

ZMATH 2014f.00959

Ding, Meixia; Li, Xiaobao

Transition from concrete to abstract representations: the distributive property in a Chinese textbook series.

Educ. Stud. Math. 87, No. 1, 103-121 (2014).

Summary: Through examining a representative Chinese textbook series' presentation of the distributive property, this study explores how mathematics curriculum may structure representations in ways that facilitate the transition from concrete to abstract so as to support students' learning of mathematical principles. A total of 319 instances of the distributive property were identified. The representational transition among these instances was analyzed at three tiers: within one worked example, from the worked example to practice problems within one topic, and across multiple topics over grades. Findings revealed four features that facilitate the transition process in the Chinese textbook series. First, it situates initial learning in a word problem context, which serves as a starting point of the transition process. Second, it sets up abstract representations as an ultimate goal of the multi-tier transition process. Third, it incorporates problem variations with connections in carefully designed tasks that embody the same targeted principles. Fourth, it engages students in constant sense making of the transition process through various pedagogical supports. Implementations and future research directions are also discussed.

Classification: U20 F30 H20

Keywords: concrete representation; abstract representation; representational transition; Chinese textbooks; distributive property

doi:10.1007/s10649-014-9558-y