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Students' understanding of expected value of a random variable

This study explores the students' understanding of the notion of the expected value of a random variable. In particular, the study attempts to find out whether students understand the statistics notion (the expected value of a random variable) in relation to the underlying mathematics concepts and whether students develop misconceptions that are related to statistics symbols and language. The data were collected from eight students who were enrolled in a calculus-based junior-level university statistics course. The results suggest that many students develop misconceptions in their understanding of the statistics term "random" and the symbol E(X), which are caused by linguistic and notational contamination. The study further suggests that while the majority of students are able to develop computational accuracy in arithmetic, enabling them to calculate the expected values of estimators, most students lack understanding of the mathematical definition of the expected value of a random variable, that is, the mathematical concepts that underlie the notion of the statistics concept.

Keywords: calculus-based statistics, expected value, mathematical understanding, misconception