

Interpersonal and Leadership Skills: Using Virtual Humans to Teach New Officers

**Julia C. Campbell, Matthew Jensen Hays,
Mark Core, Mike Birch, Matt Bosack**
University of Southern California –
Institute for Creative Technologies
Playa Vista, CA
{campbell,hays,core,mbirch,bosack}@ict.usc.edu

Richard E. Clark
University of Southern California –
Center for Cognitive Technology
Redondo Beach, CA
clark@usc.edu

ABSTRACT

Because Officers are charged with counseling and mentoring their subordinates, successful leaders in the United States Army must possess strong interpersonal skills (Headquarters, Department of the Army, 2006, 2008, 2011). Most Officers, however, develop their interpersonal skills on the job. Further, what formal training they receive consists primarily of live role-play sessions, which can fail to provide consistent practice, effective feedback, or accurate skill assessment and improvement. To address these issues, we have created a virtual-human-based role-playing environment. The Virtual Officer Leadership Trainer (VOLT) is a controlled practice environment that allows instructor management and facilitates throughput. Trainees learn interpersonal skills, see demonstrations of the skills being used correctly, and then practice the skills interacting with a virtual human via branching, scripted dialogue that allows the trainee to apply specific skills. The trainees in the classroom observe this interaction in real time. At each decision point in the interaction, trainees use personal response systems (“clickers”) to indicate what they believe to be the correct course of action. These data are available to an instructor who monitors the class’s performance and conducts an after-action review. VOLT thus allows an entire class to participate in a single role-play exercise, stimulating discussion, and facilitating peer and instructor evaluation in real time. VOLT’s instructional design is based on cognitive task analyses with expert leaders, which identified a set of learning objectives. This paper discusses VOLT’s educational goals, instructional design, technological approach, and program evaluation plan.

ABOUT THE AUTHORS

Dr. Julia C. Campbell is a Research Associate at the University of Southern California’s (USC) Institute for Creative Technologies (ICT). At USC, Julia earned an M.A. in communication and an Ed.D. in educational psychology. Her work focuses on cognitive task analysis and assessment of reaction and self-efficacy.

Dr. Matthew Jensen Hays is a Research Associate at the ICT. He earned a B.S. in psychology from Duke University and a Ph.D. in cognitive psychology from UCLA. He develops assessments and conducts basic and applied research on how training can be made as efficient and long-lasting as possible.

Dr. Mark Core is a Research Scientist at the ICT. He earned a Ph.D. in computer science from the University of Rochester. He specializes in the use of artificial intelligence in education.

Mike Birch is a Programmer Analyst at the ICT. He holds a California teaching credential and an M.S. in computer science from USC. His work centers on the use of artificial intelligence in education.

Matt Bosack is a Special Project Manager at the ICT. After an honorable medical discharge from the United States Air Force, he earned a B.A. in sociology from UCLA. Much of his work at the ICT has focused on the development and delivery of a battalion-level command trainer (UrbanSim).

Dr. Richard E. Clark is Director of USC’s Rossier School of Education Center for Cognitive Technology (CCT). His work focuses on the design and application of research on complex learning, performance motivation and the use of technology in instruction.

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A COMPLEX TRAINING PROBLEM

There are several paths to becoming an Officer in the United States Army. Some Soldiers enlist and advance through the ranks until they are commissioned. These Officers have years of experience dealing with subordinates' issues. However, the majority of Officers take other paths to commission. Most new Officers tend to be in their early or mid twenties—without the interpersonal experience that makes the aforementioned Officers such effective leaders (Hoffmann & Jones, 2005; Leslie & Van Velsor, 1996; Stevens and Campion, 1994). As a result, interpersonal skills training is critical for new Officers. Unfortunately, interpersonal skills training for new Officers mostly happens on the job (Hatfield, Steele, Riley, Keller-Glaze, & Fallesen, 2011; Varljen, 2003).

To address this training gap, we designed and developed a training platform that allows new Officers to learn and practice interpersonal skills before assuming their first assignment. Our first task was to examine the current status of interpersonal skills training in the Army. To get the most accurate information, we interviewed new and experienced Officers and asked them directly about their own interpersonal skills training and what they remembered from it. We were surprised to find that many received *no* formal interpersonal skills training whatsoever. Those who had formal training reported that most of what they learned came from their experience on the job—after they were already Officers.

The formal interpersonal skills training provided by the Army is limited (Hatfield et al., 2011; Varljen, 2003). Typically, this training involves role-play exercises with an untrained partner. For example, role-play exercises may be between two students, or a student and an instructor or assistant.

For three reasons, these exercises are likely much less effective than they could be. First, they lack structured feedback. Structured feedback is very important when using role-play exercises for training. Indeed, role-play

practice with video feedback was the best of several communication skills training techniques examined by Mills and Pace (1989). A recent review of 12 interpersonal skills training programs for physicians (Berkhof, van Rijssen, Schellart, Anema, & van der Beek, 2010) reached the same conclusion.

Second, role-play-based training suffers when there are no experienced role-players involved. Novice role-players incur a heavy cognitive load; they must assume a new identity *and* apply educationally valid intervention strategies in real time (Holsbrink-Engels, 2001).

Finally, live role-players also suffer from fatigue, illness, and their own real-world personal issues—all of which can cause the practice environment to vary from trainee to trainee. It is therefore difficult to ensure that the trainee is presented with opportunities to sufficiently practice each critical interpersonal skill.

ALTERNATIVE SOLUTIONS

Interpersonal skills training is critical to many disciplines, and so we looked outside of the military domain for a solution that addressed the drawbacks identified above. We found that the medical community uses *virtual humans* as role-players in several cutting edge training programs (Hubal, Fishbein, & Paschall, 2004). Virtual humans are an excellent solution because they can be designed to provide feedback (or can be supplemented with a system that delivers feedback). They can also quickly be updated with the most recent information available in a domain and can act as if they had experience in relevant interactions. They are also quite portable; they can often be used anywhere their software can be installed (although we used a life-sized virtual human to keep the trainees engaged, which encourages them to take the exercises seriously; Johnsen et al., 2005; Rajj et al., 2007). Virtual humans offer an additional advantage: the consequences of errors are minimal—whereas learning these skills on the job could cause

harm or death (Lok et al., 2006; Kenny et al., 2008; Parsons et al., 2009; Stevens et al., 2005).

Although current virtual human technology is not capable of completely replacing a real human, that capability is not necessary for these specific training applications. With the proper context, feedback, and instructional support, virtual humans can play a vital role in interpersonal skills training for the military. This approach was consistent with the Army's emphasis on training efforts that fuse best case practices in instructional design and cognitive psychology with prototype research efforts, especially efforts using virtual humans for training (Headquarters, Department of the Army, 2011). We therefore designed the VOLT experience to supplement virtual human role-play exercises with effective instructional support materials, vignette-based demonstrations, and instructor-facilitated practice with a virtual role-player, and advanced instructor support for an after-action review (AAR).

To maximize throughput, we elected to integrate this training experience into a 50-seat classroom. After context is provided via instructional support materials, many students observe as a single student engages in a partially-scripted interaction with a virtual subordinate. At decision points, the observing students use clickers to indicate their decisions (independent of the decision made by the student interacting with the virtual human role-player). Data from these clickers are rendered in an *instructor control panel* (ICP) that allows a human instructor to track their progress in real-time. The ICP also provides input to the instructor after the interaction to maximize the educational value of the AAR.

TRAINING CONTENT AND FRAMEWORK

Having established the overall design of the training experience, we turned our focus to the training content. Parts of Army Field Manual (FM) 6-22 provide step-by-step instruction (e.g., "explain the purpose of the counseling: what was expected, and how the subordinate failed to meet the standard"; Headquarters, Department of the Army, 2006). However, there are no examples of dialogue and there is no guidance on how someone might actually speak to a subordinate. We therefore supplemented FM 6-22 with information gathered from experts via a specialized interview technique: *cognitive task analysis* (CTA; described in the next section). We also organized this information into a framework that would standardize the teaching, practice, and assessment of interpersonal skills covered in the VOLT experience.

Cognitive Task Analysis

CTA is an interview technique for capturing expert decision-making and cognitive processes. The results of a CTA can be used to enhance training practices in a given domain (Schraagen, Chipman, & Shalin, 2000; Clark et al., 2008). For the VOLT instructional design, we combined two CTA techniques. One CTA technique we used is the *critical decision method* (CDM; Klein, Calderwood, & MacGregor, 1989). CDM organizes expert interviews to focus on goals, options, cues, context and situational awareness. The other CTA technique we used is called *concept, processes, and principles* (CPP; Clark et al., 2008). CPP provides a process for distilling expert declarative knowledge (what is it) and procedural knowledge (how to do it), as well as the associated conditions that govern when and how to employ that procedural knowledge.

We used these two CTA techniques with a relatively large group of experts: 10 Army Captains and three Army Majors. These experienced Officers came from various leadership backgrounds. We asked these leaders to tell us what they had learned from their on-the-job experiences with counseling subordinates. These experiences fell into two categories. One category comprised experiences in which subordinates exhibited a performance problem. The other category comprised experiences in which subordinates brought up a personal issue that they needed help dealing with. We asked our experts to tell us what happened in these situations, as well as alternative courses of action they could have taken and alternative outcomes that might have resulted.

Their input was enlightening. Three of the Captains said that new Officers tend to micromanage subordinates. All three Majors and one Captain emphasized how important it is to manage subordinates' perceptions of one as an Officer. Many of our experts stressed how important it was for new Officers to learn to successfully navigate their relationships with the senior Non-Commissioned Officers (NCOs). They described a careful balance between listening to and showing respect for the senior NCOs, but also having the confidence and assertiveness to make a stand when needed. A majority of the Officers said that it was important to listen to and get to know their subordinates personally.

We discovered that the leaders who described how they dealt with a subordinate's performance issue tended to implement the steps described in FM 6-22. They clearly communicated the performance issue in relation to the person's behavior (although some were more

tactful than others). They also explained to the subordinate how the performance problem negatively affected the team and the organization.

When asked about interpersonal-skills training they had received, *all* of the interviewees said that they learned how to interact with subordinates when addressing tough personal issues on the job. Two of the Majors interviewed said that only through experience did they learn to ask more questions to understand the underlying issues before suggesting a course of action. “They never train you how to come through when someone’s doing drugs or someone’s family member’s doing drugs and blowing all their money. But you’ve got to figure that stuff out on the job” (personal communication, July 2010). The situations that these leaders faced with little or no formal training included alcohol/substance abuse (including DUI arrests), suicide and mental health issues (including post-traumatic stress disorder), new Officers’ ignorance of professional boundaries, fraternization issues, relationship issues (e.g., domestic violence, infidelity, custody issues), and financial issues (e.g., bankruptcy, foreclosure, gambling problems).

I-CARE and LiSA

Based on the great deal of content available in FM 6-22 and information collected from our CTAs, we determined that a new Officer’s interpersonal skills are most important in two situations. First, when a subordinate has a performance problem, the Officer needs to be able to address the problem in a productive and effective way. Second, when a subordinate brings a personal problem to the Officer’s attention, the Officer needs to be able to respond appropriately and help the subordinate begin to resolve the issue. We distilled the CTA and FM 6-22 (Headquarters, Department of the Army, 2006, pp. B-1–B-2) into strategy sets for each of these situations.

When a subordinate is exhibiting a performance problem, the Officer should perform the following steps, which we refer to as *I-CARE*:

- Initiate communication by stating the performance issue
- Check for underlying causes
- Ask the right questions and verify information
- Respond with a course of action
- Evaluate by following-up

Each I-CARE skill includes sub skills. As an example, the first skill (“Initiate...”) includes the following sub-skills:

- State the performance issue (focusing on the problem behavior, and avoiding insulting the person)
- Ask for the subordinate’s side of the story
- Use active listening techniques (described below)
- Confirm that the subordinate is aware of the performance problem
- Describe the impact of the performance problem on the individual, team, and mission
- Describe the target behavior
- Confirm that the subordinate understands the Officer’s expectations of his/her performance

Active listening itself involves three steps, which we refer to as *LiSA*:

- Listen without interruption
- Summarize in a neutral style
- Ask for confirmation of your understanding

Active listening is critical to effective interpersonal interactions. It is important to use active listening when the speaker does not feel understood, is angry or frustrated, or is very emotional (Rogers & Farson, 1987). As a result, active listening is the first strategy Officers should use when a subordinate brings a personal problem to their attention. Of course, active listening is important to use throughout an interaction; FM 6-22 suggests that effective leaders listen more than they talk when counseling a subordinate. However, in emotionally charged situations, it is important to begin with LiSA, and then use CARE.

When and How to apply I-CARE and LiSA

Once we had established the strategies that identified what led to successful interpersonal interactions, we needed to establish when and how those strategies would be applied. That is, trainees needed to be able to:

- Recognize triggers for when and how to respond to a performance problem or respond when someone brings a problem to them
- Determine when to apply the appropriate strategies and skills during an interaction
- Demonstrate how to apply the strategies and skills in the correct order

For example, trainees needed to be able to recognize when someone was exhibiting a performance problem. They needed to be able to know that using I-CARE was the appropriate response. They also needed to be able to successfully perform each of the skills and sub-skills in I-CARE in the prescribed order.

These *learning objectives* (LOs) were the foundation for our development of the VOLT experience. Trainees needed to be able to learn what to do and when to do

it—and needed to have an opportunity to practice applying that understanding.

VOLT TRAINING EXPERIENCE

As described above, the VOLT training experience uses instructional support materials and demonstrations to provide context for interactions with a life-sized virtual human in an instructor-facilitated classroom setting. The LOs described above (I-CARE, LiSA, and when and how to apply them) are fundamental to the execution of each component of the training experience. These components are described below.

Instructional Support Materials

The first component of the VOLT experience is the instructional support materials that introduce the LOs. This activity was directly intended to provide context for the later virtual human interaction as effectively as possible. Here, again, we were able to use an interpersonal-skills-training resource from the medical community: the ComSkil Model.

The ComSkil model is an organizational framework for teaching and assessing interpersonal skills (Brown & Bylund, 2008). It is based on an analysis of over 40 training programs. This analysis concluded that strategies for effective interpersonal interaction need to be described in a concrete way, that skills that support those strategies need to be described in a concrete way, and that example dialogue needs to be used to link the skills and strategies (Cegala & Broz, 2002).

We adapted this model and used Clark et al.'s (2008) CPP framework to create the instructional support materials that trainees encounter in the VOLT experience. These materials include a "job aid," which acts as a quick-reference guide for when and how to implement I-CARE and LiSA skills. These materials also incorporate real-world events (described in the CTA) to create abbreviated case studies. Each of these case studies describes an incident in which an Officer had to deal with a subordinate's performance problem or personal issue. The I-CARE and LiSA skills are each presented in a table that describes the "trigger", or when to use the skill; defines the skill; provides a description of what to do when using the skill; and gives an example of how that skill is realized through spoken dialogue. An example of such a table is provided in Table 1.

Table 1. I-CARE Communication Skills Model

Trigger	Skill
You notice someone is having a performance issue.	Initiate communication by stating the performance problem.
Description	How to Say It
Focus on describing the problem behavior.	"Out of the past 12 taskings, we've missed 10 of them."

Trainees are introduced to the I-CARE Communication Skills Model in the VOLT student handout as a homework assignment that precedes any of the in-classroom VOLT activities. In the handout, the trainees read abbreviated case studies and review examples of how the Officers' statements translate into the I-CARE and LiSA skills. They then attempt to apply the I-CARE and LiSA skills to another case study by generating their own statements. Trainees are asked to be prepared to review their answers in class.

Training Vignettes/Skills Demonstration

We created animated training vignettes to support the homework review and provide step-by-step demonstrations for how to implement the I-CARE and LiSA skills correctly in a given context. The vignette activity may also help the instructor determine which trainees have mastered the skills and which trainees might need help during the class discussion of the vignette content.

The vignettes included both positive and negative examples of I-CARE and LiSA skill implementation. We included negative as well as positive examples because a meta-analysis showed that they combine to produce the greatest transfer of interpersonal skills (Taylor, Russ-Eft, & Chan, 2005).

Virtual Human Scenario Development

After the vignette demonstrations are complete, the interaction with the virtual human begins. This interaction is the vehicle that lets the trainees practice the I-CARE/LiSA skills. It was therefore critical that we create authentic scenarios and dialogue. We wanted to maximize the students' engagement as well as ensure that the VOLT experience was instructionally sound.

VOLT scenario development began with more interviews. We spoke to Army Officers who had served

as Platoon Leaders and Company Commanders, and had therefore already experienced what our target training audience would eventually encounter on the job. We also interviewed NCOs in order to get the perspective of the subordinate in this kind of interaction. This gave us a better understanding of the dynamics at play in the scenarios we intended to create.

Their input (as well as some CTA content) resulted in the development of several scenarios. We vetted these with other subject-matter experts (SMEs) and instructors. We then identified appropriate and inappropriate courses of actions in each situation. We used an industry-standard screenwriting program (Final Draft) to develop situation-specific dialogue. This dialogue was modified into linear scripts (i.e., back-and-forth conversations between an Officer and subordinate). These interactions could be successful (i.e., the Officer appropriately implemented the I-CARE/LiSA skills), mixed (i.e., the Officer sometimes implemented the correct I-CARE/LiSA skills in the correct order), or incorrect (i.e., the Officer demonstrated limited interpersonal skills). These linear scripts were then vetted by the SMEs and instructors for validity of tone and processes.

We used other software (Chat Mapper) to transform the vetted linear scripts into a branching narrative. Instead of a linear back-and-forth interaction, trainees have several options when deciding what to say to the virtual human. This intensive authoring process required significant attention to detail to maintain a consistent voice, tone, and emotion as the experience unfolds. As an example: If a trainee chooses to say something that upsets the virtual human, it is unlikely that they could then say something that would immediately make the virtual human ecstatic. Finalizing these narratives therefore required extensive and thorough testing, and much iteration.

One of the more challenging aspects of writing a branching narrative for VOLT was to associate each dialogue choice with a LO. At most decision points, trainees are offered a correct response, a mixed response, and an incorrect response (as described previously). To illustrate: In one scenario, the virtual human is a subordinate who has pushed one of his coworkers after a loud argument. In a meeting with the trainee (who has taken in the role of the supervising

Officer), the virtual human says “Sir, I don’t know why it’s *me* who’s in here.” The three responses available to the trainee are:

- “Okay, then, talk to me.”
- “It’s pretty simple. You pushed Thomas. Why?”
- “Don’t act like you don’t know anything’s wrong. YOU screwed up.”

Each choice needed to be distinct enough from the others so that specific LOs are relevant to each. With specific LOs associated with each choice, the system can track and assess the interaction. Our process was to tag each of the choices with skills from the I-CARE/LiSA framework. In this way, we can track which LOs are being practiced at each decision point in the interaction. (The technical details of this tracking system and the virtual human more broadly are detailed by Campbell et al., 2011).

Once the scenario had been written and the LOs had been associated with each choice, voice and movement instructions are integrated by artists and programmers. At this point, there began a final round of vetting with SMEs. It is only then that the scenario could be said to be complete.

Instructor Management

During Training

As described above, during the VOLT training experience, a single trainee performs the role-play exercise with the virtual human. During that interaction, the other trainees “play along,” using their clickers to indicate which option they would have chosen at each point. Meanwhile, the instructor utilizes the instructor control panel (ICP) to monitor real-time data about trainee performance. (The technical details of the ICP are detailed by Campbell et al., 2011).

As can be seen in Figure 1, the ICP presents the instructor with four windows: a video window, a narrative window, a chart window, and a control window. The *video window* (Figure 1, top left) has a split screen that shows the faces of the virtual human and trainee. During the practice session, the video window is mirrored on classroom monitors.

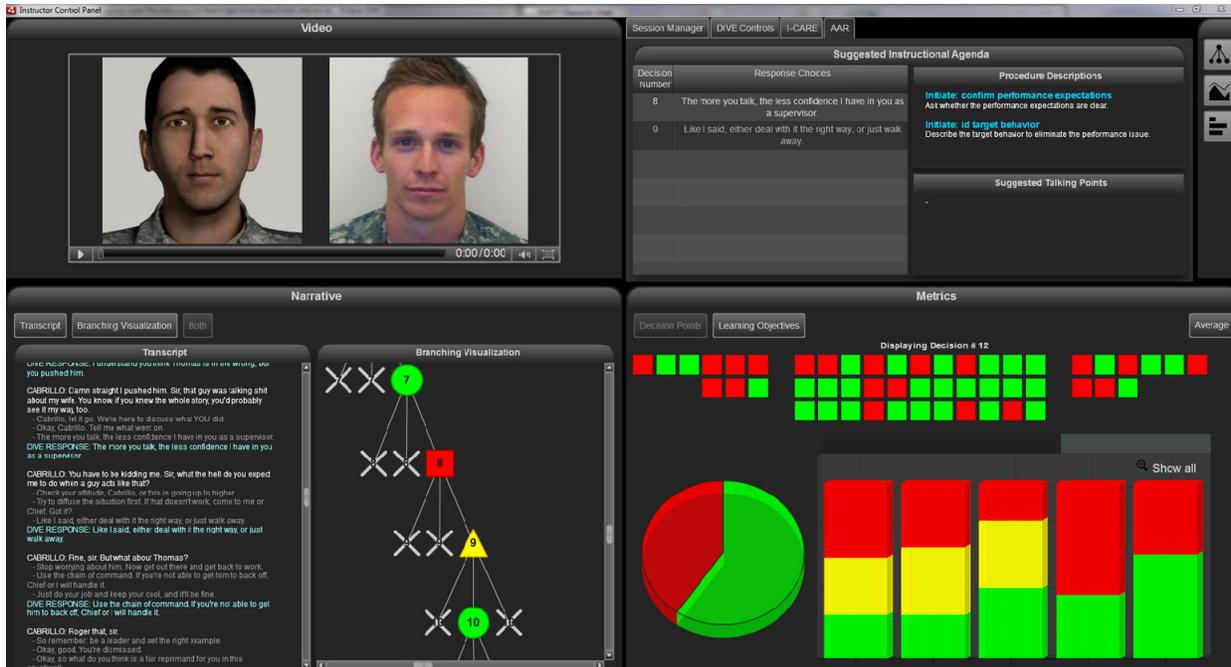


Figure 1. VOLT instructor control panel

The *narrative window* (Figure 1, bottom left) contains a transcript of the interaction between the role-playing trainee and the virtual human. It also displays a visual representation of the branching narrative. Each decision point is rendered in green (correct option chosen), yellow (mixed), or red (incorrect).

Whereas the narrative window displays information about the interaction between the role-players, the *chart window* (Figure 1, bottom right) displays information about the decisions made by the rest of the trainees in the classroom. This information can be displayed in several different ways, reflected by different sets of charts. For example, in Figure 1, the pie chart indicates that about a third of the students selected the incorrect response. The seating chart directly above the pie chart displays which students chose the correct and incorrect responses.

With the tap of an on-screen button, the instructor can choose to view aggregate performance over all of the past decision points (with better performance as more green, mediocre performance as more yellow, and poor performance as more red). With another tap, the instructor can view performance by individual I-CARE/LiSA skills. Together, these tools enable the instructor to diagnose with a single glance if there is a particular student who is having difficulty (or a group of students who may not be paying attention), if there is a common misconception in the group, or other circumstances that might necessitate intervention.

After-Action Review

When the interaction has ended, the AAR begins. The goal of an AAR is not to simply provide an explanation of what happened and how it happened in chronological order, but rather to encourage trainees to frame problem solving, performance, and assessment around an expert mental model (Smith-Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008). The *AAR window* (Figure 1, top right) therefore displays the relevant I-CARE/LiSA actions and decision steps, and a list of suggested topics for discussion informed by expert input from the CTA process. Thus, it can help the instructor interpret the large quantity of data available to consider and potentially use during the AAR.

The suggested topics in the AAR window correspond to the LOs for each decision point. They also serve to provide more information regarding why the LOs are important in that given context. Thus, the instructor can essentially see the intentions of the scenario developers in creating the different responses for the decision point. This insight may help the instructor generate better explanations for the class (The algorithm to generate these suggested topics is an area of active development, and data from the classroom will be needed to determine how best to narrow down the list of decisions made in the scenario to the most important. We currently prioritize decision points based on the correctness of decisions made by the learner interacting directly with the virtual human.)

Although the ICP contains and presents a great deal of information, it is designed to be easy to use. For example, clicking on a decision point in the AAR window will update the video window to the time of that decision point, and update the pie chart and seating chart to show data from that decision point. The same thing would happen if the instructor clicked on a decision point in the narrative window.

These design decisions served two purposes. First, they make it easy to provide video-based feedback about critical decision points. These replays are excellent reminders of the interaction and can stimulate discussion of the decisions and the non-verbal behaviors each role-player exhibited. As a result, the feedback delivered in the AAR can be substantially more powerful (Mills & Pace, 1989). Second, instructors can use the AAR window to navigate the interaction and reference the LOs without being overloaded. Alternatively, instructors can browse the data directly and show video, text, and charts as needed (most of the ICP content can be shown on the monitors in the classroom). Observing the system in use will help us determine how the individual windows are used and how people are reacting to the interface when browsing the full set of data.

VOLT PROGRAM EVALUATION PLAN

A critical component of any training system is the assessment process. Throughout VOLT development, we used formative assessments to provide information about the system. This information was then used to improve the trainees' experience and the training itself. Once VOLT has been deployed, we will conduct our summative assessments, which provide information about the consequences of the system for the trainees. Our summative assessments were developed before the system was completed so that we could avoid the potential criticism of "testing to the teach."

Formative Assessment

Our formative assessments were conducted months before the VOLT system was deployed. We used a test-bed that provides similar interpersonal skills training developed for new Naval Division Officers (The technical details of the Navy system are discussed by Campbell et al., 2011). We recruited Naval Reserve Officer Training Corps students from local universities, and they interacted with the virtual role-player as well as with a live role-player. We compared these interactions in three ways. First, during their interactions, we analyzed whether these participants tended to select better options with the live role-player

than with the virtual role-player. A tendency to favor live role-players would suggest that the participants were not taking the virtual role-play interaction seriously.

Second, we collected psychophysiological data from the trainees during each interaction. These data included heart rate, respiration rate and magnitude, eye-blink and gaze direction, and galvanic skin response (a measure of physiological arousal). These data serve as indicators of emotional responses. Any differences between interactions with the virtual role-player and the live role-player suggest points at which the virtual human experience can be made more authentic. Further, points at which there was decreased engagement or emotional involvement during both interactions may indicate where the options or script might be improved.

Finally, after each interaction, we provided the trainees with a survey designed to assess their reactions to the role-player (virtual or live). There were three main categories of items, all of which used a seven-point Likert scale. First, the trainees provided ratings of their engagement and how natural the interactions and their components (e.g., role-player body language) were. Second, they rated the intensity of their own emotional responses to various components of the role-player (e.g., vocal intonation). Third, they rated the intensity of their own emotional responses to emotions expressed by the role-player (e.g., irritation, relief). Any areas in which the virtual human received comparatively low ratings indicated ways in which the overall VOLT experience might be improved. We look forward to reporting results of this formative assessment effort in the near future.

Summative Assessment

Our summative assessments will be conducted during trainees' encounters with the VOLT experience. Whereas formative assessments were conducted only with trainees who participated in one-on-one interactions with the virtual human, summative assessments will be conducted with the VOLT trainees in the classroom, as well.

The summative assessment includes several types of questions. First, the trainees will respond to demographic questions (e.g., gender, ethnicity) and qualitative items that ask about their computer skills and prior leadership experiences. Next, the trainees will rate their confidence in their current ability to perform I-CARE-related duties (e.g., "remain neutral and supportive even when a Soldier I'm trying to help is angry or resisting"). They will also rate how important

they and their supervisors believe interpersonal skills to be. They will then rank the importance of skills relevant to their performance as an Officer (e.g., effective communication) as well as skills relevant to interpersonal problem solving (e.g., getting the Platoon Sergeant and other support personnel involved)—and explain why they provided those ranks. Next, the trainees will respond to several multiple-choice questions about VOLT course content.

Finally, they will complete a short situational judgment test (SJT). The SJT presents several scenarios. The trainees will rate how appropriate various responses are to each scenario. Their responses will be compared to those provided by SMEs, whose consensus was used as the gold standard for scoring. We will define learning as the extent to which trainees' agreement with experts increased from pretest to posttest. We look forward to reporting the results of this summative assessment effort in the near future.

LIMITATIONS AND EXPECTATIONS

We expect the results of our summative assessments to indicate that VOLT is an effective training prototype. Nevertheless, in its current state, there are system limitations that cause shortfalls in various areas. First, there is a throughput-realism trade-off. In order to enable a classroom of students to make decisions about which option to choose, the interaction had to be constrained to a few choices per decision. This enables us to track whether particular LOs are being practiced, but raises the concern that trainees will be less engaged than they might have been in a free-form conversation. Future research is needed to determine if reading the options and saying their choices aloud affects trainee engagement and learning gains.

Second, authoring new content is an extremely time-consuming and labor-intensive process. As described above, it involves working with multiple groups of experts—whose availability is often limited. It also involves generating several different types of art and animation. We are exploring automated solutions to help us streamline scenario development.

Third, although it provides a great deal of technologically advanced support, VOLT still requires effort on the part of an instructor who may have limited time and resources. Moreover, it is likely necessary for the instructor to subscribe to the I-CARE/LISA model of interpersonal skills training before facilitating the VOLT experience—or the training may suffer (e.g., as a result of limited AARs or dismissal of the automated decision evaluations). We intend to discuss the

framework with instructors before training, and believe that the framework has been validated to the point that instructors will be willing to adopt it.

We are working diligently to overcome these obstacles to the extent possible. Meanwhile, we have also established additional research plans. First, we intend to conduct rigorous user testing to further refine the interactions and the dialogue. We also would like to explore further the research that indicates that individual interpersonal skills translate into effective team leadership (Hoffmann & Jones, 2005; Leslie and Van Velsor, 1996; Stevens and Campion, 1994). Thus, we intend to develop and refine assessments so that we can examine whether VOLT produces gains in team as well as individual leadership ability. Throughout these efforts, we will use whatever we learn to improve VOLT—and, thus, the training new Officers receive—as much as possible.

CONCLUDING STATEMENT

The number of tasks today's Warfighters are expected to master continues to increase. Training—especially in complex or difficult domains (e.g., interpersonal skills)—is often unable to keep pace. By searching beyond existing military solutions, we were able to harness related work from the medical community. We also made a substantial effort to involve our SMEs as early as possible. In this way, we were able to use robust principles of cognitive psychology and instructional design to generate a rich training framework and elaborate content from an established pedagogical perspective. Coupled with advanced training technology, we believe that the VOLT experience will improve the day-to-day lives of new Officers—and their subordinates.

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