



A comparative study of statistical inference from an educational point of view

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Abstract

Inferential statistics is the scientific method for evidence-based knowledge acquisition. The underlying logic is difficult and the mathematical methods created for this purpose are based on advanced concepts of probability, combined with different epistemological positions. Many different approaches have been developed over the years. Following the classical significance tests of Fisher and the statistical tests by Neyman and Pearson, and decision theory, two more approaches are considered here using qualitative scientific argument: the Bayesian approach, which is linked to a contested conception of probability, and the rerandomization and bootstrap strand, which is bound to simulation. While Barnett (1982) analysed statistical inference from a mathematical/philosophical perspective to shed light on the various approaches, we analyse from the grand scenario of statistics education and investigate the relative merits of each approach. Some thoughts are developed to reconsider informal inference, which bases teaching on rerandomization and bootstrap and reduces probability to a frequentist concept. The ideas are designed to initiate a deeper discussion about learning paths towards inference.

Keywords: Schools of inference; statistical thinking; learning paths for inference; informal inference.