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Evaluating a Computer-Based Training System for Trauma Education

Background: Work-hour restrictions challenge educators to find innovative methods to supplement resident and student surgical education. We present a novel trauma surgery computer-based system and hypothesize that it will effectively increase residents' surgical knowledge. The two modules, thoracic surgical approaches and abdominal surgical approaches, which contain step-by-step multimedia guidance regarding surgical techniques, were evaluated.

Methods: To evaluate the thoracic surgical approaches module, an 8-item pre-test and post-test was created to determine acquisition of knowledge on location of surgical dissection, appropriate surgical techniques, and thoracic surgical complications. To evaluate the abdominal surgical approaches module, a 10-item pre-test and post-test was created to determine acquisition of knowledge on location of surgical dissection, appropriate surgical techniques, and abdominal surgical complications. A 13-item Likert scale usability survey was created for feedback on user experience. Physician residents in a general surgery training program at a large academic hospital, who had completed a minimum of 1 year residency training, completed the pre-test and subsequently participated in the online module. Participants then completed the same questions in a post-test, followed by the usability survey. Descriptive statistics were calculated comparing pre-test and post-test scores. The research was approved by the Institutional Review Board.

Results: A total of 14 general surgery residents completed the study, each participating in both the thoracic and abdominal surgical approaches modules. The average score and standard deviation for the thoracic module pre-test and post-test was 54.4% (10.5) and 89.3% (10.8), respectively. A paired t-test was found to be significant at the $p<0.0001$ level. The average score and standard deviation for the abdominal module pre-test and post-test was 46% (19.8) and 85% (14), respectively. A paired t-test was found to be significant at the $p<0.0001$ level. The usability survey results found that 93% would use these modules to supplement their trauma training, 100% were able to easily distinguish anatomy, and 93% agreed the video modules showed procedures clearly. Suggestions included an improved pace of the module and adding more audio content.