

ZMATH 2014a.00531

McGowen, Mercedes A.; Tall, David O.

Flexible thinking and met-befores: impact on learning mathematics.

J. Math. Behav. 32, No. 3, 527-537 (2013).

Summary: In this paper we study the difficulties resulting from changes in meaning of the minus sign, from an operation on numbers, to a sign designating a negative number, to the additive inverse of an algebraic symbol on students in two-year colleges and universities. Analysis of the development of algebra reveals that these successive meanings that the student has met before often become problematic, leading to a fragile knowledge structure that lacks flexibility and leads to confusion and long-term disaffection. The problematic aspects that arise from changes in meaning of the minus sign are identified and the iconic function machine is utilized as a supportive strategy, along with formative assessment to encourage teachers and learners to seek more flexible and effective ways of making sense of increasingly sophisticated mathematics.

Classification: E45 C35 D75

Keywords: flexible thinking; met-befores; mathematical symbols; minus sign; supportive aspects of function; problematic aspects of minus sign; formative assessment

doi:10.1016/j.jmathb.2013.06.004