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Prospective Teachers' Generalizing Actions as They Reason about Algebraic and Geometric Representations in an Undergraduate Mathematics Content Course.

The abilities to reason about and generalize mathematical relationships and make sense of different representations are important facets of knowledge for proficiency in teaching middle school mathematics (e.g., Allen, et. al., 2008; Izsak & Sherin, 2003; Morris, 2007; National Research Council, 2001). Teacher preparation programs provide an avenue to develop these skills by engaging prospective middle school teachers (PMSTs) in reasoning, generalizing, and representational experiences as they study mathematics content (CBMS, 2001, 2012). This study examined the actions of one group of PMSTs as they reasoned about algebraic generalizations and geometric representations of even and odd numbers in an undergraduate mathematics content course. Results indicated that "Relating" and "Encouraging Generalizing: Encouraging Relating" (Ellis, 2007) were central in PMSTs' collective reasoning about the different representations. Three of the remaining five generalizing-promoting action categories – "Publicly Sharing a Generalization or Idea"; "Encouraging Justification or Clarification"; and "Focusing Attention on Mathematical Relationships" (Ellis, 2007) – were frequently used as PMSTs made sense of how the algebraic generalizations and geometric representations were related. (Received January 06, 2016)