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During Fall 1999, a multi-year study was initiated to investigate the ways in which a mathematics pedagogy course challenged teaching assistants' (TAs) beliefs about the teaching and learning of mathematics and their teaching practice. Approximately 20 TAs and 4 faculty members participated in the course. A cyclical process of classroom activities-teaching practice-reflection served as a basis for instruction. Several sources of data were collected throughout the course, including interviews, journal entries, questionnaires, and classroom observations. Qualitative analysis of the data indicated that: (1) the TAs changed their beliefs about the teaching and learning of mathematics, and (2) a number of constraints (e.g., institutional, cultural, and a lack of appropriate models of teaching) acted as barriers prohibiting the TAs from changing their instructional practice. Redesigned course syllabi, teaching mentors, and examples of effective teaching practice, will be incorporated in the course and studied during the next phase of the study. (Received September 26, 2000)