ABSTRACT

PRESERVICE TEACHERS' KNOWLEDGE AND USE OF TRANSNUMERATION

Michael C. Daiga

This multi-method study used a seven-task survey and paired-interviews to explore preservice teachers' Statistical Knowledge for Teaching with regards to their understanding of transnumeration, a type of statistical thinking involving graphical representations where readers translate a dataset into different forms (e.g., tables to bar graphs, stem-and-leaf plots to histograms) exposing numeracy. AP-Statistics released items were used to write 16 multiple-choice tasks designed to reveal preservice teacher knowledge of transnumeration. Based on reaction from four inservice teachers to the initial tasks, eight were revised and presented in survey form to 37 preservice secondary mathematics teachers. The survey also included questions about the preservice teachers' beliefs about their ability to complete the tasks and teach the content in the tasks to secondary school students. Thirty-two of the preservice teachers were then interviewed about their solutions to the tasks and other topics relating to teaching statistics. Survey and interview data were synthesized into constant comparison tables to provide a holistic perspective of each participant's knowledge. Preservice teachers generally lacked exposure to statistical language and in cases statistical literacy, which resulted in limited descriptions of the statistics within the tasks, limited ability to describe the statistics in a graphical representation, and significant difficulty using transnumeration to interpret a specific context. Preservice teachers were more comfortable with the graphical representation portion of a task than interpreting the written portion, which often led to a false confidence or belief they understood the information being presented in a graphical representation. Preservice teachers commonly recommended teaching the content in tasks with transnumeration, even when their content

knowledge did not seem to be adequate for fully completing a task. Finally, preservice teachers who were able to articulate types of pedagogical knowledge developed responses that included demonstrating content knowledge of transnumeration in a task.