STUDENTS’ REASONING ABOUT SAMPLING DISTRIBUTIONS AND
STATISTICAL INFERENCE

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Abstract

This talk focuses on results of a classroom teaching experiment addressing ideas of sampling, variability, distribution, and statistical inference. Instruction engaged students with the aim that they develop an orientation to view these as a system of interrelated ideas. The instructional agenda emphasized building connections among these ideas by anchoring them on the foundational notion of sampling distributions—that is, patterns of dispersion one conceives as emerging in a collection of a sample statistic’s values that aggregate over the long run. Toward this end, two overarching themes were stressed in the content of instruction: 1) the process of randomly selecting samples from a population can be repeated under similar conditions, and 2) judgments about sampling outcomes (i.e., a statistic’s value) can be made on the basis of relative frequency patterns that emerge in collections of outcomes of similar samples.

Instructional activities made extensive use of computer simulations of drawing many samples and engaged students in whole-class discussions about the simulations’ results. Analyses explore students’ thinking in relation to their engagement in activities and are oriented toward characterizing their thinking in terms of dynamic imagery, coordinated conceptual operations, and schemes thereof.