Comparing Two Types of Spatial Alignment During Elementary Engineering Instruction

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Abstract: We explore two types of spatial alignment, overlay and gesture, during an engineering lesson on bridge building. Spatial alignment via juxtaposition (Gentner et al., under review) or overlay (Applebaum et al., in prep) has been found to promote understanding triangular bracing in stable structures. Gestures tracing a triangle may also support learning this concept. We used a 2(Gesture, No Gesture) x 2(Overlay, No Overlay) design to teach children ages 6-9 about triangles in bridges. In Study 1, children learned regardless of condition, but they learned significantly less in the gesture conditions, which used a fast tracing gesture (=-1.62, p=.01; M(improve_gesture)=.30, SD=.38, M(improve_no_gesture)=.48, SD=.33; alignment conditions: =-.05, p>.1; M(improve_alignment)=.42, SD=.40, M(improve_no_alignment)=.38, SD=.34). In Study 2, we presented videos with a slower, deliberate tracing gesture. Preliminary results suggest that gesture can facilitate learning by highlighting the relationship between the individual components shared by the triangle and the larger structure.