

ABSTRACT

An abstract of the dissertation of Jennifer Ann Noll for the Doctor of Philosophy in Mathematics Education presented July 12, 2007.

Title: Graduate Teaching Assistants' Statistical Knowledge for Teaching

This dissertation explores graduate teaching assistants' (TAs') statistical knowledge for teaching. Data collection methods that enabled the exploration of TAs' statistical knowledge for teaching include: (a) a task-based web survey administered to 68 TAs from 18 universities across the United States; and, (b) a series of three task-based interviews with a subset of five TAs from the larger survey population. Through qualitative research methods consistent with a constant comparative approach (Glaser and Strauss, 1967), I investigated the ways in which TAs reason about sampling tasks, and how they think about teaching and student learning in relation to sampling ideas.

Building on past research in statistics education on K-12 and tertiary students, and K-12 teachers, I present conceptual frameworks that characterize how TAs' reason about sampling concepts within experimental data and statistical inference contexts. Specifically, I discuss: (1) tensions TAs' appeared to experience between their knowledge of theoretical probability models and their expectations of experimental data; and, (2) a spectrum of reasoning about statistical inference that ranged from no conception of repeated sampling to strong conceptions of repeated sampling. Using research on teacher knowledge, and the construct of mathematical knowledge for teaching (Ball, Lubienski, & Mewborn, 2001), I propose a model for what statistical

knowledge for teaching sampling concepts might look like. I use this model to discuss the statistical knowledge for teaching demonstrated by the TAs in this study and to suggest areas in need of improvement. I discuss the implications of research on TAs' statistical knowledge for teaching on graduate and undergraduate education and directions for future research in this area of stochastics education.