The Occurrence of Transitions in Mathematical Thinking and Mental Model Development

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September 1997

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Research Apprenticeship Report Abstract

In this paper I present findings from a research study examining precalculus students’ thinking. It is my goal to develop a model of student modeling activity based on shifts in thinking that occur while students are engaged in problem solving activities. I also attempt to identify mechanisms that drive shifts in student thinking while they are engaged in problem solving activities. Data were collected by observing students during problem solving activities and collecting samples of students’ work. Data collection occurred in the context of a college precalculus mathematics classroom. I observed groups consisting of three students each (one group at a time) working together on problem solving activities during regular class meetings. Each problem solving activity involved working with a data set from a real world problem.

It is a hypothesis of this paper that transitions or shifts in student thinking that occur during the learning process are significant steps leading to the development of mental models. Accordingly, I will discuss findings from an investigation that seeks to identify the occurrence of shifts or transitions in thinking during problem solving sessions. I will attempt to show that transitions in thinking are significant events in students’ development of mental models while engaged in problem solving tasks.