ZMATH 2016c.00645

Nicolaou, Aristoklis A.; Pitta-Pantazi, Demetra

Hierarchical levels of abilities that constitute fraction understanding at elementary school.

Int. J. Sci. Math. Educ. 14, No. 4, 757-776 (2016).

Summary: This article examines whether the 7 abilities found in a previous study carried out by the authors to constitute fraction understanding of sixth grade elementary school students determine hierarchical levels of fraction understanding. The 7 abilities were as follows: (a) fraction recognition, (b) definitions and mathematical explanations for fractions, (c) argumentations and justifications about fractions, (d) relative magnitude of fractions, (e) representations of fractions, (f) connections of fractions with decimals, percentages, and division, and (g) reflection during the solution of fraction problems. The sample comprised of 182 sixth grade students that were clustered into 3 categories by means of latent class analysis: those of low fraction understanding, those of medium fraction understanding, and those of high fraction understanding. It was found that low fraction understanding students were sufficient in fraction recognition and relative magnitude of fractions, those belonging to the medium category in fraction recognition, relative magnitude of fractions, as well as in connections with decimals, percentages and division and representations of fractions, while high fraction understanding students were sufficient in all 7 abilities. It was also found that these levels were stable across time; the hierarchical levels were the same across three measurements that took place. Possible implications for fraction understanding are discussed, and directions for future research are drawn.

Classification: F43 C33 C43
Keywords: elementary school; fraction understanding; hierarchical levels; sixth grade; students' abilities
doi:10.1007/s10763-014-9603-4