VISUALIZING THOUGHT IN MEDICAL EDUCATION:
How Does Drawing Enhance the Learning of Diagnostic Skills in Radiology?

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Abstract

Studies in the learning sciences suggest that drawing may prove useful for reflection, as a learning diagnostic, and as a cognitive tool.1 A study has been designed to determine if drawing at different times while learning with an application on radiograph interpretation (Figure 1) will improve learning and cognition. The research is ongoing, and new qualitative data reveals various uses for drawing dependent on the timing of the drawing activity.

Materials & Methods

Participants are asked to (a) complete a survey on learner variables and a visuo-spatial task, and then (b) draw while identifying fractures in a series of radiographs from 40 cases within a learning app. This study has a 2x2 factorial design with three treatments, each with 35 medical students (Figure 2). A control group performs the fracture task without drawing.

“Think alouds” from a small subset (N=20) are recorded and transcribed for the qualitative pilot. Materials for the pilot include surveys, a fracture task learning app (Figure 1), recording tools, and drawing materials.

Discussion & Conclusions

The timing of a drawing impacts its role and utility as a cognitive aid during learning. The forthcoming quantitative analyses and learning curves may determine which timings improve learning outcomes across learner variables.

Pilot Results: Qualitative Trends

(a) Can drawing during radiograph interpretation improve learning?
(b) Does the timing of a drawing impact its effectiveness?
(c) Which covariates moderate the effects of drawing on learning?

Pilot Results: “Think Aloud” & Qualitative Trends

Treatment 1: Control (no drawing)
View patient history & interpret radiograph
Pre-feedback drawing
Post-feedback no drawing
Submit response & receive feedback

Treatment 2: Sense-making (post-feedback aid)
View patient history & interpret radiograph
Pre-feedback drawing
Submit response & receive feedback
Post-feedback drawing
Submit response & receive feedback

Treatment 3: Critical Looking (post-feedback aid)
View patient history & interpret radiograph
Pre-feedback drawing
Submit response & receive feedback
Post-feedback drawing
Submit response & receive feedback

Treatment 4: Reflection (self-diagnostic)
View patient history & interpret radiograph
Pre-feedback drawing
Submit response & receive feedback
Post-feedback drawing
Submit response & receive feedback

Discussion & Conclusions

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Bibliography