Empirical Teaching and Learning Trajectory:

Initial Assessment Results (Week 1)

Overall most of the students lacked conceptual understanding when it came to calculating measures of center. Students struggled with understanding what mean, median, and mode represented. Many students identified these measures of center using intuition about “average,” “middle,” or “typical.” When describing the mean, the students described how they could “add the numbers and divide by how many there are” (Flynn). When describing the median, students frequently chose the value that came in the middle (e.g., 2nd/3rd/4th), or described it as being the “middle value” or “middle number.” When describing the mode, students described the measure as the “wrapped up, repeated number” or the “most common number.”

Flynn adopted some adapitve teaching toward the end of week 1. Students quickly discovered various reasons for choosing certain measures of center, but did not have time to delve into formal measures of variability, which are also required in the 6th Grade Common Core.

Understanding Data (Week 2, 3, 4)

These lessons focused on having the students generate and analyze dot plots to represent data sets. Students learned to use dot plots to organize the data into categories and to answer questions about the data set (e.g., “What is the middle data value?”). Students also had the opportunity to analyze data sets using graphical representations (e.g., dot plots) and to communicate their findings to others. These lessons also included an introduction to the concept of measures of center, including the mean, median, and mode.

Understanding Mean (Week 5, 6)

As students gained experience with dot plots and comparing data, they began to understand the importance of measures of center. Students identified the mean as the average, the median as the middle, and the mode as the most frequent. Students also began to understand that the mean is affected by extreme values, while the median is not.

Students worked on constructing the mean cube representation above the dot plot representation they had learned earlier. Students also used probability to identify the middle data value within a dot plot. Students also developed an understanding of the mean as a balance point and began to see how the mean can be used to represent data sets.

Measures of Center (Week 7, 8)

As students become more familiar with the mean, they began to use it as a measure of center for numerical data sets. Students also learned how to calculate the mean using a calculator and how to interpret the mean in the context of the data set.

Students continued to work on understanding measures of center, including the mean, median, and mode. Students also learned how to calculate the mean using a calculator and how to interpret the mean in the context of the data set.

Post-Assessment Results (Week 9)

Overall students gained conceptual understanding when it came to calculating measures of center. Students were able to use measures of center to represent a data set, and they were able to calculate the mean, median, and mode for various data sets. Students were also able to use measures of center to make predictions about a data set, and they were able to calculate the mean, median, and mode for various data sets.

Students gained procedural fluency and strategic competence in selecting and constructing display data. In the final interviews, students chose to represent data by using dot plots with a single bar for the initial interview, and they used the dot plots to represent the data. These displays helped them to locate the centers of data sets.