Development and Validation of Training Themes for Joint, Interagency, Intergovernmental and Multinational (JIIM) Operations

Karol G. Ross
Cognitive Performance Group
Orlando, FL
karol@cognitiveperformancegroup.com

Meagan Arrastia
Florida State University
Tallahassee, FL
meagan.arrastia@gmail.com

Anna Grome
Klein Associates Division, ARA
Fairborn, OH
agrome@ara.com

Brooke B. Schaab
US Army Research Institute, JFCOM
Suffolk, VA
brooke.schaab@jfcom.mil

Jim Ong
Stottler Henke, Inc
San Mateo, CA
ong@stottlerhenke.com

David Spangler
Global Innovation & Design, LLC
Chesapeake, VA
globalidea@cox.net

ABSTRACT

The contemporary operating environment for U.S. military forces requires a new emphasis on collaboration across services, across government agencies and with non-governmental agencies and host nations to create global stability. This paper documents an effort to capture the expertise of experienced military and non-military players in these operations. Interview findings, operational lessons learned, and previous research form the basis for our investigation into how best to prepare our forces to plan and execute operations in Joint, Interagency, Intergovernmental and Multinational (JIIM) environments. First, we reviewed documents that reflected lessons learned or other insights into these types of collaborations. Second, we conducted interviews with military and civilian experts in operations that required collaboration among the military and other organizations, as well as host nation officials and citizens. Third, we analyzed those interview transcripts and combined them with the findings of the document review in order to derive themes that expressed the high-level cognitive skills evident in JIIM operations. We found the following themes in the document and interview data: Understand the situation within its historical, regional, and cultural context; Understand the other participants; Shift perspective; Establish and maintain common ground; Build capability to affect the situation; Visualize the operation; Support information exchange; and, Maintain flexibility. We describe our six-step thematic analysis method and the resulting themes. Finally, we report on our theme validation process with SMEs. The resulting themes currently form the basis for high-level learning objectives as part of an emerging joint staff-training product for the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas.

ABOUT THE AUTHORS

Karol G. Ross is the Chief Scientist for the Cognitive Performance Group. She is currently pursuing research in the areas of cross-cultural competence training and assessment as well as the development of cognitive metrics to support training assessment for the defeat of Improvised Explosive Devices (IEDs). She earned her doctoral degree in experimental psychology in 1984 from the University of Tennessee, Knoxville.

Meagan C. Arrastia is a former Research Associate at the Cognitive Performance Group. Currently, she is pursuing a PhD in Instructional Systems with an emphasis in Cognitive Psychology at Florida State University. Her current research focuses on the assessment of cross-cultural competence. Meagan holds a BA and an MA in Applied Sociology from the University of Central Florida, Orlando, Florida.

Anna Grome is a Senior Cognitive Scientist at Klein Associates Division of Applied Research Associates. One of her core focus areas is uncovering and describing the cultural influences on decision-making and multinational collaboration. She has led and supported multiple efforts in this vein for the Army and Air Force, using in-depth interview methods to uncover how mental models of collaboration and decision-making differ across culture, developing training requirements for crowd control in the Middle East, and developing strategic communications for influencing Middle Eastern terrorist networks. She is currently a core team member on an effort for the Office of the Secretary of Defense to develop Situated Cultural Training (SCT) for military personnel deployed to Afghanistan. Mrs. Grome holds a M.S. in Industrial-Organizational and Human Factors Psychology from Wright State University, Dayton, OH and a B.A. in Psychology and Spanish from Denison University, Granville, OH.

Brooke B. Schaab has been a Research Psychologist with the U.S. Army Research Institute for 10 years. Her current work focuses on improving the capability of military personnel to lead, participate, and make decisions as members of joint, interagency, intergovernmental and multinational teams and to enhance sense making, collaboration, decision-making, and adaptation in network-enabled operations. Partners in these efforts include Spain, Sweden, and several African nations.

Jim Ong leads the development of advanced training and decision support systems and authoring tools at Stottler Henke. He specializes in creating authoring tools and intelligent tutoring systems that provide automated coaching, performance assessment, and feedback. Previously, he served in applied research, software product development, software consulting, and systems engineering roles at Bolt, Beranek and Newman, PPD, and AT&T Bell Laboratories. Jim received MS degrees in electrical engineering and computer science from the University of California at Berkeley and from Yale University.

David Spangler has over 26 years experience in leadership, organization and management and was an Associate Professor with over 10 years experience at the post-graduate level, and Master Faculty with over 3 1/2 years curriculum and lesson development experience. He was a Navy Fighter and Instructor Pilot with 6.5 years experience, over 3000 flight hours, 560 arrested landings and 20 combat sorties. His areas of specialty include training development, modeling & simulation design, and modular education for Simulation Scenario & Exercise Development; Multinational, Joint, IA Education & Training; Joint Planning & Assessment; Design & Systems Perspective; Curriculum Development; Military Acculturation.

Development and Validation of Training Themes for Joint, Interagency, Intergovernmental and Multinational (JIIM) Operations

Karol G. Ross
Cognitive Performance Group
Orlando, FL
karol@cognitiveperformancegroup.com

Meagan Arrastia
Florida State University
Tallahassee, FL
meagan.arrastia@gmail.com

Anna Grome
Klein Associates Division, ARA
Fairborn, OH
agrome@ara.com

Brooke B. Schaab
US Army Research Institute, JFCOM
Suffolk, VA
brooke.schaab@jfcom.mil

Jim Ong
Stottler Henke, Inc
San Mateo, CA
ong@stottlerhenke.com

David Spangler
Global Innovation & Design, LLC
Chesapeake, VA
globalidea@cox.net

INTRODUCITON

The contemporary operating environment for the U.S. military forces requires a new emphasis on collaboration across services, across government agencies and with non-governmental agencies and host nations in order to create global stability in the interest of national security. While U.S. national objectives drive operations, our interests are increasingly dependent on supporting the security and stability of a wide range of regions and nations in which we find ourselves conducting operations. The skills to determine relevant objectives and take effective actions in such a collaborative environment have long been a part of the U.S. military capabilities, but these skills are now more in the foreground of operations and are required of a wider range of personnel from the tactical to the strategic level.

New and emerging doctrine directs the nature of these interactions for the U.S. military. (See for example U.S. Army Field Manual 3-07 "Stability Operations," October, 2008; Joint Publication 3-07.3, "Peace Operations," 17 Oct 07; and DoD Directive 3000.05, "Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations," 28 Nov 05). While this doctrine provides guidance and structure, it does not capture the expertise required to apply that doctrine successfully. The purpose of this effort was to capture the expertise of experienced members of the military and combine it with the expertise of non-military players in these settings, as well as with operational lessons learned and previous research in order to insure that training and education prepares our forces to plan and implement Joint, Interagency, Intergovernmental and Multinational (JIIM) environments.

In these types of operations, expertise is concentrated within and dispersed across certain elements of the military forces such as Civil Affairs, units who have successfully engaged in counterinsurgency operations in Iraq, members of Provincial Reconstruction Teams in Afghanistan, and those who have served in Joint or State Department positions. Additionally, expertise has developed in non-government organizations that are part of these collaborative efforts. Our approach to understanding this expert performance was to conduct interviews across this range of experienced people using a critical incident approach and then to perform a thematic analysis to capture the high-level cognitive skills in the form of themes that can inform the focus of training and education.

Theme-based training of cognitive skills is a successful strategy employed by researchers working in the area of cognitive psychology for the military. The concept of using themes to guide cognitive development through situated learning has grown from the constructivist approach to instruction.

The Cognition and Technology Group at Vanderbilt University (CTGV; 1990) presented one of the first employments of theme-based instruction using technology in their model of situated instruction. They created an environment for students to experience a problem from multiple perspectives or themes. The environment was for fifth-grade students to teach them all aspects of story writing (e.g., initiating events, character development, differentiation of protagonist and antagonist, setting) and, thus the word themes—a common concept in literature, was used to capture the high-level concepts to be taught. They explored one specific movie "Young Sherlock Holmes" on video disk using the technology to access scenes repeatedly from many viewpoints. The group receiving theme-based education excelled beyond the control group that studied rules of writing in a more linear fashion with current, accepted reading and writing programs. The group engaged in the theme-based instruction wrote stories with more elements; produced plots that linked characters and events to goals more often; used targeted vocabulary more frequently; and produced higher quality classroom discussions.

The goal of such instruction is to go beyond superficial familiarity with concepts and facts to mastering the conceptual complexity of an area. Spiro, Coulson, Feltovich, and Anderson (1988) produced a model of Cognitive Flexibility to guide learning which also put forth the concept of a deeper level of cognitive insight gained by theme-based exploration of situations or scenarios. They asserted that this method of learning supported the ability to spontaneously restructure the knowledge gained in adaptive response to changing situations. Spiro, et al. (1992b) demonstrated this approach with adult learners in the area of tactical thinking. They used one case study, the battle of Chancellorsville—a case study typically used in U.S. Army tactical education—to support theme-based learning. Their efforts focused on demonstrating a deeper conceptual understanding of tactics better generalization to new settings by using a theme-based structure to examine a scenario or case.

The purpose of thematic instruction, then, is to aid the learner in going over the same problem space from different viewpoints. This instructional strategy promotes cognitive flexibility in a domain of practice and avoids counter-productive training in introductory training and in some higher-level learning. By counter-productive training, we refer to training that inhibits transfer of knowledge to field performance. Reasons for failure include oversimplification of concepts, linear presentation of material ignoring the inter-related nature of concepts, using one exemplar leading to a student perception of one right answer for complex problems, and using simple analogies for complex systems (Spiro, Feltovich, Jacobson, & Coulson, 1992a). Theme-based instruction when applied as a method to help the student explore situations from different perspectives produces a more cognitively complex understanding of a domain more quickly and transfer of concepts to field performance in a more flexible manner.

This approach has been successful in military training. During the development of the "Think like a Commander" (TLAC) training environment, a number of high-level cognitive skills common across performance of expert tacticians were summarized to guide practice in this domain. The approach of TLAC is to explore a situation from these multiple perspectives or themes (Ross, & Lussier, 1999). This successful approach to training thinking skills (Lussier, Shadrick, & Prevou, 2003) is also the basis for another research effort to produce training for military crisis management thinking skills in the Red Cape tool (Shadrick, Schaefer, & Beaubien, 2007).

While a theme-based approach has been successful in military training in limited applications, the method for thematic analysis is not clear in the literature. Thematic analysis is a qualitative method for encoding information, usually interview data, although other sources may be included such as documents. The results are a list of themes, lists of indicators, or descriptive models. Theme-based training as an approach to situated or scenario-based training and education is dependent on generating acceptable themes that reflect the high-level cognitive skills in a domain. Many researchers and training developers do not accept or understand the qualitative analysis that is the basis of such training. This problem is, in part, due to the lack of presentation of the method of analysis. This deficiency affects the ability of the research and development community to duplicate successful training approaches based on themes.

In the qualitative research literature, "[t]hematic analysis is widely used, but there is no clear agreement about what thematic analysis is and how you go about doing it" (Braun, & Clarke, 2006, p. 79). There are a number thematic analysis methods (such as conversation analysis, interpretative phenomenological analysis, discourse analysis, and narrative analysis). Thematic analysis is generally used to pull meaning from the data in order to understand a phenomenon or specific aspects of a phenomenon that are

psychological (such as the experience of choosing cosmetic surgery or of going through a serious illness) or social in nature (such as patterns of drug abuse in a particular segment of society). Because theme-based cognitive training has been successful, if limited, it is important to clarify how the method for developing themes.

THEME DEVELOPMENT: STUDY 1

Method

Our method consisted of three primary activities. First, we identified relevant documents that reflected lessons learned or other insights into military joint, interagency, intergovernmental and multinational operations. Second, we conducted a series of interviews with subject matter experts (SMEs) whom we had identified as experienced in operations that required collaboration between the military and other organizations, as well as host nation officials and citizens. Third, we analyzed transcripts from those interviews to derive themes that expressed the high-level cognitive skills evident in the experiences. To represent our findings, we combined interview findings with insights gained from the documents we had reviewed to produce a table of themes and a model of how the themes interact.

Research Question

A theme captures an important aspect of the data in relation to the research question and displays the findings in a patterned manner across the data set (Braun, & Clarke, 2006). Our research question was what are the high-level cognitive skills that underlie successful performance in JIIM operations?

Participants and Documents

We recruited interview participants with experience in JIIM environments. Our goal was to compare multiple perspectives at tactical and operations levels. Participants in the military or associated with military organizations were volunteers. We provided monetary compensation for SMEs from other organizations. We interviewed a total of 16 military or military-related SMEs (one of which was not used for analysis); three African nationals, one affiliated with a non-government organization and two with a government health organization; and five SMEs with Department of State experience for a total of 23 interviews.

As for documents reviewed, we included a report that members of our project team had produced on lessons learned in JIIM operations as an earlier part of this effort (Agrait, & Loughran, 2007). This document reviewed lessons learned, previous interviews, workshop documentation, and relevant documents to synthesize the state of performance in JIIM settings in terms of players, processes, and environments. In addition, we identified several other documents that provided insights into performance that is contingent on collaborating with host nation government and civilians, other military services, and other agencies.

Specifically we reviewed seven documents:
1) The JIIM lessons learned document
2) Transcripts of three days of meetings of the HASE (Healthy Africa Scenarios Exercise) Workshop in Ghana, Africa held January 21-25, 2008
3) A briefing on the Joint, Interagency, Intergovernmental and Multinational Planner's Course from the *Joint Forces Staff College*
4) A report on cognitive challenges in operations other than war (Miller, et al., 2003)
5) A report that reviewed the cognitive challenges of working across military organizations (O'Dea, et al., 2006)
6) A report on the elements of cross-cultural competence required for military operations (Ross, 2008)
7) A draft report on modeling cross-cultural competence in the U.S. Army (McCloskey, Grandjean, & Ross, in publication)

Data Collection Procedure

We used a semi-structured interview protocol was used that was based on the Critical Decision Method (CDM) (Crandall, Klein, & Hoffman, 2006; Hoffman, Crandall, & Shadbolt, 1998). We captured digital recordings of all interviews, and all interviews were transcribed for analysis.

Analysis Plan

The guiding principle in our analysis was to find the elements of performance that are key aspects of successful planning and operations in JIIM environments. Key aspects were not determined by a simple prevalence count, i.e., how many times certain performance elements were mentioned, but by the emphasis placed on how the operations are accomplished or how they fail, i.e., expert strategies. Existing documents that had previously examined operations in terms of expertise or lessons learned helped us determine the emphasis to place on elements of performance.

Our approach was inductive, i.e., the themes identified emerged from the data gathered specifically for this

project or to reports that are based on data about relevant performance. In this approach, the themes may bear little relation to the actual questions asked in the interviews. We developed questions to help us indirectly assess the elements of expertise by gathering rich examples of performance, insights, and strategies that drove performance. One assumption of the research is that as expertise develops, people are not generally able to articulate the how and why of their cognitive performance. Therefore, the analysis uses the specifics of the data, but the data itself has been collected to expose the cognitive challenges and strategies inherent in situations without directly asking participants why they did things the way they did.

The inductive process does not try to fit the data into a pre-conceived framework, but creates the framework from the data. The process also provides a rich description of the cognitive challenges and strategies as opposed to a description of the procedures involved in planning and operations. Analysis requires interpretation of specific data to general themes. In general, we coded specifics into categories within each individual data item (interview or document) and then summarized across the data set.

The first step in the process was to read the data set to immerse the analysis team in the findings. The research question informs how reading proceeds. The analysis team made notes of interesting ideas in the data and documented those that we could possibly convert into coding categories. Review of the selected documents was interspersed with reviews of the interview transcripts. Two analysts experienced in thematic analysis for cognitive performance and experienced in the subject area conducted the first step. The outcome was a set of potential codes, viewed as preliminary themes, from each analyst and notes to connect each potential theme to the interviews and documents that had suggested the code. During this step, more researchers typically generate more codes than will be retained during the final analysis.

The second step was to generate initial codes. In this case, the codes are preliminary themes of expert high-level cognitive skills. The two analysts independently reviewed each other's codes and rationale for each and then discussed the overlap and wording for each code. The outcome of this step was an agreed upon set of codes that were to serve as preliminary themes.

The third step was to convert the preliminary themes into a representation to help the team understand the nature of each theme. We constructed a three-column table to present an initial name for each theme, a one-paragraph definition of the theme, and a list of the cognitive challenges associated with the theme.

The fourth step was to review the themes more exhaustively against the data set to identify areas needing refinement. In this step, the analysis team re-read the data set. A third analyst joined the team and the entire team reviewed each data item completely. Each item was coded according to the themes that had been developed, and an additional field was created for "other" themes or interesting elements that emerged during the complete review. The number of instances of a theme found in the data set, or prevalence, does not necessarily mean a theme is more crucial. Our inclusion of other documents in the data set allowed us to examine the nature of performance in JIIM environments in general across a wide range of data and previous analysis in order to make judgments about the criticality of any one aspect of performance and judge whether to retain inclusion of a theme in the representation.

The fifth step was to refine the names of each theme and the corresponding definitions and cognitive challenges for each. Our goal was to have a name for each theme that was easy to remember and to create definitions and explanations of cognitive challenges drawn from the data, i.e., using the words of the experienced interview participants or findings in previous documentation to the extent possible to define and explain the themes.

The sixth step was to create a model of expertise in JIIM planning and operations that reflected the high-level cognitive skills of experienced practitioners as opposed to a behavioral analysis, i.e., procedural representation. Our goal was to reflect the flow of performance and inter-relationship among the themes as shown in Figure 1.

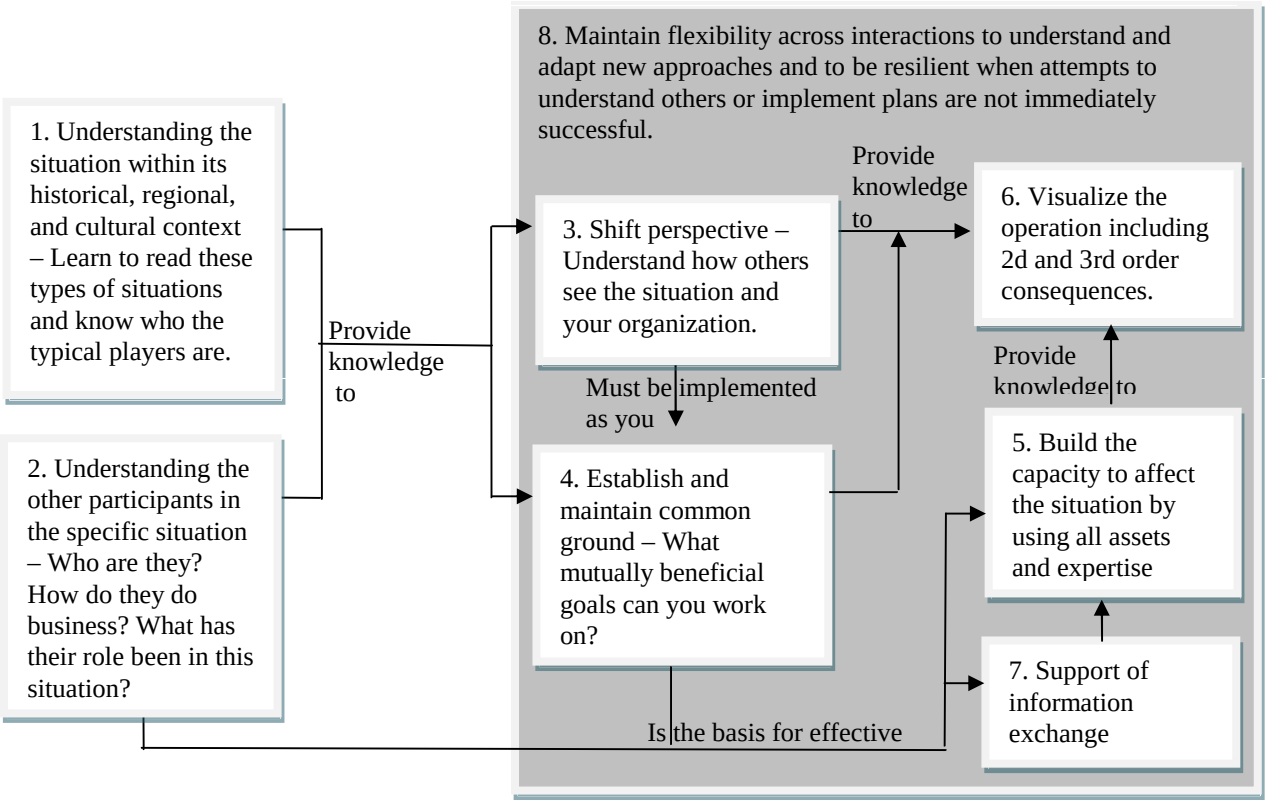

Figure 1: Model of High-Level Cognitive Skills Required for JIIM Operations

Results

We describe the eight resulting themes below in terms of a progression in complexity of performance from initial understanding of the situation to maintaining flexibility during operations.

1. *Understand the situation within its historical, regional, and cultural context* - Operations will take place in diverse settings requiring the individual to have a framework for entering and understanding widely diverse, new situations. Taking this mental model into the setting will be the factor that allows the individual to become more immediately effective. A clear framework for grasping a new area of operations and the events leading up to the current situation provides a stable basis for assessment and decision-making. Commonly, area briefings prior to deployment do not bring the situation to life or provide a good understanding of the dynamics involved, especially if the individual brings no framework for absorbing the information to the mission introduction.

2. *Understand the other participants* – The second framework that an individual should take into a JIIM environment is a basic understanding of who the various players are that typically work in that setting. Knowing the types of organizations and entities that can be involved will facilitate identification and understanding of the players currently involved. The individual should also understand how these organizations and groups typically function. There will be differences in how they do business such as differences in work pace and work hours; integration into the community; maintenance of clear cut roles and responsibilities versus diffuse roles; communication styles; metrics for progress; comfort with and availability of technology; authority structures; and whether they concentrate on tasks or relationships to do business. For example, one item of critical importance in any situation is to understand who has the decision-making power and what the process is for making decisions in the organizations and other groups with whom one must negotiate or collaborate. Our

forces often seem to disregard or discount the processes and goals of other organizations or groups, which negate our ability to collaborate, negotiate or leverage expertise.

3. *Shift perspective* – Once the individual has entered the situation, he or she can facilitate collaboration by using the ability to shift perspective in order to see the situation from another person's point of view. Shifting perspective allows one to understand, predict, and influence behavior and foster communication. This ability also includes the need to be aware of how you and your organization appear to other organizations and the host nation/region. One must understand others' rationale for decision-making, consider their intent, their priorities, patterns of living, and long-term goals. A wide range of our forces in the JIIM setting must more routinely apply this skill, which is typical of U.S. Army Civil Affairs or Special Forces.

4. *Establish and maintain common ground* – As a basis for collaboration and stability, our forces must establish mutual goals and interests. This is the basis for unity of effort in the JIIM situation where military unity of command does not apply. Building in the time necessary to find common ground, and actually discovering it becomes a significant challenge during operations. Just focusing on one's own organization fits many people's comfort zone. Self-regulation to maintain control and openness when dealing with others takes practice. The resulting relationships create the basis for establishing common goals and coordinated actions. The ability to shift perspectives is an ongoing requirement while working to establish common ground.

5. *Build capability to affect the situation* – Once an understanding of the situation and the players is beginning to develop, the staff or team can begin to build capabilities across organizations and other entities that will serve mutual goals. The basis for enhanced capability is to know and use all assets to address common goals much like in any other tactical situation. The difference is that assets in JIIM environment require sustained effort to identify and use. The diverse set of resources and expertise that may exist in your own organization and other participant organizations is often not explicit. They can go untapped if not deliberately sought out. Explore who has expertise around different issues or problems. Recognize the military can bring technical skill and disciplined decision-making to the situation. Use those strengths without "shutting out" others who have ownership in the situation. Recognize the military often does not have knowledge about what technologies and processes work best locally and these must be discovered.

6. *Visualize the operation* - Anticipate the need to transition to the next phase including the resources needed for different players. Only by understanding the other entities in a situation, including their strengths and interests, can an individual and team visualize an operation and potential consequences. Again, the tactical skill of visualizing an operation is relevant to the JIIM environment but is more complex and built on collaborators outside one's organization know, need and are in the process of doing.

7. *Support information exchange* - Different organizations have varying information needs, priorities, and sense of urgency for information sharing. One must understand that the methods and channels of communication differ across organizations such as method of presentation; who shares information; who has authority for information sharing; and how complete information must be to support decisions. Communication styles impact information exchange and can create a great deal of frustration and use up huge amounts of non-productive time when they are in conflict. Examples of differing communication styles are flexible versus standardized, embedded in relationships versus "all business" focus, limits on who shares information and how. Opportunities and limits to information exchange can vary and influence planning and execution. Seek to create access to information sharing rather than expecting others to conform to one's own organizational expectations.

8. *Maintain flexibility* – The most important aspect of success in JIIM environments is flexibility. When the U. S. military is in a situation where they are not in charge, such as in a JIIM setting, the tendency may be to attempt to become more controlling. One must recognize when an approach or stance in a situation is not working, and be willing to adapt it. The themes leading up to "maintain flexibility" are the basis for flexibility in the JIIM environment.

VALIDATION OF THEMES: STUDY 2

Method

Validation of the themes served to help us understand the eight themes reflect successful operation in a JIIM environment. The methods for this study consisted of two main parts, one quantitative and one qualitative. First, we developed a survey instrument consisting of 54 items from the previous interviews with JIIM SMEs in order to validate the eight themes discovered. The items are statements describing the skills that make up each theme with the answer choices displayed in a 5-point Likert scale ranging from "very important to mission success" to "very unimportant to mission success." In addition to the survey, we conducted two focus groups to solicit feedback about the themes from individuals that have actually had to employ such skills in JIIM environments. Feedback about the themes in the words of the SMEs added richness to the data from the survey information. We analyzed the survey data to determine whether the themes were valid to SMEs. In addition, we analyzed the focus group transcripts for the denial or affirmation of the validity of the themes.

Research Question
The purpose of the second study was to explore the eight themes that emerged from the previous interviews and to test the validity of the themes. Our main two research questions are "Are these themes valid in the JIIM environment?" and "Given these themes, what are some incidents in which these were crucial to mission success?" The intention of the aforementioned survey was to answer the first question pertaining to the validity of the themes and the objective of the focus group was to answer the second question.

Participants
Our goal was to test the validity of theme by working with a sample of people with many JIIM experiences and interactions. In order to achieve this goal, we recruited Civil Affairs Officers. We surveyed 18 reservist Civil Affairs Officers from the 350th Civil Affairs Command, at the Army Reserve Center in Pensacola, FL. The mean age of the sample was 47 years and the average number of years in service was 23. The sample consisted of three Colonels, eight Lieutenant Colonels, two Majors, three Sergeants First Class, one Master Sergeant, and one Staff Sergeant with 72% of the sample being Officers. Of those eighteen participants, six volunteered to participate in a focus group based on the extent of their Joint Task Force experience.

Data Collection Procedure
All participants signed informed consent forms, which we collected before the administration of the surveys, as well as the beginning of the focus groups. A semi-structured interview protocol was used for the focus groups which consisted of first describing the themes as stated in the results of Study 1 followed by probing questions to determine the importance of each theme and the relevance of the statements used to describe theme. We elicited critical incidents in which the themes were crucial in the success of the mission. We created digital recordings of both focus groups and both were transcribed for analysis.

Analysis Plan
The aforementioned research questions dictated the analysis in this study. The first question is whether the themes found are valid. In order to answer this question we analyzed the survey data using the following steps:

1. *We entered the data into the SPSS data-analysis software.*

2. *We cleaned and checked the data for any errors.* This purpose of this step was to check for any human-errors that might have occurred during data entry.

3. *We calculated the mean and standard deviation for each question.* We constructed a table listing the frequency of each answer choice, the mean, and the standard deviation of each question.

4. *We combined the individual questions into their thematic groups.* We designed each item to reflect an aspect of one theme. We assembled the items back into a group representing the theme they described in order to report on themes and not individual questions.

5. *The mean answer choice and standard deviation for each theme was calculated*. This indicated the consensus of the importance of each theme to mission success within a JIIM environment. We constructed a table displaying the percentage of participants that found the theme important based on the average response across relevant items for each theme.

For the qualitative portion of the analysis, the second research question guided the procedure. The research question was to identify examples of the different themes from the incidents reported by the SMEs. In order to identify these incidents we followed three steps:

1. *We read the themes to re-familiarize each researcher with the definitions.*
2. *We read the transcripts of the focus groups to familiarize the researchers with the data.*
3. *We analyzed each transcript for each theme, one at a time.* We coded each incidents and catalogued it under each theme relevant to the incident described.

Results

Survey Results

The participant answered each item with a number from one to six with one being "very important" and six being "very unimportant." A theme was "important" if the with mean of its items ranged from 1.1 to 2.1. The rate of importance for every theme ranged from 91-100% of the respondents giving it an answer of 2.1 or lower. Shifting Perspective was the lowest ranked theme, being important to 91% of the sample. Maintaining Flexibility was the most important theme—ranked as important by 100% of the sample. The percentage of participants that found each theme important is shown in Table 1 below. Although the sample size does not allow for generalization of the results to the U.S. Army population, the findings do indicate a trend in which these themes are applicable for JIIM performance from the point of view of SMEs who were very experienced in these settings at both tactical and operational levels.

Focus Group Results

We conducted thematic analysis on the Focus Group data to derive examples of each theme for later use in training. We did not code the themes for frequency in each focus group. Instead, we identified the situations based on emphasis given to a particular theme. This means that even though an example given addressed more than one theme, we identified the most pronounced theme related to the incident. We identified incidents in the focus groups that validated each of the eight themes as important in critical situations.

Table 1: Survey Validation of Themes

Theme	Related Item Numbers	Total Items	% of Participants Validating Themes
Understand the situation within its historical, regional, and cultural context	1-9	9	95.1%
Understand the other participants	10-16	7	96.8%
Shift perspective	17-24	8	91.0%
Establish and maintain common ground	25-31	7	99.2%
Build capacity to affect the situation	32-38	7	95.2%
Visualize the operation	39-44	6	94.4%
Support information exchange	45-49	5	91.1%
Maintain Flexibility	50-54	5	100%

DISCUSSION

Despite some successful applications of theme-based training in the Army to teach intermediate-level cognitive skills, there is little documentation of how to derive themes in new competency areas. Themes of expert thinking, such as the ones we have derived in this project, support the development of scenario-based learning designs. Such designs can accelerate the acquisition of knowledge and boost the learner's capacity to engage meaningfully in practice situations earlier than might be expected. Theme-based learning offers an opportunity to develop mental frameworks through practice on how to approach a situation as an expert. We, as a community, are not leveraging this avenue to accelerate expertise and adaptive performance in part because it is difficult to discover and organize themes in an area of competency due to the lack of guidance and examples. Our study provides an example of a process for developing themes.

We are currently using the themes we identified in this project to develop training for the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas. This training embeds practice in areas of each theme within a range of stability operation vignettes. The themes will support acceleration of performance by providing a framework for how to employ Stability Operations doctrine. The learner encounters information about Stability Operations—mission organization, procedures, and processes within the context of successful, expert strategies.

The themes provide a framework in the training to reinforce habits of thought that are consistent with expert performance to guide deliberate practice of these thought processes. In this way, the training accelerates progression toward expertise. (See, for example, Ericsson, 2008 and Lussier, 2008). For the CGSC course, a heterogeneous group of students will use the JIIM training. Our goal is to provide a collaborative framework for the intermediate and advanced student to allow them to practice the critical cognitive skills that create success. At the same time, we want to accelerate the acquisition of entry-level knowledge so that students new to these complex environments can quickly construct a framework of what is important for success. Too often training for entry-level knowledge is boring and decontextualized. These methods result in a lack of retention and a lack in the student's ability to generalize knowledge to new settings and to higher-level learning, essentially requiring the student to re-learn introductory information later in the education or training process. Our goal is to allow different levels of students to participate in and benefit from demanding class exercises following our computer-based tutorials based on a common framework for expert performance.

ACKNOWLEDGEMENTS

The authors would like to thank Partners International Foundation who organized the Health African Scenarios Exercise workshop and shared workshop data with us. We also want to thank the faculty at Joint Forces Staff College, members of the 91st Civil Affairs Battalion at Ft. Bragg, the 350th Civil Affairs Command, Pensacola, Florida, and others who shared their expertise and perspectives on Joint, Interagency, Intergovernmental, and Multinational stability and support operations. The Army Research Institute funded this research under a contract with Stottler Henke Associates, Inc., and it was conducted under the direction of Dr. Brooke Schaab.

REFERENCES

Agrait, R. & Loughran, J. J. (2007). *Lessons Learned from Joint, Interagency, International and Multinational (JIIM) Workshops and Papers*. Vienna VA: ThoughtLink, Inc.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101.

Cognition and Technology Group at Vanderbilt University (CTGV) (1990). Anchored instruction and its relationship to situated cognition. *Educational Researcher, 19*(6), 2-10.

Crandall, B., Klein, G., & Hoffman, R. R. (2006). *Working minds: A practitioner's guide to cognitive task analysis.* Cambridge, MA: The MIT Press.

Ericsson, K. A. (2008). *Accelerating Learning and Acquisition of Expert Professional Performance through Deliberate Practice.* Presentation at the DoD Accelerated Learning Technology Workshop. Held 22-23 July 2008, Alexandria, VA.

Hoffman, R. R., Crandall, B. W., & Shadbolt, N. R. (1998). Use of the critical decision method to elicit expert knowledge: A case study in cognitive task analysis methodology. *Human Factors, 40*(2), 254-276.

Lussier, J. W. (2008). *Adaptive Thinking Training for Army Captains*. Presentation at the DoD Accelerated Learning Technology Workshop. Held 22-23 July 2008, Alexandria, VA.

Lussier, J. W., Shadrick, S. B., & Prevou, M. I. (2003). *Think Like a Commander prototype: Instructor's guide to adaptive thinking*. (Research Product 2003-02). Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences.

McCloskey, M., Grandjean, A., & Ross, K. (in publication). *Assessing learning and development in Army cross-cultural competence*. (Phase 1 SBIR Report.) Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences.

Miller, T. E., Phillips, J. K., Battaglia, D. A., Wiggins, S. L., Baxter, H., Mills, J. A., & Ross, K. G. (2003). *Collaborative online training for operations other than war (OOTW)* (Final Technical Report for Contract #F33165-00-C-6003 Air Force Research Laboratory, Mesa, AZ). Fairborn, OH: Klein Associates Inc.

O'Dea, A., Ross, K.G., McHugh, A, Phillips, J.K., Throne, M.H., & McCloskey, M., & Mills, J.A (2006). *Global teams: Enhancing the performance of multinational staffs through collaborative online*

training (Research Report 1849, AD A469425). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences

Ross, K. G. (2008, May). *Toward an operational definition of cross-cultural competence from interview data*. Patrick AFB, FL: Defense Equal Opportunity Management Institute (DEOMI). http://www.deomi.org/CulturalReadiness/CulturalResearch.cfm#R

Ross, K. G., & Lussier J. W. (1999). A Training Solution for Adaptive Battlefield Performance. *Proceedings of the Interservice/Industry Training, Simulation & Education Conference (I/ITSEC)*, 1999. Orlando FL.

Shadrick, S. B., Schaefer, P. S., & Beaubien, J. (2007). *Development and content validation of crisis response training package Red Cape: Crisis Action Planning and Execution* (Research Report 1875). Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences.

Spiro, R. J., Feltovich, P. J., Jacobson, M. J., & Coulson, R. L. (1992a). Cognitive Flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains. In T. Duffy, & D. Jonassen (Eds.). *Constructivism and the Technology of Instruction: A Conversation* (pp.57-75). Hillsdale, NJ: Lawrence Erlbaum Associates.

Spiro, R. J., Feltovich, P. J., Coulson, R. L., Jacobson, M. J., Durgunoglu, A., Ravlne, S., & Jehng, J. (1992b). *Knowledge acquisition for application: Cognitive flexibility and transfer of training in ill-structured domains* (ARI Research Note 92-21). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences

Spiro, R. J., Coulson, R. L., Feltovich, P. J., & Anderson, D. K. (1988). Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domains. In *The Tenth Annual Conference of the Cognitive Science Society.* Hillsdale, NJ: Lawrence Erlbaum Associates.