Developing Objective Metrics for Training Transfer Through the Use of Virtual Environments

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Overview of Training Programs

- Teenage Driver Training – study funded by Centers for Disease Control
  - P.I. - Dr. Brenda Wiederhold
  - Study completed – 3 year follow-up in progress

- Stress Inoculation Training – USAARL, Fort Rucker – funded by TATRC
  - P.I. – Major Melba Stetz
  - Dr. Stetz will discuss

- Stress Inoculation Training – Combat Medics – funded by TATRC
  - P.I. – Dr. Mark Wiederhold
  - Scenario creation in progress

- PTSD Prevention – SIT – VRMC & Balboa Naval Hospital
  - ONR
  - P.I. – Dr. Brenda Wiederhold

- Injury Creation Simulator – funded by TATRC
  - P.I. – Dr. Mark Wiederhold
  - Phase I: completed
Overview of Training Programs

- **Student State** –
  - 3-year study funded by DARPA, DSO
  - Effectiveness of laptop simulator for training military personnel
  - P.I. – Dr. Mark Wiederhold
  - Phase I & II: completed
  - 970 participants from US Navy, Marine Corps & Coast Guard
Objectives of DARPA Study

- Examine effectiveness of low fidelity, inexpensive VR training simulators for use in teaching personnel tactical and trauma care skills.
- Teach personnel stress management techniques and have them practice those techniques while performing stressful tasks.
- Improve performance during real-life combat situations (i.e., transfer of training).
Transfer-of-Training Model

2 Groups

1) **Experimental** – receives simulator training prior to performance testing

2) **Control** – receives all training in field
June 2004 military exercise at Strategic Operations

- **Training exercises**
  - squads of 20 Marines entered the Iraqi village
  - encountered a variety of civilian and hostile forces

- **Scenarios**
  - Some troops were “killed” while others were wounded
  - **Echelon I scenario**
    - very basic trauma care was rendered, as the troops are under fire
    - provide injuries such as:
      - head wounds, penetrating chest wounds, burns, and shrapnel from exploding IEDs.
      - Basic life support (including airway management) was stressed, as well as control of hemorrhage.
Hollywood Special Effects
Training Transfer to 3 types of skills

- 1. Specific skills
- 2. General skills
- 3. Unrelated tasks
Injury Creation Simulator (ICS)

– The Next Generation Injury Creation Science
The ICS could play a key role in enhancing the training of Sailors and Marines in Kernel Blitz amphibious assault operations.
Dynamic Injuries

- **Old Methods – moulage techniques**
  - Disadvantages to the moulage techniques is that the injuries are static and do not change once they are created

- **New concept in trauma – the dynamic injury**
  - For example:
    - A wound complete with active bleeding that stopped when a tourniquet was applied
    - Chest wound with a hidden tube that delivered air to the chest injury site
    - Wound where compression was more difficult, bleeding continued; we were able to fill large IV bags with special-effects blood and deliver tubing to the injury site so as to create brisk bleeding from the wound
Injury Creation Simulator (ICS) – The Next Generation Injury Creation Science

The simulator will be designed with a lightweight but completely protective metal plate between the participant’s skin and the “wound.”
Echelon I Triage and Assessment
Echelon II Treatment
(Battalion Aid Station)
Military Applications

- Enhance operational and medical decision making
- Improve medical training
- Deliver medical treatment across all barriers
- Providing realistic training
- Allows medics and corpsmen to practice triage and transport
- Enables corpsmen to actually carry or drag their squad mates to safety.
- Provides much-needed stress inoculation training as medics see their team members injured