**Development and Evaluation of a Mobile Simulation Lab With Acute Care Telemedicine Support**

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**INTRODUCTION**

Skillful performance is central to the provision of quality care. Evidence suggests that only well-organized, deliberate practice with instruction and feedback leads to best outcomes. Professionals in rural and remote locations often face significant challenges in the maintenance of procedural proficiency and the delivery of acute care medical services. This is especially important with low-frequency, high-stakes encounters or procedures. Simulation-based medical education can play an important role in skills maintenance but limited access to simulation labs and resources due to time, cost and distance are often prohibitive. Mobile telesimulation has the potential to facilitate high quality instruction and overcome many of the barriers.

**OBJECTIVE**

- To produce a mobile unit capable of telesimulation that allows a skilled mentor to provide efficient and effective real-time instruction from a geographically separate base station

**METHODS: Aim – FineTune – FollowThrough**

Utilizing the AFT design methodology, a multidisciplinary team, with medical, engineering, simulation, and teaching experience, developed a common language and design methodology. The team is using iterative, cyclical design methods to produce and evaluate an initial prototype of the mobile telesimulation unit (MTU), with evaluation and benchmarking outcomes at each step of the design process.

**INITIAL MTU PROTOTYPES**

With the AFT based plan, prototype development is guided by goals placed in 3 main areas: Comfort, Technology, and Human Factors. Motor and Cognitive Modelling Diagrams (MCMODs) provide a well defined path to follow, and give the group clear, common goals to complete. Main considerations and requirements have been identified for each focus area, establishing measurable objectives throughout the project. The early development of the MTU uses chest tube insertion as a representative procedure integrated into the simulation scenario. The simulation-based topic or procedure to be reviewed can be varied to meet the needs of a broad range of users, both within and outside of the medical field.

**FINAL DESIGN (PROTOTYPE C)**

Prototype C will be evaluated for educational effectiveness. Chest tube insertion will be used as the representative procedure integrated into a simulation scenario. Medical students will be taught the procedure under one of two conditions. The control group receives face-to-face instruction, demonstration and feedback from an expert located in the MTU while the intervention group communicates with the expert, located in the tele-simulation, HELPS, lab at Memorial University. Participants will complete a retention test 1 week after the intervention.

**IMPLICATIONS**

The Mentor Experience: Financial and time constraints are limiting when connecting a mentor to the remote learner; such as a physician travelling to rural communities to teach low frequency-high stakes procedures.

Use of two way audio and visual communications between the MTU and base site will enable expert instruction of learners and provision of valuable feedback on their performance through use of effective debriefing.

Simulation participants will be able to interact and converse with the mentor, have access to relevant instructional materials, and experience hands-on learning in a supervised environment.

**CONCLUSIONS**

With access to a reliable data network as the only location constraint, the MTU will provide a comfortable, engaging and consistent learning environment, comparable to in-person instruction, for participants anywhere it is deployed. Such a design will have practical applications in a variety of settings and for a variety of medical and non-medical simulation-based instructional purposes.

**REFERENCES**


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