

THE VIRTUAL EMERGENCY CRASH CART: AN IMMERSIVE VIRTUAL REALITY LEARNING EXPERIENCE FOR NURSES

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Intent:

The purpose of our research is to develop a customizable virtual crash cart that could provide risk-free, on-demand training to all nurses for becoming familiar with a medical facility's specific cart configuration.

Description:

Nurses play an integral role in the management of cardiopulmonary arrests. In inpatient facilities, nurses are at the patient's bedside 24 hours/day and are likely to be the first to respond and manage initial treatment during an emergency. In many institutions the nurses do not play only a supportive role, but they also manage initial treatment while the patient's physician is en route to the location of the emergency. Opportunities to practice using a hospital's emergency crash cart are inhibited due to the cost associated with unlocking the cart and hospital's responsibility to ensure that the medications within the cart are up-to-date for patient safety. Interviews with nurse educators at local hospitals revealed that cart training is often performed by having newly employed nurses observe emergency situations when the cart gets unlocked.

As an alternative, this research proposed to develop a virtual crash cart that could provide risk-free, on-demand training to all nurses. In this joint project of the College of Nursing and the Department of Computer Science, a research team is currently developing a computer-assisted immersive environment which will provide a nurse learner with the opportunity to interact with virtual crash carts in near realistic emergency situations without the risk of patient injury. There are two key elements of this research. First, several currently used emergency cart designs and configurations will be recreated in the environment through a graphical database. The research team is currently working with local hospitals to acquire visual images of the drugs and drug-preparation procedures in order to compile the database. Using the images already acquired, a highly realistic life-size prototype, virtual crash cart has been developed and is operational on a touch-sensitive monitor. Screen captures of the prototype are shown below in Figure 1. Second, expert knowledge of the dynamic interactions between emergency response team and the patient's medical condition, encapsulated through the vital life sign parameters, will be acquired, analyzed through artificial intelligence techniques, and then modeled in the immersive environment. Through experimental testing with a population of nursing students and novice nurses from area hospitals and local medical centers, the environment will be refined by weaving in new dynamic scenarios.



Figure 1 – Screen Captures of Our Virtual Crash Cart

Evaluation:

The contribution of our research will be assessed through improvements in the nurses' knowledge and the speed and accuracy of their responses in high-stress situations.