

ZMATH 2015d.00167

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Playing mathematical instruments: emerging perceptuomotor integration with an interactive mathematics exhibit.

J. Res. Math. Educ. 44, No. 2, 372-415 (2013).

Summary: Research in experimental and developmental psychology, cognitive science, and neuroscience suggests that tool fluency depends on the merging of perceptual and motor aspects of its use, an achievement the authors call perceptuomotor integration. We investigate the development of perceptuomotor integration and its role in mathematical thinking and learning. Just as expertise in playing a piano relies on the interanimation of finger movements and perceived sounds, the authors argue that mathematical expertise involves the systematic interpenetration of perceptual and motor aspects of playing mathematical instruments. Through 2 microethnographic case studies of visitors who engaged with an interactive mathematics exhibit in a science museum, we explore the real-time emergence of perceptuomotor integration and the ways in which it supports mathematical imagination.

Classification: C30 D40 D30

Keywords: mathematics skills; perceptual motor coordination; informal education; teaching methods; learning strategies; motion; freehand drawing; video technology; exhibits; museums; computers; educational technology; mathematical concepts; computer graphics; ethnography
<http://www.nctm.org/publications/article.aspx?id=35541>