

## **UC Irvine**

### **Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health**

#### **Title**

Inside the Black Box: Using Think Aloud to Study Clinical Reasoning During Simulation

#### **Permalink**

<https://escholarship.org/uc/item/5vm6x26q>

#### **Journal**

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 17(4.1)

#### **ISSN**

1936-900X

#### **Authors**

Cassara, M  
Jongco, A  
DeVoe, B  
et al.

#### **Publication Date**

2016

#### **Copyright Information**

Copyright 2016 by the author(s). This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

conferences over a three-year period) used a mixed linear regression model to assess whether post-conference speaker evaluations were associated with image fraction (percent of slides with at least one image) and text density (number of words per slide).

**Results:** A total of 105 lectures were given by 49 faculty members. A total of 17,397 evaluations were included. On average, 47.4% (SD=25.36) of slides had at least one image, modeled as “image fraction” 0.474. Image fraction significantly predicted overall higher evaluation scores [F(1, 100.676)=6.158, p=.015] in the adjusted model. The mean (SD) number of words per slide was 25.61(8.14) but was not a predictor [F(1, 86.293)=0.55, p=.815]. Of note, the speaker [χ<sup>2</sup>(1)=2.952, p=.003] and speaker seniority [F(3, 59.713)=4.083, p=.011] significantly predicted higher scores.

**Conclusions:** This is the first published study to date assessing the association between slide design and CME speaker evaluations by an audience of practicing clinicians. The incorporation of images was correlated with higher evaluation scores, in alignment with Mayer’s theory of multimedia learning. Contrary to this theory, however, text density was not a predictor. This suggests that predictors speaker evaluations are multifactorial. Faculty development efforts should focus on teaching best practices in both slide design and presentation skills.

## 41 Inside the Black Box: Using Think Aloud to Study Clinical Reasoning During Simulation

Cassara M, Jongco A, DeVoe B, Kerner R, Brenner J, Kikel M, Wickey J, Tamuz M / Northwell Health System Center for Learning and Innovation, New Hyde Park, NY; Long Island Jewish Medical Center, New Hyde Park, NY

**Background:** Medical educators use simulation to assess how EM trainees develop differential diagnoses. Trainees reflect retrospectively on their clinical reasoning during post-scenario debriefings. Debriefings, however, mask individual decision making due to hindsight bias and peer influence. We posit that adopting “think aloud” from cognitive psychology, in which individuals express thoughts as they occur, avoids such biases.

**Objectives:** Explore the feasibility of using think aloud methods during SIM scenarios to elicit how trainees, in real time, construct differential diagnoses.

Hypotheses:

1. Using think aloud methods during scenarios is feasible.
2. Think aloud methods prompt trainees to describe how they construct differential diagnoses.

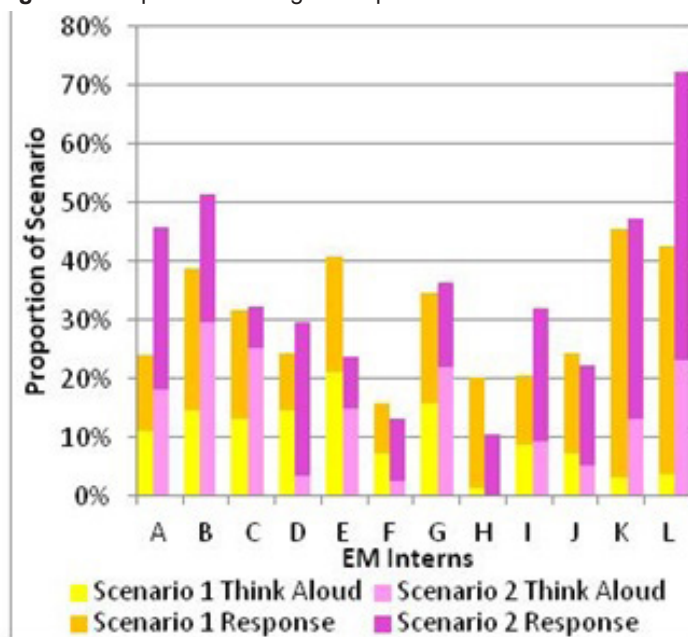
**Methods:** All EM interns from two residency programs participate during an orientation day (n=21). This experiment generates qualitative and quantitative data by coding videos.

We use convergent parallel mixed methods to analyze the data. The intervention includes group think aloud exercise (n=5,6); individual participation in two Standardized Patient (SP) scenarios (anaphylaxis, myocardial infarction); group debriefing; and individual questionnaires. We instruct interns to think aloud and SPs to ask about diagnoses during scenarios. Two blinded researchers independently code each second of 10 minute scenarios. They use content analysis, applying researcher generated predetermined descriptive codes to qualitative data. Codes include diagnoses and cues (e.g., symptoms).

**Results:** Using think aloud methods during scenarios is feasible. Interns think aloud as they interview and examine SPs (n=12/21 Limitation: Data lost due to technical error). Scenario 1: Interns think aloud 9.91% median of scenario time (range 1.33 - 20.95); they address SP questions for 18.77% median time (range 8.66 - 42.55). Scenario 2: Interns think aloud 14.16% median time (range 0 - 29.67); they address SP questions for 19.41% median time (range 7.19 - 49.12) (See Cassara Figure 1). Initial content analysis suggests that these methods prompt interns to describe how they use cues to construct differential diagnoses.

**Conclusions:** Thinking aloud during scenarios prompts interns to describe how they construct differential diagnoses, providing educators with vital data for assessing and remediating diagnostic reasoning.

Figure 1. Proportion thinking aloud per scenario.



## 42 Multisource Feedback in a Simulation-Based Milestone Assessment of Emergency Medicine Residents

Siegelman J, Shah B, Nagrani S, Gajewski A / Emory University, Atlanta, GA