Serious Games for Psychological Health Education

Anya Andrews

Instructional Systems Architect, Senior Research Scientist
Institute for Simulation and Training, University of Central Florida
3100 Technology Parkway, Orlando FL, 32826
aandrews@ist.ucf.edu

Abstract. This paper presents a summary of recent research efforts aiming to address modern psychological health education needs through the use of innovative instructional tools. The current body of research on virtual learning environments and serious games as they relate to psychological treatment shows promising results, especially in the case of the instructional interventions that provide an optimal blend of education and training and focus on the psychological health knowledge acquisition as well as appropriate stress management skills and behaviors. In concert with the theoretical and research foundations within the psychological health domain and pedagogical precepts in the area of simulation and game-based learning, this article also presents design considerations for serious games for psychological health.

Keywords: Serious Games, Psychological Health Education, Mental Health, Virtual Learning Environments.

1 Research Overview

The fundamental goal of the Research and Development (R&D) effort highlighted in this paper was to conceptualize innovative solutions to educate service members about the military Psychological Health (PH) process and equip them with the skills necessary to ensure their psychological well-being at every stage of the military deployment cycle. The research and analysis activities conducted during this effort were aimed to inform the design of an interactive instructional system for psychological health education. The key areas under investigation included the psychological issues commonly encountered within military environments, the coping strategies that can be employed by service members to mitigate those issues, available care options within the military PH process, and associated barriers to care.

During the course of the research effort, an extensive review of academic and military publications was performed to identify and analyze the theoretical foundations and empirical evidence for explaining the relationship between PH factors, available care options, coping strategies, and stress management skills relevant to military environments. Qualitative meta-analysis techniques were used to analyze and confirm/resolve apparent consensus and contradictions within the research findings by exploring the relations between study characteristics and findings. A rich knowledge base of first-hand perspectives from military personnel and their families was assembled from interactive interviews with military experts, their family members as well as support group websites,

R. Shumaker (Ed.): Virtual and Mixed Reality, Part II, HCII 2011, LNCS 6774, pp. 3–10, 2011.

social networking sites, and blogosphere. This information correlated with the existing body of research and provided a collection of storyline vignettes to be leveraged for the design and development of the PH instructional interventions to be delivered to the learners through the use of serious games.

2 Pedagogical Foundations for Military Psychological Health Education

The research links the absence of effective mental health training and education programs to the lack of critical coping skills that could safeguard "at risk" populations against potential psychological health issues. Focused on providing relevant skills, such as recognizing the signs and symptoms of stress, identifying sources of stress, applying relevant coping strategies, and seeking professional help and/or social support, these programs can help prevent psychological disturbances resulting from traumatic stress events, minimize the severity of existing mental health disorders, and ultimately protect the psychological well-being of our troops and their families. It is interesting to note that most of the existing research focuses on mitigating clinical conditions, such as PTSD for the post-deployment service members.

Resilience is frequently identified as an important competency for prevention of PTSD. The Battlemind program does offer pre-deployment resilience training, although it does not specifically address mental health issues and prevention strategies. While there are a few resilience programs that address some of the mental health issues for combat readiness; there is currently no system-wide military resilience training strategy to mentally prepare service members for the stresses of combat [1]. During the meta-analysis, the research team determined that most of the available resilience training resources were not necessarily affiliated with military organizations. It is also unknown what percentage of service members are aware of such programs.

Although the current research appears to be limited in terms of assessing the power of prevention, there is an obvious consensus about the importance of awareness-oriented interventions that can be introduced at the pre-deployment phase, thereby, giving service members the tools to help mitigate potential psychological challenges. Research focused on the specific mental health needs of various "at risk" populations, barriers to accessing care, and the efficacy of existing prevention and intervention programs is critical to making mental health care more relevant, available, and effective. In the training programs, specific emphasis must be placed on the development of the high-impact skills, such as resilience, self-regulation, problem identification, self-reflection, strategy formation, self-adaptation, and others.

3 Prevention as a Pedagogical Construct

The power of prevention versus treatment has been extensively recognized in general psychology literature, however, military psychology tends to be largely focused on the after-effects of traumatic combat experiences, with relatively low emphasis on prevention. This tendency can easily be associated with the lack of awareness among

service members about the military stress prevention programs in general. While military psychology research does acknowledge prevention in the form of *pre*-deployment preparation and training, there are mixed opinions about whether more serious conditions, such as PTSD, can be prevented.

Although the value of prevention has been recognized by research and there is an obvious trend towards addressing the psychological needs of military personnel starting at the pre-deployment stage, the system-wide focus is still largely placed on dealing with post-deployment after effects. At the same time, in response to the frightening suicide rates among military personnel resulting from long deployments, continuous separations from family, and the perceived stigma associated with seeking PH help, numerous military organizations initiated a series of training and education efforts for military suicide prevention and stigma-related issues.

What is prevention? Feldner, Monson, & Friedman [2] emphasized that prevention exclusively focuses on reducing the *incidence* (rather than prevalence) of a disorder. Thus, three categories of prevention approaches have been distinguished:

- A *universal intervention* is applied to all members of the population, regardless of their risk for developing a disorder.
- A *selective intervention* targets only persons at risk for developing, but showing no signs of, a disorder.
- An *indicated intervention* is aimed at individuals demonstrating aspects of a disorder but who are sub-syndromal.

According to Cannon-Bowers & Bowers [3], prevention training for populations with a potentially high risk of PTSD will significantly help minimize risk, minimize cost, minimize impact on healthcare system, and overall improve the quality of life. Widely described in literature and empirically evaluated, Cognitive Behavioral Therapy (CBT) is an effective method used for treatment and prevention of mental health disorders. Feldner et al [2] report promising results from a series of studies using CBT in comparison to repeated assessment, delayed assessment, and supportive counseling, collectively resulting in significantly PTSD rates. In the quest to find novel approaches to facilitate prevention of mental health disorders, Stetz et al [4] conducted a series of experiments using Virtual Reality Stress Inoculation Training (VR-SIT) and Coping Training (CT) via relaxation behavior techniques and found evidence of the 'hardening' effect against combat stress." [4]. While this study blazes a trail for the use of virtual environments for stress prevention interventions, the absence of long-term data for the participants' ability to cope with their traumatic exposure requires further investigation and validation of the effectiveness of these two treatment techniques for prevention purposes.

4 Virtual Learning Environments and Serious Games for as Psychological Health Education Tools

The current body of research surrounding virtual learning environments and serious games as they relate to psychological treatment shows promising results, especially in the case of the training interventions that provide an optimal blend of education and training and focus on the PH knowledge acquisition as well as stress management

skills and behaviors. The notion of Serious Games (SG) refers to the use of state-of-the-art gaming technologies for developing adaptive instructional solutions. According to the Serious Games Forum (2008), "*a serious game may be a simulation which has the look and feel of a game, but corresponds to non-game events or processes, including business operations and military operations*." An Immersive Learning Simulation (ILS), also known as a Serious Game, is "*an optimized blend of simulation, game element, and pedagogy that leads to the learner being motivated by, and immersed into, the purpose and goals of a learning interaction"* [5].

Serious games use meaningful contextualization, and optimized experience, to successfully integrate the engagement of well-designed games with serious learning goals [6]. Gaming environments offer exceptional potential for teaching cognitive and behavioral skills by providing opportunities for simulating the real-life situations and conditions, under which the development of these skills occurs. Games motivate learners to take responsibility for their own learning, which leads to intrinsic motivation contained by the game-based learning method itself. While engaged in a serious game, the learners tend to retain a significant amount of information by building cognitive maps. This process fosters adaptive decision making, a critical competency of modern military personnel.

4.1 Virtual Reality Exposure Training (VRET)

Virtual Reality Exposure Training (VRET) is a growing treatment protocol for specific anxieties, phobias, panic disorders, and PTSD [7]. The theory behind exposure-based training maintains that repeated exposure to fearful situations within a safe and controlled environment provides unique opportunities for the user to rehearse a different emotional reaction. Successful rehearsals activate new brain patterns in response to the emotional situation. Ultimately, repeated successful exposure may enhance emotional regulation in live situations.

In practice, exposure training is typically a therapeutic intervention administered in the presence of a clinician verbally guiding the person with a psychological disorder to imagine, narrate, and emotionally process the traumatic event. Although this type of imagined exposure training has been proven effective for PTSD, there is an inherent challenge with this visualization method, because one of the cardinal indicators of PTSD is avoidance of the feared stimuli. Many patients are unable or unwilling to visualize the feared content in their imaginations [8]. VRET provides a way to circumvent this avoidance tendency by immersing the user into a computer-generated environment that systematically exposes him to the fear stimuli. Using this methodology, the University of Southern California, Institute for Creative Technologies (ICT) developed a VRET system for combat-related PTSD. *Virtual Iraq* and *Virtual Afghanistan* provide relevant contexts for exposure therapy, such as a middle-eastern themed city and desert road environments. In addition to visual stimuli, the program can deliver directional 3D audio, olfactory, and tactile stimuli. A separate interface allows a clinician to control the situation in real time and customize the scenario to meet the needs of a specific patient. The initial clinical trial outcomes of this approach appear to be encouraging.

4.2 Second Life as a Healing Space for Veterans

Another notable example of virtual environment to help soldiers reintegrate into civilian life revolves around an exclusive space for veterans within the online virtual world, Second Life®. This social networking outlet provides a safe place for soldiers to find camaraderie, become aware of different treatments options, and seek the help that they need. This virtual world environment serves as a healing space for veterans upon re-entry [9]. As mentioned earlier, numerous barriers may prevent veterans from seeking mental healthcare upon their return from war. Many soldiers are geographically dispersed and find it difficult to create a local community of returning veterans. The leading-edge virtual immersive therapies are not widespread and are not available to most soldiers. Using the online social site such as Second Life® circumvents these issues by providing a place where veterans can interact anonymously within the site from the privacy of their own homes. This social space provides a network for veterans to find companionship with other soldiers who have recently returned from war. The site also provides opportunities for veterans to practice a number of Complementary and Alternative Medicine (CAM)-based exercises, such as relaxation techniques, cognitive behavioral therapy, and self-reflection. A resources area provides access to websites and information on which traditional therapies a person might find beneficial. Virtual human agents are available within the site to provide guidance and resource information.

4.3 "Walk in My Shoes" – A Serious Game for Psychological Health

Within the context of the described effort, the research team designed a serious game called "Walk in My Shoes", which is intended for a diverse learner audience, ranging from military personnel at different stages of deployment cycle (pre-deployment, deployment/in-theatre, and post-deployment) to veteran and civilian populations whose psychological well-being may be affected by the stress-inducing challenges of the military life. As a result of a series of analyses, the research team determined that the serious game approach driven by the guided exploratory learning strategy would represent an optimal way to foster PH knowledge and skill acquisition in an engaging self-reinforcing environment. The game is designed to introduce the learner to the common psychological health challenges faced by military personnel today. The user will explore different coping strategies and help options available at different stages of the military deployment cycle. Focused on the military PH process intends not only to raise the learner awareness regarding the PH-related issues and available options, but also help develop stress prevention, recognition, and management skills.

The instructional strategy of the serious game "Walk in My Shoes" is based on the narrative-centric guided exploratory approach and the best practices of digital storytelling. Due to the motivational power of narrative, digital storytelling can be both engaging and effective especially in discovery learning that lends itself to the learners' active exploration of the subject matter. In contrast to didactic pedagogies based on memorization of facts, discovery learning encourages students to learn by posing questions and answering them through analysis, reflection, or problem-solving activities. Narrative-centered learning environments offer significant potential for supporting guided exploratory learning. By taking advantage of the inherent structure

of narrative, narrative-centered environments provide learners with engaging worlds in which they actively participate in motivating story-based problem-solving activities. Using digital storytelling techniques, meaningful scenarios encapsulated within a storyline-driven mini-virtual world will illustrate a full range of psychological issue cases commonly encountered in military environments.

As a narrative-centered serious game, "Walk in My Shoes" takes the learners on a guided exploratory journey within a purposefully constructed virtual mini-world where the learners can face the psychological health challenges common within military environment and practice a variety of coping strategies as they "walk in the shoes" of the key game characters. The learner enters the game through a virtual living room and "meets" the key game characters via a Photo Album located on the coffee table. The photographs in the album depict individual characters facing different sets of challenges and issues typical for a particular stage of the deployment cycle. The learner will have an opportunity to "walk in the shoes" of each character and experience a variety of psychological challenges as well as explore appropriate or less appropriate coping strategies and help options. A virtual mentor, Dr. Livewell is a trained military psychologist who provides valuable tips and advice along the way.

The prototype development effort was primarily focused on the pre-deployment stage and included the learning activities designed to address the challenges of pre-deployment preparations. Thus, the virtual mini-world included a number of environments (e.g. legal aid office, bank, parents' house, friend's house, Family Readiness Group meeting building, park area, bar, and others), offering the opportunities to engage in meaningful interactions with other characters who would provide the learner with a wealth of pre-deployment-related information presented using engaging digital storytelling techniques. During the "journey", the learner receives information from a variety of channels including legal/financial professionals, family, friends, support group members, etc. The auxiliary game characters will play a crucial role in raising the learner's awareness about things that need to be done to gain the "peace of mind" at the pre-deployment stage.

In addition to raising the learner's awareness, the game also provides opportunities for the learner to engage in decision-making activities and cognitive exercises. Along with collecting useful tips and advice from the strategic characters, the game offers the means to reflect upon one's thoughts and feelings and practice applying a number of coping strategies (e.g. identifying one's own psychological vulnerabilities, cognitive restructuring/reframing, thought distortion removal, setting expectations, etc.) to deal with the psychological burden of the pre-deployment stage. A variety of cognitive exercises for practicing the coping strategies are woven into the storyline in the form of a fictitious Mood Log and a number of mini-games associated with the events unfolding within individual environments of the virtual mini-world.

4.4 Games for Psychological Health: Key Design Recommendations

The results of the described effort are both theoretical and practical in nature. The research and development outcomes contribute to the following major bodies of research: psychological health, military health education, and game-based learning. In concert with theoretical underpinnings for game-based instruction and the author's experience with serious games for mental health, the following design recommendations are offered to educators and developers of future serious games:

1. A pedagogically sound serious game concept
2. A solid construct of explicit and implicit learning events that are directly linked to instructional objectives.
3. Purposeful use of gaming technologies to ensure appropriate levels of realism and immersion in relation to the learning content.
4. A robust storyline that is contextually rich and engaging.
5. The so-called "fun factor" which represents an appropriate blend of learner engagement, competition, humor, and entertainment elements.

In addition to these design considerations, when crafting serious games for mental health, it is important to remember the "*Primum non nocere*" principle, also known as "*Do no harm*" and exercise a proper degree of scientific caution.

5 Conclusions

During the course of this effort, the research team uncovered a number of research gaps and practice-related inconsistencies within the field of psychological health education. While they do not necessarily pose a significant threat for the design and development of novel training solutions, it is important to monitor the trends surrounding these issues and structure the future efforts to address the existing set of challenges. Novel psychological health education tools are critically needed to mitigate the increasing psychological healthcare needs of military and civilian populations. While the cited training examples can certainly be considered a step in the right direction, a variety of PH instructional programs are needed for today's military community. To ensure the effectiveness of the new programs, it is important to leverage the theoretical foundations in the area of deployment psychology, emotional intelligence, and stress resilience, specifically with the emphasis on decision making.

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