Disaster Emergency Medical Personnel System (DEMPS) selection of a virtual world platform to address human performance requirements

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ABSTRACT

Virtual Worlds are increasingly seen as tools for improving human performance. Virtual Worlds offer a rich, realistic environment similar to the "real world" with the advantage of providing training anytime, anywhere in many settings, to many users. With multiple providers of virtual worlds, each offering different capabilities, selecting the right platform can be a challenging task but one that is crucial for success. This paper shares the decision factors leading the Department of Veterans Affairs (VA)'s Veterans Health Administration's (VHA) Disaster Emergency Medical Personnel System (DEMPS) to select a virtual world platform to address human performance requirements.

DEMPS volunteers are deployed to care for Veterans during an emergency or disaster and provide interagency support under the National Response Framework. The DEMPS volunteer is a full-time VA employee at one of 153 VA Medical Centers located across the U.S., Puerto Rico, Guam, and Philippines. With over 8,600 geographically dispersed volunteers, providing education and training is a monumental task. Missions vary depending on the disaster type and location. Existing training focused on awareness and administrative functions. An annual live exercise provided the only opportunity for volunteers to be exposed to the tasks performed in an actual disaster.

Selection of the Virtual World was driven by an analysis of human performance requirements. Multiple approaches to gaining insights into the requirements included a review of current training, a gap analysis, media analysis, documented competencies and visioning. Recognizing the need for user acceptance, the team engaged stakeholders and will share insights on that aspect of human performance as well as the analysis used to determine key capabilities.

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INTRODUCTION

Virtual Worlds are increasingly being considered as a way to deliver training to improve human performance. Yet, the approach to deciding to enter the Virtual World is not well-documented. Once the decision is made to use a Virtual World as the optimal delivery method to meet the training requirements, there are few examples of the approaches and tools to support the evaluation and selection of a platform. This paper shares the approach used by the DEMPS Team to employ Virtual World technology for training along with the criteria developed to evaluate the various solutions available.

OVERVIEW OF THE DISASTER EMERGENCY MEDICAL PERSONNEL SYSTEM (DEMPS)

The DEMPS Program provides volunteers from a variety of occupations to deliver health care and render assistance in the event of a disaster. DEMPS maintains a database of over 8,600 volunteers from various occupations who can be rapidly deployed to provide assistance in a number of areas. These areas include health care delivery and related services with physicians, nurses, nurse practitioners, physician assistants, pharmacists, pharmacy technicians, mental health counselors, and allied health personnel. Non-clinical support can include transportation, food service, construction, safety, industrial hygiene and engineering, chaplains, personnel to aid in victim identification and forensic investigations, firefighters, engineers, contract specialists, maintenance workers, emergency management, and administrative staff.

The Department of Veterans Affairs (VA) Veterans Health Administration (VHA) may deploy volunteers to take care of Veterans during a disaster or may deploy to assist civilians via tasking from the Federal Emergency Management Agency or the Department of Health and Human Services once a Presidential Disaster Declaration is issued and the National Response Framework is activated. The DEMPS volunteers are called upon to function in a variety of health care delivery settings such as hospitals, out-patient clinics, mobile medical outreach operations, special needs shelters, emergency operations centers, and Federal Medical Stations which are pre-identified facilities for use in an emergency.

DEMPS volunteers were deployed in 2010 to provide assistance in Haiti; in 2009 DEMPS volunteers were deployed to the Red River floods and in 2008 were deployed to San Antonio, TX and Ruston, LA to assist those impacted by Hurricanes Ike and Gustav. In 2005, over 1,300 DEMPS volunteers were also part of the emergency response for Hurricane Katrina. To reduce the impact on ongoing VA operations, volunteers are deployed from multiple medical centers and facilities.

DEMPS volunteers are often required to function in austere and challenging environments. To provide some insight into the setting and situations volunteers experience while deployed, Dr. Anna Palma documented her story through "The Shelter Chronicles" which captures the environment she encountered as a DEMPS volunteer in support of disaster relief efforts following Hurricane Ike in San Antonio. Below is an excerpt:

> Our shelter only occupies a tiny portion of the warehouse. Armed VA police staff both entrances which is especially important following a rape (or attempted rape) at the FEMA shelter which occupies the rest of the

> warehouse. Our tour of the FEMA shelter today took us through what can only be described as a sea of dark blue cots bearing the FEMA logo – imagine 4,000 souls camping out on low unpadded cots set up on a concrete floor. It is like nothing I have ever seen before. Several of the new staff have already been moved to tears. The VA shelter itself was intended to be set up simply as a medical shelter – that is, custodial care, assisted living, etc. In fact, it has become a haven of last resort for all sorts of very sick people. There have been a good handful of very large immobile patients requiring bariatric beds. One lady took an overdose of something last night and was unresponsive this AM but the local ER has already sent her back without psych evaluation – oh yes and this man gets chest pain frequently…there is a quadriplegic man who drops his BP in the upright position (as such folks often do) and so needs his wheelchair just so, and a lady who had diarrhea but refused to bathe since no one had ever seen her naked (the angelic nurses gained her confidence and bathed her in the decon tent set up outside the shelter) — did I mention yet that the shelter, being a warehouse, has NO RUNNING WATER?!? As many as 50 patients have been admitted in one single shift, and the heaviest admissions seem to come at night. One day recently a shelter in Houston simply closed its doors and placed its guests on a bus – the folks didn't even know where they were headed! They arrived after midnight at the FMS… (VA NW Health Network, Fall, 2008)

DEMPS volunteers include those with no deployment experience as well as those who have been deployed before. As evidenced by Dr. Palma's chronicle, the conditions and settings vary. It is therefore important that the DEMPS volunteers be prepared for the range of situations and settings they may encounter while rendering assistance.

Human Performance Requirements

DEMPS consists of three phases: Pre-deployment which encompasses notification of volunteers and the preparation of the volunteers; Deployment which includes performing duties as part of a team in response to a disaster or emergency and post-deployment which entails returning home. Successful execution of each phase is essential to the success of the DEMPS mission.

The Veteran Health Administration's Emergency Management Strategic Healthcare Group (EMSHG) which includes the DEMPS Program launched an initiative to review their processes and procedures for selection, training and management of personnel to better prepare emergency personnel for pre-deployment, deployment and post-deployment activities. In 2009, EMSHG tasked The George Washington University (GWU) Institute for Crisis, Disaster and Risk Management to define and validate competencies for DEMPS including all three phases: pre-deployment, deployment, and post-deployment. The competencies are listed in Table 1 below.

Table 1. DEMPS Competencies

PD-P1: Maintain "personal readiness" for personnel deployment.
PD-P2: Maintain "family readiness" for personnel deployment.
PD-P3: Maintain "professional readiness" for personnel deployment.
PD-R1: Receive and respond to notification at all times when on call for deployment according to the home organization's protocols.
PD-R2: Accomplish required tasks in the deployment mobilization process within the designated timeframe.
PD-R3: Conduct all in-transit tasks to successfully travel to and from the home organization and the reporting-in site for the supported organization, or to travel between deployed locations.
PD-R4: Demonstrate completion of designated initial engagement activities upon arrival to the intermediate or supported organization's report-in location.
PD-R5: Effectively perform within the general incident operations of the supported organization.
PD-R6: Effectively perform the specific job assignment in the deployed location.
PD-R7: Follow safety, security and health maintenance guidelines during job activities and during billeting and other daily living activities during deployment.
PD-R8: Demonstrate completion of all personal demobilization activities designated by your home organization and by the supported organization.
PD-R9: Demonstrate completion of all recovery activities designated by your home organization.

These overarching competencies have sub-competencies, with knowledge, skills, and abilities identified for each. The DEMPS National Program Manager is using the competencies and sub-

competencies to expand and enhance the current training program.

DEMPS Training Overview

Until recently, there was limited training for DEMPS volunteers. In fact, the original DEMPS training consisted of a power point presentation created in 2007 entitled "What is DEMPS". This was a 15 minute knowledge-based presentation covering the administrative aspects of pre-deployment preparation delivered via the Internet.

The current DEMPS training includes FEMA's Incident Command System training and a variety of web-based courses delivered via the VA Learning Management System. They include the DEMPS Awareness Course (created in 2009); DEMPS Deployment Volunteer Course; Introduction to the Incident Command System; Center for Disease Control, Crisis and Emergency Risk Communication Training Course, Emergency Response, and VA Travel Card Training.

The DEMPS training also includes a major field exercise which is conducted yearly. The field exercise covered one of six scripted Health and Human Services (HHS) missions, and included pre-deployment, deployment and post-deployment procedures. However, only a fraction of the 8,600 registered DEMPS volunteers participated in the annual exercise.

Using the George Washington University developed competencies as a basis, the DEMPS National Program Manager convened several workshops with a cross-section of the DEMPS volunteers to review the competencies and to identify training to support achieving proficiency in the competencies. E-learning is being developed to address a number of the competencies. The DEMPS volunteers were also asked to recommend the media for each sub-competency. A team of instructional system designers reviewed and validated these media recommendations. While the knowledge can be addressed through e-learning, there were gaps in terms of being able to address all of the skills and abilities. These items were flagged for training via a virtual, simulated environment.

Why Consider A Virtual World?

Virtual Worlds provide a venue in which many learners in dispersed locations can acquire and practice both individual and team skills. One of the advantages they offer is the ability to practice in a realistic setting and to interact with others. Virtual worlds have been shown to: Instill confidence in students through simulations before moving to the real-world practice; to create a sense of community through regular events, meetings, and learning activities; to improve content learning through role-play, debate, jigsaw, and knowledge construction/transfer activities; and to engage learners in active collaboration through immersion and construction of objects (Aldrich, 2009). Additional benefits found in the literature include high student satisfaction, engagement (Franceschi, Lee, & Hinds, 2008), better knowledge retention (Aldrich, 2009), enhanced student performance and facilitation of knowledge building through collaboration, synthesis and the experience of participation (Carnavale, 2000; Ferguson & Wilson, 2001). In doing initial searching of successful applications of Virtual Worlds for training, the DEMPS Team identified the use of Second Life™ by the emergency management community including an application, Play2Train™, sponsored by the Office of the Assistant Secretary for Preparedness and Response, United States Department of Health and Human Services. Play2Train™ was developed in 2005 through the Idaho Bioterrorism Awareness and Preparedness Program. Play2Train™ provides emergency management training and is being used by many organizations including the Center for Disease Control & Prevention (CDC), universities and the VA San Diego Health Care System (VASDHS). Play2Train™ was recently recognized through the Defense GameTech Federal Virtual Worlds Challenge, receiving the 3rd place award in the government skill-building category.

The DEMPS Team made an initial visit to the VAMC San Diego to learn first-hand about their experiences in using a multi-user virtual environment (MUVE) for emergency preparedness training. San Diego is collaborating with the University of California, San Diego's School of Medicine and Department of Family and Preventive Medicine, Division of Global Health, the VA Long Beach Healthcare System, the California Institute for Telecommunications and Information Technology, and Play2Train™ at the Institute of Rural Health, Idaho State University to develop the VIPER (Virtual Immersive Platform for Education and Research) team to study and examine this medium for clinical and incident command training.

The initial pilot study included learning objectives for a virtual pandemic flu patient surge functional drill for emergency department triage nurses. It provides students with the opportunity to perform their regular duties (e.g. nurse) and their hospital Incident Command System (ICS) duties; provide accurate and

timely communications to patients, coworkers and administrators; demonstrate the ability to use triage methods; practice infection control practices and use of personal protective equipment; and demonstrate stress management approaches for emergency events.

The initial pilot study results include positive experiences from a training perspective such as the ability to manipulate the environment to inject additional events, the opportunity to practice situations that could not be replicated in real life due to danger (fire, smoke, chemicals) and cost (such as having live actors with flu symptoms). The MUVE allows easy manipulation of the environment and constructive learning to introduce additional challenges based on the proficiency of the learners. Moreover, actions and resources are tracked electronically, and the exercise is recorded and provided for playback via a machinima (video recording of a virtual world) to enable team debrief and assessment. Additionally, experts can observe and critique the performance by watching the exercise in world. New scenarios can be developed rapidly (Greci, et al., 2010).

From the learning perspective, the students reported an increase in disaster preparedness problem solving knowledge, better team planning, communication, and decision making and also liked the debriefing approach. The students also expressed a sense of immersion in the virtual world and how they reacted emotionally by feeling anxious when they saw a long line of Avatar patients awaiting treatment (Greci, et al., 2010).

There was an additional, unexpected result. During the virtual world exercise, the students developed a system for adding an extra flu designator for triage purposes. In a real life drill a few months later (also pandemic flu patient surge) they wanted to use the same door labels they devised in the Virtual World to identify patients in the same way (Greci, et al., 2010). This suggests that the virtual world allows for innovation and transfer to real world environments.

Based on the experience described and reported by the VASDHS Team, the DEMPS Team determined that a virtual world could address the training challenges and gaps for the DEMPS program and began to explore the different virtual world platforms available. The initial review of virtual world platforms indicated that multiple systems were available including proprietary and open source solutions. Moreover, different platforms were being selected and implemented across the Federal government for a variety of purposes including training.

The decision was made to develop criteria for identifying and evaluating the various options based on the needs of the DEMPS competencies and training requirements. The criteria would then be applied to evaluate network-based simulation platforms for use by DEMPS. The DEMPS Team also recognized the need to identify the stakeholders within the VA who could contribute to this introduction of a new training venue to the VA. VIPER was hosted and operated by the University of California under a research grant and therefore was outside of the VA Office of Information and Technology (OI&T) as well as the VA training organization, Employee Education Service (EES). It was felt that both organizational components would be integral to the successful use of virtual world technology for training by the VA.

DEVELOPING A PERFORMANCE BASED APPROACH AND CRITERIA

Forming the Team

The DEMPS Team conducted a stakeholder analysis to identify who in the VA should be invited to participate in the Virtual World evaluation and ultimate implementation. Through this analysis, the DEMPS Team added additional members from EES as well as new members from the VA Information Technology National Training & Education Office (VA NTEO) and the VA Office of Information and Technology (OI&T). The DEMPS team also invited participation from the new VA Simulation Learning Education and Research Network (SimLEARN) Center because of SimLEARN's interest in virtual worlds for healthcare education and training. Representatives from the VA San Diego VIPER study were also included as criteria advisors to draw on their research and training expertise.

Developing the Vision

The DEMPS Team had a visioning session in which they reviewed the DEMPS competencies, the current and planned training and the training gaps. Table 2 shows the visioning session results.

Table 2. Visioning Results

Integrated Learning	Connect skills and knowledge from multiple sources and experiences including e-learning. Levels of engagement based on KSAs.
Learning Domains	Activities will address the cognitive and affective domains.
Higher Order Thinking	Provide an environment for learners to understand, connect, categorize and manipulate the facts they are given. Allows them to seek new solutions to new problems without worrying about mistakes— turns mistakes into learning opportunities or an opportunity to devise a new approach.
Team Skills	Develop and practice team skills including leadership, decision making, communication, situation monitoring, mutual support and feedback.
Seamless Transition	An opportunity to seamlessly enter the virtual environment to gain practice on the skills and abilities of a competency.
Multiple Perspectives	Provide an opportunity to walk through each phase of a DEMPS deployment from the individual learner's role or perspective as well as the ability to experience it from a team perspective.
Mission Rehearsal	Enable mission rehearsal and preview for specific deployments in the setting with team members and organizations involved. This would leverage identified buildings of opportunity to be used in the event of a disaster.
Mission Exercises	Conduct mission exercises for training.
Lessons Learned	Offer scenarios based on actual missions drawing on the lessons learned as well as the ability to review experiences and scenes from actual deployments.
Assessment Methods	Use a variety of assessment methods including knowledge checks with individualized remediation, self assessment against checklist and compare to a replay of an expert's action, and expert assessment of performance.
Schedule Sessions	It will also include the ability to coordinate with other learners in different roles to practice team skills including the ability to schedule a learning session with other DEMPS volunteers.
Familiarization	The virtual environment will include a module on familiarization. This module will provide users with basic information concerning a virtual environment.

The team also identified the desire to have the virtual world serve as an integrated learning environment where learners could access training via e-learning, use social networking to connect with other DEMPS volunteers and to share lessons learned.

Using the results from the visioning session, the learning activities embedded in realistic and relevant competency data, the media analysis performed via the competency workshops, and training requirements and gaps, the DEMPS Team developed criteria to use in evaluating different platforms. The team also considered the insights shared by the VA San Diego VIPER Team including the desire to have

Avatars, objects, environment, visual and audio cues, and scenarios and contexts (situated learning). The authentic performance criteria is shown below in Table 3.

Table 3. Performance Criteria

Supports scenario based learning of competencies by allowing scripted events
Enables the learner to select specific regions of the virtual environment and easily move to that region to gain practice on the skills of a competency. For example, there may be a location that is dedicated to the home where the DEMPS learner can practice personal and family readiness
Provides synchronous classroom based learning opportunities
Supports e-learning opportunities either through access to content on posters and other interactive elements within the world or via a link to an external training application
Offers ways to engage the learner and facilitate teamwork, including offering games such as scavenger hunts
Provides the ability to explore equipment including the ability to operate equipment, lift and position containers, unpack boxes, etc.
Provides an engaging environment that draws the learner into the world so that they are immersed in the world and can "feel" the situation. The environment elicits emotions and enables the learner to express emotions through facial expressions, changes in voice, and gestures
Allows the learner to customize his or her Avatar or persona in the virtual environment
The environment offers the capability to replicate situations that allows the learner to assess the situation, analyze the situation, select and implement a course of action, and experience the outcome of their choices and decisions. It also offers an opportunity to explore alternative outcomes based on changing the choices made
Enables the individual learner to develop team skills including leadership, decision-making, communication situation assessment, monitoring, mutual support, and feedback via either interaction with Avatars that play different roles or via intelligent Avatars or a combination of both
Supports teams of learners to practice team skills by engaging in team-building exercises and by offering the ability to practice team functions in a mission setting
Supports the ability to walk through each phase of a DEMPS deployment through multiple roles, assuming the role of the DEMPS volunteer, the family member, team member, and patient
Enables mission rehearsal and preview for specific deployments in the setting with team members and organizations involved. This includes replicating buildings of opportunities that would be used in the event of a disaster and the ability to interact with representatives from other organizations
Supports conducting mission exercises with teams
Enables the delivery of scenarios based on actual DEMPS deployments
Enables the development of scenarios with trigger events that unfold based on the actions taken by the learner
Provides a review of experiences and scenes from actual deployments as well as lessons learned from experts
Offers knowledge checks with individualized remediation
Supports the learner self-assessment through the use of checklists
Allows the learner to compare his or her performance against an expert's
Supports expert assessment of learner performance by allowing the expert to locate and view multiple learners

and observe from perspectives including "birds eye view" as well as unobtrusively in world and visible presence
Design is intuitive
Supports navigation within the world
Can generate usage statistics (Identify triggers and record actions taken and outcomes both with scripting events and server side code)
After Action Review including the ability to record and replay events for debriefing
Voice chat (group and private telephone calls, use of radios)
Text chat (group and private)
Social Networking
Ability to invite schedule and monitor training events
Training is available for the developers
Vendor provides online support
Vendor provides on-phone support
Vendor provides on-site support
Terms of usage are not restrictive and allows user development of content

Applying the Criteria

Based on a review of platforms at conferences, through dialog with other users, and a review of the literature, nine vendors were invited to participate in an evaluation of their platforms. Seven vendors agreed to participate in the evaluation and demonstrated their platforms. The criteria were provided to them in advance of the evaluation and were used in the actual evaluation process. As a result of the evaluation, three platforms were selected for additional evaluation. This second evaluation allowed the DEMPS team to experience each of the three platforms first hand and to further explore the capabilities each platform offers in terms of addressing the DEMPS performance requirements.

VIRTUAL WORLD DEVELOPMENT AND IMPLEMENTATION PLANS

Final selection of the virtual world platform will occur during Fall, 2010. Upon implementation of the platform, the DEMPS virtual world will be designed and developed.

Instructional Design

Instructional Design (ID) is a critical process in the design of virtual worlds for training. A recent study (Fanning, 2008) warns that the biggest design flaw in the creation of virtual worlds for training would be to start with the creative idea instead of the audience. Further, those who avoid using ID in the creation of the virtual world were not able to produce measureable results of the learning outcomes. Those who create successful virtual environments that are usable and accessible by the intended users, did use an ID process that was intensive in identifying the audience, business goals and learning outcomes, instructional methods to achieve the learning outcomes, selection of delivery methods within the VR environment to mediate the instructional methods and packaged the VR environment to support participants with technical issues and establish a social presence in the early stages.

DEMPS focus on human performance requirements in the selection of the Virtual World platform will extend to the design and implementation by adopting the Kapp and O'Driscoll (2010) ADDIE Instructional Design model in creation of the DEMPS Virtual environment:

- Analysis: of the content, learners and technology, and problems that may occur. This includes analysis of four main areas: (1) Identify the tasks/concepts and skills to be taught and the learning outcomes expected, (2) the environment in which the learning should occur, (3) the technical considerations and (4) the learners. We will apply the results of the competency analysis, workshop

and lessons learned from San Diego pilots in defining the tasks/concepts and skills.

- Design: of performance objectives, instructional strategies, sequence, interactions and methods of instruction. This will include but not be limited to decisions about strategies such as: synchronous/ asynchronous, use of facilitators, self-navigation/discovery, collaboration with other learners, role playing, scavenger hunts, and debriefing, etc. Sequencing must consider the order of the events/strategies and activities the learners engage in. The environment will include the terrain and learning spaces to be used and the objects to be manipulated. We are expecting to design performance objectives and select strategies that will provide individual and team cognitive learning and a constructivist experience as well as strategies to provide attitudinal performance.

- Storyboard: Since virtual worlds are complex, we plan to first design storyboards for the scenarios/ strategies because it is easier and less expensive to alter a storyboard than the full Virtual World.

- Development: Creation of the 3D structures, spaces, buildings, objects, Avatars and scripts. Some of this may be purchased or obtained for no charge. Create guidelines for facilitators.

Strategy Selection/Application of Lessons Learned

The selection of instructional strategies will support the cognitive and affective domains of learning. It is expected that Constructivism as a learning theory within the cognitive domain (also known as Discovery based learning) will be supported. Constructivism has been shown to be most effective when learners receive guidance in the form of coaching and hints. Absent proper guidance and feedback, discovery based learning can be ineffective and learners may learn incorrect concepts (Hammer, 1997).

Learners often do a poor job of dealing with large amounts of anomalous data that appear in simulation (Chinn & Brewer, 1993; Chambers, et al., 1994).
Once learners have a hypothesis, they may engage in a phenomenon called confirmation bias where they look to support rather than refute their working hypothesis (Laughlin, Roper and Howell, 2010).

In learning environments, collaboration directly contributes to the success of group work (Bagley & Chou, 2007; Cuseo, 1992). Virtual world collaboration adds a high sense of presence for group interaction. Collaboration and team work will be a strong component of the DEMPS virtual world.

The DEMPS project expects to utilize constructivist and collaborative strategies. In addition, lessons learned (see Table 4 on the next page) from the University of California San Diego and the VAMC San Diego pilot will be important to consider during the design, development and implementation phases.

Table 4. Lessons Learned from University of California San Diego/VA San Diego Healthcare System

- Training through a web 1.0 methodology can be reinforced in a VR environment
- Learners get lost in virtual space due to cognitive overload
- The learning process is interrupted by navigation concerns and in mastering the interface
- Important to complete the individualized learning piece in the virtual world first, then team
- VR promotes team communication
- VR encouraged team decision making
- VR promotes planning, especially in a new environment
- VR allows virtual debriefing that can be replayed and reviewed easily
- Learners must be provided with the opportunity to explore multiple perspectives as one activity is not enough
- Recommend range of roles – trying on different roles and learn about the diversity of strengths within a group (nurse, doctor, pharmacist, electrician, etc.) so they can see other roles and its effect on my role
- Have a facilitator who helps learners in the environment with content and technical issues
- An observer to watch people who are stressed and not participating – whisper in their ear to get them moving
- An obstacle course as orientation to the world: basic moving and talking but no need to show and use ALL the features; use teams with a time limit to go through the orientation - 2 or 3 per team as 4 is too many. A scavenger hunt reinforces new VR skills and places the skills in context. Team building exercise is a good ice breaker for students who did initial training at different times
- Classroom lectures need to be quick
- Arrows on ground are effective to show the way
- Quizzes that take you out of VR can be disconnecting
- Disequilibrium is a valuable challenge that creates a sense of instability that allows new learning to take place
- Encourage everyone to move out of their comfort zone
- Design principles that we have found to be important: Authenticity of Avatars, objects, environment, visual and audio cues, scenarios AND learning activities must be authentic activities embedded in realistic and relevant contexts (situated learning), input devices, menus customized to user preference and cheat sheets
- Graduated approach from simple orientation to simple synchronous to individual drills to complex drills

SUMMARY AND CONCLUSIONS

Based on the literature, as well as the San Diego VIPER Team experiences, and evaluations, it is clear that a network-based simulation will meet the DEMPS performance requirements. In particular, we see the multi-user virtual environment (MUVE) technology as offering an environment in which learners can acquire, practice, and demonstrate their knowledge, skills, and abilities. It offers an environment for experiencing and learning how to manage stress. Additionally, as shown from the VIPER project, the virtual world technology offers an opportunity to innovate and to apply these innovations in real life. We believe that the insights into how this technology can offer a solution to meeting performance requirements for a distributed set of learners will be valuable to others.

DISCLAIMER

This work was conducted and prepared for publication while working as employees of the U.S. Federal Government in the Department of Veterans Affairs. The views expressed in this article do not necessarily represent those of the Department of Veterans Affairs or of the United States Government.

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