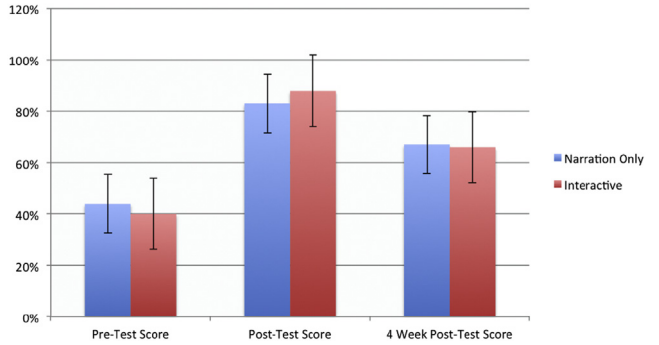
We compare the effectiveness of an interactive lecture with a narration-only lecture of the FAST (Focused Assessment with Sonography for Trauma) ultrasound examination.

Methods: This was a prospective randomized controlled study of medical students (years 2-4) at an urban, academic medical center. Participants were randomized to one of two online lecture groups: 1) An interactive FAST lecture created using Adobe Captivate 8 software or 2) A narration-only FAST lecture. The educational content of both lectures was identical. However, the interactive lecture additionally included manual video playback, learning interactions ("accordions" and "pyramids"), rollover images, quizzing, and "hot spots." Outcome measures were exam scores on a pre-test, post-test at 0 and 4 weeks, user satisfaction and comfort with FAST anatomy and pathology. Standard descriptive< statistics were utilized.

Results: 46 students were enrolled, with 24 participants in the interactive lecture group and 22 participants in the narration-only lecture group. There were no significant differences between the two groups in pre-intervention, post-intervention, and four-week post intervention test scores (Figure 1). User satisfaction and understanding of FAST anatomy and pathology was rated highly for both learning styles but was not significantly different between the groups. The interactive lecture took on average 16 minutes longer (95% CI 7-26min) to complete.

Conclusion: There were no significant differences in outcome measures for an interactive online lecture compared to a narration-only online lecture for learning the FAST ultrasound examination. An interactive educational curricula may not always be a time-effective teaching method and requires additional study.

Figure 1: Comparison of test scores between narration-only and interactive lecture groups.



69 The Uphill Battle of Performing Education Scholarship: Barriers Education Researchers Face

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Study Objectives: Education research is a developing field. Education researchers are often limited by time, funding, lack of mentorship, and lack of reward. The objective of this study is to evaluate the perceptions of successful education researchers regarding barriers specific to this type of scholarship and potential strategies for success.

Methods: Successful emergency medicine (EM) education researchers, as identified by authorship on a manuscript included in Academic Emergency Medicine's "Critical Appraisal of Emergency Medicine Education Research: The Best Publications of [years 2008-2014]" or designation of "Scholar" from the Medical Education Research Certificate program, completed an online survey consisting of multiple choice, 10-point rating scale, and free response items. Descriptive statistics were reported. Qualitative analysis used a thematic approach.

Results: 42 education researchers completed the survey. The most common type of scholarship produced was a peer-reviewed research manuscript with 39/42 (92.9%) having published one within the last 5 years. Respondents were highly productive, 19/42 (45.2%) reported having more than 20 peer-reviewed education scholarship publications on their CV. 25/42 (60%) had formal research methodology training. Motivating factors to perform education research included personal interest, intellectual stimulation, desire to contribute to the field, follow evidence-based practices, and promotion. The greatest motivators were personal intellectual stimulation and to become a better teacher, mean ratings of 8.52 and 7.21. Other motivators (mean rating) included national recognition (6.31), requirements of promotion (5.74), and departmental recognition (5.55). The most frequently cited rewards for performing education research included intellectual satisfaction of solving a problem (39/42) and satisfaction of contributing to the knowledge of the field (39/42). Other rewards included promotion (28/32), departmental recognition (26/42), national recognition (23/42), protected time (10/42), and monetary awards (7/42). Respondents were satisfied with their achievements in education research and their overall career, mean ratings of 7.02 and 8.22 respectively and felt that performing research contributed positively to their career satisfaction, mean rating 7.14. Challenges identified included lack of funding, lack of time, difficulty finding collaborators, maintaining methodological rigor, public acceptance of the importance and value of education research, and lack of departmental support. Discouraging factors identified were lack of time and competing responsibilities such as administrative and clinical demands. Education researchers cited that more funding, protected time, mentorship, and a collaborative community would help them achieve their research goals. Advice offered to those who want to become more involved in education research included obtaining mentorship, formal research training, identifying collaborators, and adhering to rigorous methodological standards.

Conclusion: Our study identified multiple barriers, motivators/discouragers as well as strategies for success in performing education scholarship. This information may inform interventions to support educators in their scholarly pursuits and improve the overall quality of education research in EM.

70 Diagnostic Performance of a New Real-Time Cardiac Electrical Biomarker

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Study Objective: The measured 12-lead electrocardiogram (mECG) describes a dipolar electric field such that only 3 leads are needed to construct a derived 12-lead ECG (dECG) with high correlation when compared to the measured standard 12-lead ECG (mECG). A new cardiac electrical biomarker (CEB) has been identified from the derived 12-lead ECG that is a measure of dipolar energy. This CEB has been shown to detect acute myocardial ischemic injury (AMII) with reportedly high diagnostic accuracy. This CEB is constructed and displayed continuously in real time from 3 measured leads on a standard bedside cardiac monitor.

We contruct the CEB from derived 12-lead ECGs and report its diagnostic accuracy in the detection of AMII.

Methods: This is a case control study conducted in a suburban community setting that included 120 mECGs from patients presenting to an emergency facility. The dECGs corresponding to these mECGs were derived using 3 measured leads I, II, and V2. These cases included 12.6% ECGs interpreted as acute myocardial ischemic injury (AMII). All AMII cases had clinically correlated elevated serum troponin I concentrations. The CEB was constructed for each dECG and is a measure of the dipolar forces in the cardiac electrical field used to distinguish AMII from non-AMII ECGs. All ECGs were interpreted by a board-certified cardiologist and an emergency physician serving as reference standards who were blinded to the CEB and to each other. The CEB is displayed every 10 seconds on the bedside continuous cardiac monitor (VectraplexECG System®, VectraCor, Inc., Totowa, NJ). An ROC analysis showed a CEB value >94 is suggestive of AMII, <66 is suggestive of non-AMII, and CEB values 66-94 are considered indeterminate (caution). The CEB diagnostic accuracy was evaluated by sensitivity, specificity, likelihood ratios (LR-, LR+),and post-test odds ratios (OR-, OR+). Pearson r was used to determine mECG versus dECG quantitative correlation.

Results: In this study, the CEB sensitivity and specificity for AMII was 93.3% and 83.0% respectively ($p< 0.05$). The CEB demonstrated a LR+ and LR- of 5.48 and 0.08 respectively. The CEB also demonstrated post-test OR+ and OR- of 79.1% and 1.2% respectively. The utility of the CEB test was 90.9% with 9.1% of the CEBs falling in the indeterminate zone. The mECG versus dECG quantitative correlations were very high at 0.881 ± 0.071 ($p <0.05$).

Conclusions: The CEB is able to swiftly differentiate ECGs with AMII morphology from those with non-acute morphology in the appropriate clinical setting directly from the cardiac monitor. The CEB allows an immediate, continuous, real-time, cost-effective and efficient means of identifying patients with AMII who are being monitored in the emergency department and other telemetry acute care settings.