ACCELERATING COMPETENCY DEVELOPMENT IN MANAGEMENT OF MECHANICAL VENTILATION OF PEDIATRIC CRITICAL CARE PROVIDERS: A SERIOUS GAME APPROACH

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Background: Pediatric critical care providers must learn how to manage patients on mechanical ventilation (MV). Teaching about MV often occurs at the bedside, however, there is often insufficient time to teach both basic and highly complex concepts. Novel instructional strategies have proven educational benefits, but most require many hours and/or resources. Serious games are an active learning strategy which have demonstrated effectiveness in augmenting learning medical education, without the significant time burden. To our knowledge, the use of a serious game to emphasize specific knowledge and skills with regards to MV in critical care has not been done. We sought to develop an educational module using a serious game to teach these skills.

Materials/Methods: Using an educational design research (EDR) approach (iterative cycles of design, evaluation, and redesign), we developed and refined a serious game to expedite the competency in management of critically ill patients on MV among critical providers.

Results: Knowledge Content We surveyed faculty, fellows, and respiratory therapists to determine the learning needs. By triangulating inputs from multiple groups, we created a comprehensive list of high yield content areas to focus on. Design Principles To guide our game design, we created a theory-informed conceptual framework (Figure 1) through a synthesis of game principles and their linkage to learning principles. A literature review and an environmental scan were performed to determine exemplary game mechanics. We derived initial design principles for rapid prototyping–cycles of trial, testing, and refining the game and gameplay by involving pilot users to gain insights from all groups. We have finalized the design principles, a module prototype, and incorporated all content areas for formative evaluation and implementation. Effectiveness Evaluation We developed a serious game evaluation tool aligned with the proposed conceptual framework to evaluate the game based on; game attributes of fantasy, curiosity, choice, and challenge; as well as 3-dimension (cognitive, behavioral, and emotional) engagement and flow state. Additionally, we will evaluate the game for usability and educational effectiveness (cognitive knowledge and self-efficacy).

Conclusions: We developed a serious game to emphasize specific knowledge and skills with regards to MV in critical care providers. Next steps include incorporating the game into the existing educational activities for new first year fellows.

Images / Graph / Table

Game Attributes

Fantasy

Curiosity

Choice

Challenge

Motivation

3-D Engagement

Flow

Emotional

Behavioral

Cognitive

Flow

Intended Learning Outcomes

Cognitive Knowledge

Problem Solving

Decision-Making

Metacognitive Thinking