**6.SP Average Number of Siblings**

**Task**

The number of siblings for a group of sixth grade students is shown below:

1, 0, 2, 1, 6, 0, 2, 0, 1, 10.

a. Make a dot plot of the data.

b. Find the mean and median of the data.

c. What does the mean tell you about the data? What about the median?

d. Which measure of average (mean or median) do you think best describes the data? Why?

**IM Commentary**

The goal of this task is to compare the mean and median in a context where the data is slightly skewed to the right. The two large data values raise the mean significantly while not impacting the median. The mean communicates the mathematical average of the number of siblings while the median shows that most of the students have very few siblings. While it has not been requested (in the interest of making this task more accessible), a box and whiskers plot would communicate both the median value and the fact that the data is skewed to the right.

The dot plot has been included for practice and to give visual reinforcement of what it means for data to be skewed to the right. For data which is more heavily skewed, the median is usually used instead of the mean to communicate the "average" value: two
important everyday examples of this are house prices and personal income. Teachers may wish to gather actual data from their students instead of using the supplied data. It will not necessarily be skewed to the right but this is still likely.

**Solution**

a. A dot plot of the data is shown here:

We can see that the data is skewed to the right by the two large values of 6 and 10.

b. To find the mean, we first sum up the numbers of siblings to find a total of 23. There are ten data points so the mean is \( \frac{23}{10} = 2.3 \). For the median, there are an even number of data points so the median is the average of the middle two. Listing them in increasing order \((0,0,0,1,1,1,2,2,6,10)\) the middle two values are both 1's so the median is 1.

c. The mean gives the overall average number of siblings. So there are an average of 2.3 siblings in the student families. The mean does not communicate, however, how these siblings are distributed between the different families.

The median is the average of the middle two values. The fact that the median is 1 tells us that at least half of the students have either 1 sibling or 0 siblings. This is a lot of information. On the other hand, it does not give us any indication how many siblings are in the other families: there could be as few as 1 but there could also be many.

d. These middle two values for the number of siblings are representative of an "average" family so we could argue that the median is a better measure of center as it represents the number of siblings in a typical family. For the mean, a large contribution is made by the two students with 6 and 10 siblings: this accounts for 1.6 of the overall value of 2.3 of the mean. While the mean does not represent an average family (in the
sense that none of the students has 2 siblings), it is still important. When we read in the newspaper about an "average" family with 1.6 children, this average is the mean. City planners who have to decide where to put schools and how many schools to build will care about the mean more than the median.