

Relationships between Quantitative Reasoning and Students' Problem Solving Behaviors
Contributed Research Report

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Abstract: This presentation reports on the results of a study into precalculus students' reasoning when solving novel problems. The study intended to identify students' mental actions that support or hinder their ability to provide meaningful and correct solutions, while also characterizing the role of quantitative reasoning in the students' solutions. Analysis of clinical interviews with each student revealed that a student's propensity to reason about quantities and a problem's context significantly influenced his or her problem solving approach. Students who spent a significant amount of time orienting to a problem by identifying quantities and relationships between quantities leveraged the resulting mental images throughout their problem solving activity. Contrary to this, students who focused on recalling procedures and performing calculations spent little time reasoning about a problem's context and encountered difficulty providing meaningful and correct solutions. These findings offer insights into the relationship between students' reasoning and their problem solving behaviors.

Key Words: Precalculus, Problem Solving, Student Reasoning, Quantitative Reasoning