How to Foster the Integration of Text and Diagrams: An Eye Tracking Study on the Use of Signals in Multimedia Learning

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Abstract: Learners studying text and diagrams (multimedia) often fail to integrate information from both sources. Hence, signals that make explicit the relation between both representations should improve understanding. The current study investigated which changes in information processing can explain improvements in comprehension due to signals. In an eye tracking study 35 students learned about the functioning of the heart. In a no-signals condition, a text and diagram were presented unaltered. In the signals-condition, correspondences between the representations were highlighted by means of labels, color coding, and deixis. Signals improved understanding of text-diagram correspondences and guided attention towards diagrams. Moreover, diagrams were fixated earlier in the signals-condition. A mediation analysis showed that these changes in visual attention completely explained the effect of signals on comprehension. Hence, signals improve learning from text and diagrams by fostering learners' early reference to diagrams and by increasing the amount of attention devoted to them.