Updates to www.stapplet.com for the 2022–2023 School Year (Detailed version)
July 30, 2022

1. **Homepage/General**:
    a. Reorganized to create new "Concepts" category.
    b. Categories for Simulation-Based Inference and Traditional Inference have been removed, as these were simply links to the various Data Analysis applets.
    c. Preference options have been updated to allow for more color choices.
    d. Will read both – and - as a negative sign when copying-and-pasting data.
    e. Enhancements to Collaborative applets:
        i. Addressed an issue where data added to collaborative applets "flickers" in and out of student and teacher screens; this should occur far less often
        ii. Teacher screens in collaborative applets refresh more often to aid in demonstration
        iii. Student screens in collaborative applets refresh slightly less often to lower database loads

2. **Data Analysis: New Applets**
    a. Collaborative version of *One Quantitative Variable, Multiple Groups*. Perfect for collecting data that will result in parallel dotplots (e.g., The Federalist Papers activity, The Craft Stick activity, etc.). One-click export to non-collaborative applet for inference options.
3. **Data Analysis: Improvements**
    a. *One Categorical Variable, Single Group*
        i. Percentile bootstrap intervals available in Simulate sample count and Simulate sample proportion/percent options in inference menu.
    b. *One Categorical Variable, Multiple Groups* & *Two Categorical Variables*
        i. Mosaic plot option now is a square and has horizontal scale along the top.
    c. *One Quantitative Variable, Single Group*
        i. Collaborative version has one-click export to non-collaborative applet for inference options.
        ii. Normal Probability Plot option in graph menu
        iii. Option to show parallel boxplot over dotplot, histogram, NPP
        iv. Percentile bootstrap intervals available in Simulate sample mean option in inference menu.
        v. Inference for standard deviation (σ) – tests and confidence intervals
        vi. Sign test for paired data/median of population
        vii. Wilcoxon signed-rank test for paired data/median of population
    d. *One Quantitative Variable, Multiple Groups*
        i. New collaborative version has one-click export to non-collaborative applet for inference options.
        ii. New data entry option if copying and pasting from a data set where columns are variables (1 quantitative and 1 categorical).
        iii. Normal Probability Plot option in graph menu
        iv. F test for ratio of variances

v. ANOVA now includes full ANOVA table in output, with option for Fisher's LSD intervals for follow-up analysis
vi. Wilcoxon rank-sum test
vii. Kruskal-Wallis test

e. *Two Quantitative Variables*
i. Collaborative version has one-click export to non-collaborative applet for inference options.
ii. Traditional regression output available when calculating linear model
iii. Prediction interval for value of response variable (including option to show boundaries graph)
iv. Confidence interval for mean value of response variable (including option to show boundaries graph)

f. *Multiple Regression*
i. More detailed regression output now available.

4. Probability: New Applets

a. *Poisson Distributions*
b. *t Distributions* (cdf and invT)
c. χ^2 *Distributions* (cdf and invχ^2)
d. *F Distributions* (cdf and invF)

5. Probability: Improvements

a. *Normal/t/χ^2/F Distributions*:
i. Clicking up/down arrows in mean/sd/df boxes immediately updates graph
ii. Clicking up/down arrows in boundary/area boxes immediately updates calculations
iii. Option to show labels (boundaries, area, curve mean/sd or df) available
iv. Reports relevant probabilities as ≈0 or ≈1 instead of =0 or =1.

b. *Binomial Distributions*:
i. Clicking up/down arrows in *n* and *p* boxes immediately updates graph
ii. Clicking up/down arrows in boundary boxes immediately updates calculations
iii. Reports relevant probabilities as ≈0 or ≈1 instead of =0 or =1.

6. Concepts: New Applets

a. *The Idea of Probability* – Similar to applet of same name from TPS/SPA. Illustrates the idea of probability/law of large numbers with coin flipping.
b. *Law of Large Numbers* – Similar to the Idea of Probability, but with Mrs. Gallas shooting free throws.
c. *Simulating Sampling Distributions* – Similar to classic applet at onlinestatbook.com.
i. Allows user to explore sampling distribution of $\bar{x}$, s, and s^2 using different population shapes and sample sizes.
ii. Can also choose categorical population to simulate sampling distribution of $\hat{p}$ (similar to Reese's Pieces applet at rossmanchance.com).
iii. Boxes help students clearly distinguish the population/sample/sampling distribution.

d. *Simulating Confidence Intervals* – Similar to the simulating confidence intervals applet at rossmanchance.com and other applets.
    i. Allows user to explore capture rate of confidence intervals for μ using different population shapes, sample sizes, confidence levels, and method of calculation (t, z with σ, z with s).
    ii. Can also explore confidence intervals for p by choosing the categorical population, along with the value of p, sample size, and confidence level.
e. *Logic of Significance Testing* – Similar to applet of same name from TPS/SPA and *Is Mrs. Gallas a Good Free-Throw Shooter?*
f. *Power* – Allows user to calculate and illustrate power for a test of a single proportion and a test of a single mean.
    i. Clicking up/down arrows in entry boxes allow users to see impact of changing sample size, α, and effect size.
    ii. Option to show rejection region. Hovering over rejection region shows values of $\bar{x}$ or $\hat{p}$ that lead to a rejection of H_0.

7. Activities: New Applets

a. *Guess the Correlation* – Similar to applet of same name at rossmanchance.com.
    i. Calculates the error for each guess to help with in-class contests.
b. *Froot Loops* – A new option for the *M&M'S/Skittles* activity applet
c. *Old Faithful* – Simulates the sampling distribution of the sample slope by sampling from the population of Old Faithful eruptions. Based on an activity in TPS/SPA.