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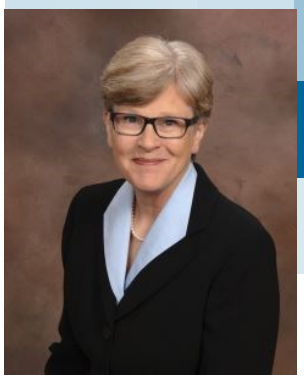
Interdisciplinary collaboration between engineering, mathematics and science

SEMS Research Highlights



Efficient and Effective CPR Training *via* Simulation

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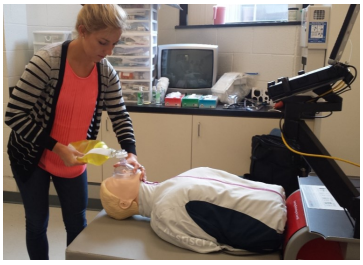
This newsletter presents the research conducted within the School of Engineering, Mathematics and Science (SEMS) at Robert Morris University (RMU). It covers various relevant topics including: interdisciplinary efforts, successful research grants, student research, posters and papers, journal publications, presentations at national and international conferences, contribution to professional societies, STEM educational research, industrial consulting collaborations and applied research.

Current cardiopulmonary resuscitation (CPR) training is designed for a one-size-fits-all, biennial schedule. As individuals' skills decay over time, there is a need for retraining. The wide variability in CPR psychomotor skills observed in past research provides an opportunity to develop performance-based training schedules based on individual needs. Individuals could be trained only as needed in order to maintain a specific minimum level of skill. This would avoid over- or under-training any given individual, thus improving training efficiency and effectiveness while reducing overall training and logistics costs.

This study tests an algorithm developed by the US Air Force 711th Human Performance Wing Research Laboratory referred to as the Predictive Performance Optimizer (PPO). The algorithm measures initial skill acquisition and predicts the decay in proficiency and the training needed to re-acquire the desired proficiency level. With the goal to individualize CPR training, the PPO algorithm can be used to guide the acquisition of CPR skills to a target level of proficiency and then prescribe the training schedule needed to maintain that proficiency level over time. The research work is currently underway to answer the following key questions:

- Can the PPO predict skill decay and acquisition of proficiency in chest compression and bag-mask ventilations?
- Can the PPO be calibrated using data from training sessions that are spaced at once a day for 4 days, once a week for 4 weeks, once a month for 4 months, or quarterly for 1 year intervals?



(a)

(b)

Bag-mask ventilation simulation in (a) and chest compression simulation in (b)

This is a publication of SEMS - Research and Outreach Center (ROC) which was established in 2010 by the SEMS Dean Dr. Maria Kalevitch. SEMS-ROC connects SEMS faculty and students with the region, the nation and the globe, demonstrates diversity and interdisciplinary interests of all three departments in the school.

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