Concepts of Statistical Inference: A Randomization-Based Curriculum

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Abstract: I present ideas and activities for helping students to learn fundamental concepts of statistical inference with a randomization-based curriculum rather than normal-based inference. I propose that this approach leads to deeper conceptual understanding, makes a clear connection between study design and scope of conclusions, and provides a powerful and generalizable analysis framework. I present arguments in favor of such a curriculum, demonstrate some activities through which students can investigate these concepts, highlight some difficulties with implementing this approach, and discuss some pedagogical questions to be resolved.

Allan Rossman is Professor of Statistics at Cal Poly– San Luis Obispo. His Ph.D. is in Statistics, from Carnegie Mellon University. He is co-author of the Workshop Statistics series and also of Investigating Statistical Concepts, Applications, and Methods, both of which adopt an active learning approach to learning introductory statistics. He is a Fellow of the American Statistical Association and was Program Chair for the 2007 Joint Statistical Meetings. He serves as Chief Reader for the Advanced Placement program in Statistics and is Past-President of the International Association for Statistical Education. He was one of the recipients of the Mathematical Association of America’s Haimo Award for Distinguished College or University Teaching of Mathematics in 2010.