

## **Isolating the Impact of Audience Response Systems on Medical Student Learning**

Tyler Mains

**Background:** The current literature on Audience Response Systems (ARS) includes contradictory results. One potential reason is the multiple confounding factors inherent in most medical education research, such as individual lecture effectiveness, learners' multiple exposures to the material, and learners' motivation to study the content independent of the teaching methodology used. Understanding ARS' effects on learning therefore necessitates a rigorous, controlled study design.

**Hypothesis/Aim:** The authors conducted a randomized controlled trial to isolate the impact of ARS on learning. They hypothesized that the utilization of ARS would increase students' comprehension and retention of material presented during a lecture.

**Methods:** First-year medical students at Johns Hopkins University volunteered to enter this study ( $n=92$ ), and were randomly assigned to one of two groups. Group A watched a previously recorded lecture on severe burn, a topic outside of the first-year curriculum. Group B watched an identical lecture except three ARS questions were imbedded throughout the lecture. Students took a survey and quiz immediately after the lecture and a second quiz two weeks later.

**Results:** Adding ARS questions during the lecture increased students' immediate quiz scores by an average of 1.34 out of 10 (13.4%,  $p<0.001$ ) and their delayed quiz scores by an average of 1.02 (10.2%,  $p=0.005$ ). The rate of information loss during the two weeks did not significantly differ between the groups. Group A's scores decreased by a mean of 0.512 out of 10 (5.12%) while Group B's scores decreased by a mean of 0.684 (6.84%),  $p=0.60$ .

**Conclusions:** By using a previously recorded lecture on a topic outside of the first-year medical curriculum, the authors were able to isolate the impact of adding ARS to a lecture. Limitations include the use of a single site, coverage of a single topic, and the small number of quiz questions. Overall, ARS increased learner knowledge and comprehension, both immediately following a lecture and two weeks later, but did not slow the rate of forgetting.