

THE INFLUENCE OF VISUAL REPRESENTATIONS ON LEARNING FROM MATHEMATICS LESSONS

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The inclusion of information that is interesting, but irrelevant to the lesson, has been found to distract learners and diminish comprehension in a phenomenon referred to as the *seductive details effect* (Lehman, Schraw, McCrudden, & Hartley, 2007). Math textbooks often contain images, either decorative (i.e., for aesthetic purposes only) or contextual (i.e., related to the background of the lesson) that are irrelevant to the mathematical concepts being taught.

There is empirical evidence that decorative images have a negative influence on learning (Levin, Anglin, & Carney, 1987), likely because of the seductive details effect. In contrast, contextual images have been shown to help with aspects of reading comprehension for some populations (cf. Pike, Barnes, & Barron, 2010), although the effects of contextual images on learning from math lessons have not been explored. It is unknown whether contextual images would distract from mathematics learning or if they would benefit mathematics learning through assistance with reading comprehension. The purpose of this study is to examine the influence of contextual and decorative images on learning from a mathematics lesson. Eye-tracking methodology was used to determine if the inclusion of these images, which are mathematically irrelevant, caused diminished visual attention to the lesson text and graphs, which are mathematically relevant.

Forty-one undergraduate students participated by reading four mathematics lessons on functions. The data indicated that there was little visual attention to either decorative or contextual images. Including decorative or contextual images did not influence visual attention towards math relevant information in the lesson (i.e., the graph and lesson text). Therefore, it can be inferred that the students tended to ignore the images in the lessons. There were no differences in written recalls of lessons or answers to questions across image conditions. Compared to the lesson text, little visual attention was directed towards the graphs, which were mathematically relevant visual representations. This is unfortunate because graphs can assist in mathematics learning (Shah, Mayer, & Hegarty, 1999). An important direction for future research may be to develop methods to direct learner attention towards graphs.

References

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