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Big Ideas in Bite-Size Pieces: Teacher Knowledge of Mathematics

A growing body of research argues that elementary teachers' ability to support learning is related to their understanding of a specialised domain of mathematics, variously referred to as pedagogical content knowledge or mathematics for teaching. For our purposes, we refer to this knowledge as mathematics for teaching and learning (MTL). Based on our six year study of 573 upper elementary preservice teachers (as well as about 100 in-service teachers), we argue that preservice teachers' knowledge of elementary mathematics remains highly procedural and rule-based, especially upon entry to the education program. Our evidence further suggests that the perception of mathematics as a procedural rule-based subject also persists among many in-service teachers. According to our database related to MTL, preservice teachers who experienced learning in the earlier (i.e.1997) version of the current Ontario elementary curriculum since even as early as grade 4, could not be argued as conceptually stronger than those who were in school prior to this curriculum revision. Our data suggest that preservice teachers still typically perceive mathematics as "something to memorize", with explanations taken to mean simply stating a rule. Teacher candidates with strong mathematics backgrounds were initially only marginally stronger conceptually than their peers. Recent mathematical interventions at our institution include an optional course in 'mathematics for teaching' as well as a mandatory high stakes examination in MTL. These changes have appeared to support stronger participant growth during the teacher education program, but results remain less than satisfactory. Implications for curriculum development, given this climate, will be discussed.