In-Class Project 2

Submit in group. Due March 4th.

The second in-class project aims to implement Excel to analyze data and make inferences concerning two populations. I will provide ACT test scores for five high schools in Fayette County from 2003 to 2017. You need to analyze the data and test if two schools have same quality.

1 Data

We will still be using the Fayette County high schools' data. I have uploaded a new data set for this project in Canvas. Notice, unlike the first project, the sample size has increased.

2 Descriptive Statistics (20 points)

First, I want you to summarize the data in a similar way as you have done in the first project. Actually this is often what we do whenever we have a data set, regardless of whether it is stock performance, sale records, or unemployment rate for each state. The first thing you want to do is always to check the mean, standard deviation, maximum and minimum.

I want a table(s) showing the above four statistics of English, Math, Reading, and Science for each school in Fayette County. (10 points)

I also want a graph(s) showing the comparison of time trend for each test type. (10 points)

3 Do Schools Differ in Quality? (80 points)

After you have summarized the data for each school, now we would like to know if two school really differ in school quality, that is test scores. Recall what we have done in the first project, where you compare different schools mainly by their mean test scores. Now we know the mean is point estimate, and we have learned interval estimation and hypothesis testing, which enable us to test the hypothesis that whether two schools differ at a given confidence level. Throughout the entire analysis, we use $\alpha = 0.05$.

3.1 Assume population variance is known to you (based on your calculated variance), do schools differ in English test scores? Setup hypothesis testing for each pairwise schools and analyze.

3.2 Assume population variance is known (based on your calculated variance), do schools differ in Math test scores? Setup hypothesis testing for each pairwise schools and analyze.

3.3 Assume population variance is unknown, do schools differ in Reading test scores? Setup hypothesis testing for each pairwise schools and analyze.

3.4 Assume population variance is unknown, do schools differ in Science test scores? Setup hypothesis testing for each pairwise schools and analyze.