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Using Simulations to Discover the Truth About the Sampling Distribution of Means.

Students take random samples drawn from the population of random digits (a uniform distribution). Each student has a different sample size, assigned by the instructor. Usually sample sizes vary from 10 to 150. Each student draws the same number of samples. The simulations are done as an out-of-class assignment. Each student reports the sample size, the mean of the sample means and the standard deviation of the sample means. To insure that all the students understand the process the students each draw a few samples of size 5 in class. The sample means are recorded and the mean and standard deviation of the sample means are computed. At the next class meeting students provide the information requested. A scatter plot of sample size vs. mean of the sample means reveals that the mean of the sampling distribution is very close to 4.5 for all sample sizes (4.5 is the mean of a uniform distribution of random digits). A scatter plot of sample size vs. standard deviation allows the students to discover that the standard deviation of a sampling distribution of means is the population standard deviation (2.87 for the digits) divided by the sample size. Comparison of the histograms of the sampling distributions for different sample sizes allows the class to discover the CLT. (Received July 30, 2005)