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**Embodied interaction as designed mediation of conceptual performance.**

Martinovic, Dragana (ed.) et al., Visual mathematics and cyberlearning. Dordrecht: Springer (ISBN 978-94-007-2320-7/hbk; 978-94-007-2321-4/ebook). Mathematics Education in the Digital Era 1, 119-139 (2013).

Summary: Can conceptual understanding emerge from embodied interaction? We believe the answer is affirmative, provided that individuals engaged in embodied-interaction activity enjoy structured opportunities to describe their physical actions using instruments, language, and forms pertaining to the targeted concept. In this chapter, we draw on existing literature on embodiment and artifacts to coin and elaborate on the construct of an embodied artifact – a cognitive product of rehearsed performance such as, for example, an arabesque penchée in dance or a flying sidekick in martial arts. We argue that embodied artifacts may encapsulate or “package” cultural knowledge for entry into disciplinary competence not only in explicitly embodied domains, such as dance or martial arts, but also implicitly embodied domains, such as mathematics. Furthermore, we offer that current motion-sensitive cyber-technologies may enable the engineering of precisely the type of learning environments capable of leveraging embodied artifacts as both means of learning and means for studying how learning occurs. We demonstrate one such environment, the Mathematical Imagery Trainer for Proportion (MIT-P), engineered in the context of a design-based research study investigating the mediated emergence of mathematical notions from embodied-interaction instructional activities. In particular, we discuss innovative features of the MIT-P in terms of the technological artifact as well as its user experience. We predict that embodied interaction will become a focus of design for and research on mathematical learning.

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