, formal or informal, that may affect how you carry out your mission	*UNDERSTAND HOST NATION* Interact with local authorities	§ Knowing motivations of other operators in mission § Being discreet § Show that you respect other operators § Workarounds	Border Patrol
25	Assess what personnel or resources are available as an intermediary or on your behalf to work through issues (HN military contacts, State Dept, embassy, country team, JAG, etc)	*UNDERSTAND HOST NATION* Interact with local authorities	§ Leveraging other organizations or operators § Preparation you can't get from others	
26	Identify the 'real' authority in the community	*UNDERSTAND HOST NATION* Interact with local authorities	§ Preparation you can't get from others	
27	Understand the local culture in order to better accomplish mission	*UNDERSTAND HOST NATION* Interact with local authorities	§ Not making a mess for the locals § Preparation you can't get from others § Taking the civilians' perspective § What it means to be an American	Abandoned Supplies
28	Assess where the US and host nation goals may conflict	*UNDERSTAND HOST NATION* Interact with host nation government	§ Conflicting agendas § Knowing motivations of other organizations or operators	Escort Service
29	Define the boundaries of the US military's involvement in the host nation's government	*UNDERSTAND HOST NATION* Interact with host nation government	§ Avoiding mission creep § What to expect in an OOTW—roles are gray and hazy	Escort Service
30	Assess what personnel or resources are available on your behalf to work through issues (HN military contacts; State Dept; embassy; country team; JAG; etc)	*UNDERSTAND HOST NATION* Interact with host nation government	§ Leveraging other organizations or operators § Preparation you can't get from others	
31	Understand host nation culture in order to better accomplish mission	*UNDERSTAND HOST NATION* Interact with host nation government	§ Not making a mess for the locals § Preparation you can't get from others § Taking the civilians' perspective § What it means to be an American	
32	Understand civilians' actions in context of the culture	*UNDERSTAND HOST NATION* Understand local citizens	§ Not making a mess for the locals § Recognizing the high need area § Taking the civilians' perspective	Abandoned Supplies
33	Employ culturally appropriate interventions consistent with the economy and standards of living	*UNDERSTAND HOST NATION* Understand local citizens	§ Not making a mess for the locals	

Not making a mess for the locals; Preparation you can't get from others; Taking the civilians' perspective; What it means to be an American; and Recognizing the high need area.

In a few cases the original teaching points could not in fact be incorporated into the story. In these cases, the DMX either unfolded in an unexpected direction, capturing different teaching points, or simply could not support all the original teaching points, in which case the outliers simply were excluded. Despite the few changes to which teaching points were incorporated in the DMXs, the set of ten vignettes remained representative of all eight high-level focus areas (see Table 3).

Table 3

DMXs Developed and their Association with the High Level Focus Areas

	DMX Title	Associated High-Level Focus Area(s)
1	Mt Cameroon Eruption	Work to Get Out Support a Request For Assistance (RFA) Maintain Mission Focus
2	Border Patrol	Understand Host Nation
3	Surveying a Region in Distress	Maintain Mission Focus Support a Request For Assistance (RFA)
4	Securing the Red Cross	Support a Request For Assistance (RFA) Interact with NGOs
5	Abandoned Supplies	Understand Host Nation Work to Get Out
6	Establish Maintainable Camp	Work to Get Out
7	Distributing Food	Interact with NGOs Work to Get Out
8	Press taking over the Airfield	Understand Multinational Forces
9	Crowd Behavior	Manage Presence Understand Host Nation
10	Escort Service	Support a Request For Assistance (RFA) Understand Host Nation

Once the DMX developer was satisfied with the content of his/her DMX it was reviewed by another member of the research team to determine whether it was realistic, whether it indeed addressed the teaching point, and whether it seemed engaging. The DMXs were revised following this step to incorporate the reviewers' feedback.

At this stage in the effort we have developed 10 DMXs in paper-and-pencil format. The next step is to implement the DMXs on the Decision Net platform. Here again we will revise the content of the vignettes by developing a visual representation to accompany each DMX. Based on what sort of map or other visual we develop for each game, we may determine it necessary to alter the situation described in the DMX.

DECISION NET: A WEB-BASED TRAINING APPROACH

Decision Net is a web-based platform for engaging in DMXs. It has been used for training, experimentation, and data collection, and has potential application as a tool to support knowledge management. In this case, we will clearly be leveraging the training capabilities of Decision Net.

The hallmark of all Decision Net DMXs is that they are low-physical fidelity, high-cognitive fidelity exercises that can be developed and iterated more quickly and less expensively than high-fidelity simulations. Another attraction of Decision Net compared to other simulation technologies is that the on-line DMX sessions can be conducted at any agreed-upon time, and sessions typically last about 60 minutes and therefore do not require an immense time commitment. Furthermore, Decision Net is intended to engage participants from any place on the globe that has Internet access; there are no travel costs associated with participation. These features have made Decision Net a fiscally-realistic platform for training delivery to non-co-located groups with similar job tasks and distributed teams.

Decision Net can support individual players—where several participants play a single role—or distributed teams—where several participants have different roles that are dependent on one another. In either case, the DMX session is conducted by a single facilitator who has domain experience and instructional skill.

Another advantage of Decision Net is that it can support several different approaches to implementing DMXs. It is possible to run a static DMX that presents a single situation that requires a course of action. It can also support vignettes that unfold over the course of time, where participants receive a series of situation reports, or SITREPs, and make multiple decisions and assessments as the situation progresses. Moreover, a Decision Net DMX can be structured to enable participant responses to drive the course of the scenario; either pre-scripted messages or ad hoc transmissions

produced by the facilitator can be inserted based on how participants are "playing" the DMX.

The Decision Net interface contains several features not available when the DMXs are conducted in paper-and-pencil format. First, approximately two-thirds of the screen's real estate is covered by a visual representation of the DMX such as a map of terrain, locations of roads and towns, or any representation that is appropriate for the particular vignette. This visual representation is dynamic. If it is a map, for example, the facilitator and the participants can draw, move icons, and highlight areas of interest (i.e., as they communicate verbally they can point out the area of the map to which they refer). In addition, if the DMX unfolds over time, the visual display will reflect changes in the situation—movement of icons, or more icons depicting civilians, distribution centers, and so forth. Another feature of the interface is an area where the DMX text is located. Participants can scroll through the text, but they cannot see text (i.e., SITREPs) that has not yet "happened." A final feature is the chat room, where participants can type notes to each other or to the facilitator. This is an especially useful element when the participants form a distributed team with different roles in the DMX.

Our training concept is to implement the HA DMXs on Decision Net so that instructors at JSOU can deliver virtual training to any operational units who anticipate conducting HA missions. Specifically, we have targeted the 3rd Air Force at Mildenhall, UK, as recipients of the training. The 3rd AF is responsible for Africa and a large portion of Eastern Europe, where natural disasters and armed conflict result in an unfortunate number of humanitarian crises. The value of Decision Net for the 3rd AF is that they can receive training delivered by JSOU without the expense of traveling to Florida. They can also segment the training into blocks that are manageable given their everyday job requirements. For example, they could choose to participate in one DMX session per month. Another potential advantage we intend to explore in the future is inclusion of NGOs and IOs in the training sessions, so that 3rd AF operators can benefit from the civilian perspective on HA missions. Conversely, this arrangement would also provide NGO and IO representatives a better understanding of how military operators work and think. It is the conclusion of every SME with whom we've spoken that communication and relationship building between civilian relief workers and military personnel prior to a mission is one primary key to success in a humanitarian assistance situation.

In implementing the existing 10 DMXs onto the Decision Net platform, we will further revise the vignettes into a "progression of SITREPs" format. Each DMX will unfold over time. Participants, each playing the same role (e.g., military representative to the Civil-Military Information Center, or Operations Officer), will receive SITREPs updating them on the situation. They will use the SITREPs to make assessments of the situation and decide upon actions to take. Their assessments and decisions will be the fodder for the decision-centered debrief conducted by the facilitator.

USER TESTING AND IMPLEMENTATION

Prior to finalizing the DMXs and the Decision Net application, we intend to validate a subset of the DMXs to ensure that the content is realistic, that the teaching points associated with each exercise are indeed addressed, and that the structure of the Decision Net platform is optimal. We anticipate validating the product at JSOU. We will observe a JSOU instructor facilitating a series of DMX sessions. The sessions will likely be conducted with students attending the school for a weeklong course, and we anticipate conducting one DMX session per day. Although the JSOU participants will be co-located, we will attempt to replicate the distributed nature of the training as closely as possible. We intend to set each student up at a computer terminal in the classroom, and set the facilitator up at a terminal in another room. This arrangement would mimic that of a JSOU instructor delivering Decision Net training to a classroom of participants at the 3rd AF.

To ensure that the content of the DMXs is realistic, prior to the validation sessions we will work with the facilitator to ensure that he believes the vignettes are realistic. If they are not, we will revise them before we conduct the DMX sessions with the course participants. In addition, during the sessions we will observe the play of the game and record any participant comments that reflect confusion pertaining to the situation. In our experience, exercise participants almost always communicate concerns about the scenario if they deem it unrealistic. They also provide feedback as to what changes could solve the problem to make it realistic.

To gauge whether the teaching points associated with each DMX are addressed, and whether the DMX indeed produces learning related to the teaching points, we intend to develop a short "test" that measures a participant's degree of knowledge about each of the teaching points. We will administer this test at the beginning of the course, prior to students receiving any of the DMXs, and again at the end of the course after they have received five DMXs. We anticipate demonstrating a richer knowledge of the HA operating environment and positive strategies for dealing with

some of the ambiguities and challenges likely to occur in such missions. While we hope the results from the pre-and post-tests show enhanced knowledge in line with the teaching points, we will most certainly create additional measures to validate whether the DMXs generate insights and lessons learned pertaining to the teaching points.

To determine whether the structure of the Decision Net platform is optimal, we will observe the sessions looking for ease of interaction with the technology, and we will collect feedback from the facilitator and participants. We would like to learn whether the interface is easy to use and whether it enables a good understanding of the events that are taking place in the DMX. We also would like to make our own determination as to whether the "progression of SITREPs" format seems to work well in this domain. In the past we have implemented static, paper-and-pencil DMXs with this audience. They generated excellent discussion across a range of HA-related topics. We would like to see the same degree of learning with the Decision Net DMXs. If the sessions do not go as well as expected, we may decide to return to the original static format within the Decision Net platform.

CONCLUSION

The CTA conducted for this study elicited and described the richness of expertise embedded in the stories and personal experiences of the SMEs. The researchers leveraged this expertise by transferring it into training vignettes ideal for dissemination in a distributed learning environment. The development of the Decision Net training vehicle is underway and will be accessible via the Internet in late 2002. Demonstrations of the final web-based product may be incorporated into the presentation for the I/ITSEC conference. Validation of the DMXs and testing the usability of Decision Net at JSOU will occur in the upcoming months.

The findings from previous research in OOTW suggest that, when compared to warfighting, personnel are not as adequately trained to deal with the complexity OOTW missions impose. This problem is compounded by the fact that personnel with OOTW operational experience are rotated, and the organizations left behind suffer from an absence of expertise in future deployments. The data from the present study supports these earlier findings. Newer personnel are often unprepared to handle problems unique to these missions, as their role in an HA deployment will vary drastically from the technical specialties for which they are trained. We believe this data-driven approach for developing and delivering cognitive training is ideal for preparing airmen and officers for future HA deployments.

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