Does the K-12 practice of mixing pictures and graphs contribute to students' 'graph-as-picture' misconceptions?

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Abstract: Graphs are often introduced to young students in a form (e.g. pictograms) that conflates them with pictures. Numerous examples from the UK National Curriculum illustrate this practice (Garcia-Garcia & Cox, 2008). We criticize this approach and suggest that it may negatively impact students' acquisition of diagram comprehension skills. The graph-as-picture (GAP) misconception (interpreting a diagrammatic representation as a picture) might be an inadvertent consequence. We developed a method for detecting and remediating the GAP misconceptions in the form of an interactive diagram system. Students use a large touch screen to perform a representation decision task and to play an interactive 'racing car' game. The student's finger interactions with the on-screen 'car' are dynamically coupled to an adjacent speed/distance graph. Students are encouraged to experiment (e.g. by varying their 'driving' speed on straight track sections and corners) and to observe the concomitant changes on the speed-distance graph.