Statistical Significance: What is it?

NCTM Boston, April 2015

Statistical problem solving process:

1. Formulate a question that can be answered with data.
2. Design a plan and collect appropriate data.
3. Analyze the collected data by graphical and numerical methods.
4. Interpret the analysis with respect to the original question.

Guidelines for Assessment and Instruction in Statistics Education (GAISE)
http://www.amstat.org/education/gaise/GaiseCollege_full.pdf

A Progression of Statistics from CCSS-M Grade 6 through Grade 12

Domain: Grade 6 - Statistics and Probability

Cluster: Develop understanding of statistical variability.

Standard: 6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

Standard: 6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Standard: 6.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Cluster: Summarize and describe distributions.

Standard: 6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Standard: 6.SP.5 Summarize numerical data sets in relation to their context, such as by:

a. Reporting the number of observations.

b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

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Domain: Grade 7 - Statistics and Probability

Cluster: Draw informal comparative inferences about two populations.

Standard: 7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

Standard: 7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

High School Conceptual Category: Statistics and Probability

Domain: Interpreting Categorical and Quantitative Data

Cluster: Summarize, represent, and interpret data on a single count or measurement variable

Standard: S-ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

Standard: S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

Standard: S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Standard: S-ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Domain: Making Inferences and Justifying Conclusions

Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies

Standard: S-IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

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