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**A pilot study teaching metrology in an introductory statistics course.**

Summary: Undergraduate students who have just completed an introductory statistics course often lack deep understanding of variability and enthusiasm for the field of statistics. This paper argues that by introducing the commonly underemphasized concept of measurement error, students will have a better chance of attaining both. We further present lecture materials and activities that introduce metrology, the science of measurement, which were developed and tested in a pilot study at Iowa State University. These materials explain how to characterize sources of variability in a dataset, in a way that is natural and accessible because the sources of variability are observable. Everyday examples of measurements, such as the amount of gasoline pumped into a car, are presented, and the consequences of variability within those measurements are discussed. To gauge the success of the material, students' initial and subsequent understanding of variability and their attitude toward the usefulness of statistics were analyzed in a comparative study. Questions from the CAOS and ARTIST assessments that pertain to using variability to make comparisons, understanding the standard deviation, and using graphical representations of variability were included in the assessment. The results of the comparative study indicate that most students who were exposed to the material improved their understanding of variability and had a greater appreciation of the value of statistics.

*Classification:* K45 C25
*Keywords:* stochastics; statistics; university teaching; introductory courses; undergraduate curriculum; deep understanding; measurement errors; multiple observations; misconceptions; metrology; variability in data; data collection educational research; comparative studies; measurement process; student attitudes; student perceptions; conceptual understanding; learning objectives; course materials; educational media; lecture notes; group activities; content assessment
http://ww2.amstat.org/publications/jse/v22n3/casleton.pdf