AUGMENTED REALITY: THE FUTURE OF MEDIC TRAINING

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BACKGROUND

Augmented reality (AR) has been used successfully in the marketing and entertainment industries to bring products and simulated experiences to life (Kipper & Rampolla, 2013). AR technology is a powerful way to provide the experience of first-hand exposure to realistic perceptual cues (e.g., visual, haptic, and auditory stimuli) in situations that might ordinarily be very difficult to replicate. This makes AR an increasingly viable tool to deliver occupational training in complex environments. While virtual reality (VR) immerses a person in a virtual environment, AR allows the users to see the real world with virtual objects superimposed (Zhu et al., 2014). The relatively low cost and extreme flexibility of AR applications makes them practical and portable.

AR offers important advantages over existing training technologies. Manikin systems have long been an integral part of Combat Life Saver training and their technology continues to evolve to support increasingly sophisticated medical training. For example HAPMED includes an instrumented manikin arm that allows personnel to practice proper tourniquet application (Chi Systems). Other sophisticated manikins simulate amputation trauma, airway injuries, cardiac events, and provide practice opportunities for intubation, tourniquet, cricothyrotomy and other important trauma care procedures. Each provides excellent opportunities to build psychomotor skills required to administer critical interventions. Because they are fixed hardware tools, manikin systems lack the ability to represent certain perceptual cues that can be vital to appropriate diagnosis and treatment of some conditions.

AR-based training systems represent an important opportunity to overcome these challenges. The robust visualization capability of AR allows for the representation of critical cues that is not available in either manikin systems or live-tissue models. AR also makes it possible to more easily present cues that represent injury escalation over time. Finally, software updates can be rapidly developed to incorporate new conditions, new corresponding cues and new scenarios to train associated skills. AR solutions will eventually be a cheaper, more scalable and more robust form of training than current training approaches.

AR is particularly effective as a training tool in situations where creating and leveraging a real-world training environment is too difficult, too dangerous, or too expensive, such as training in active combat zones. AR is also effective in training medics how to respond to rare, but critical conditions, such as hemorrhagic fevers (e.g., Ebola), or exposure to chemical or biological agents (e.g., anthrax, saran gas).

MACROCOG NITIVE AUGMENTED REALITY TRAINER

The Macrocognitive Augmented Reality Trainer (MART) uses AR technology to create a virtual patient that displays perceptual cues that cannot be mimicked in a physical training manikin. Leveraging natural decision making research (Hoffman, Ward, Feltovitc, DiBello, Fiore, Andrews, 2014; Klein, 1997; Klein & Borders; 2016, Klein, Phillips, Rall, & Peluso, 2007; Klein & Wolf, 1995; Patterson & Miller, 2010; Zsambok and Klein, 1997) we have developed compelling scenarios, presenting cognitive challenges such as recognizing critical cues, quickly diagnosing, and identifying appropriate interventions. MART incorporates adaptive training components (Lazzara, Dietz, Weaver, Pavlas, Heyne, Salas, & Ramachandran), to provide scaffolding that aligns with trainee skill level.

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References


