

1067-Z5-1677

Kevin C. Moore* (kvcmoore@uga.edu), Mathematics and Science Education, 105 Aderhold Hall, Athens, GA 30602-7124. *Quantitative Reasoning and Students' Approaches to Solving Novel Problems.*

This presentation reports on a series of investigations into precalculus students' reasoning when solving novel applied problems. Specifically, this report describes how a student's propensity to reason about quantities and relationships between quantities influences his or her problem solving behaviors. Students with a disposition towards identifying quantities (e.g., measurable attributes) in a problem situation constructed robust images of the problems' contexts. These orientation behaviors supported their using relationships between quantities to plan their solutions. The students were able to anticipate a series of calculations and provide a meaning for these calculations before performing any numerical calculations. In contrast, students who focused on procedures devoid of quantitative meaning were mostly unsuccessful in developing meaningful and correct solutions. These students predominantly executed numerical calculations step-by-step without planning future calculations. They also had difficulty providing a rationale for their solutions beyond referring to a previously learned procedure or formula. This presentation will provide an overview of these results, including insights into students' reasoning abilities that support their solving novel problems. (Received September 21, 2010)