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**Multiple representations as tools for discovering pattern and variability – insights into the dynamics of learning processes.**

Wassong, Thomas (ed.) et al., Mit Werkzeugen Mathematik und Stochastik lernen. Heidelberg: Springer Spektrum (ISBN 978-3-658-03103-9/pbk; 978-3-658-03104-6/ebook). 179-192 (2014).

Summary: Dealing with multiple representations is an important learning goal, but also a tool for fostering teaching and learning. It has mostly been explored for algebra and statistics. In this article, we explore how relating different representations can also be used as a tool to foster learning about phenomena of randomness, here concretely for discovering pattern and variability in the context of the empirical law of large numbers. Our case study shows that the process of connecting different representations is quite complex for students and does not establish itself, but helps to foster deep conceptual insights into the duality of pattern and variability.

*Classification:* K40 K50 U70 U60

*Keywords:* multiple representations; randomness; law of large numbers; patterns; variability; board games; computer simulations; absolute frequencies

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