# Appendix V A Lesson Example: Central Tendency of Data

00:01 Teacher: Dear all of you, we recently conducted a physical fitness test. How did you do?

00:08 Student A: The boys took the long-distance running test, standing long jump, and seated forward bend. The girl took the 800-meter long-distance running test, and sit-ups.

00:50 Teacher: I have also collected some data here. Of course, there are no names of specific students on it. These data can help us understand everyone’s physical condition. So, how to extract useful information from this data?

01:20 Student B: Can you see the shortest time of our long-distance running results? In this way, we can know who is first.

01:38 Student C: You can rank the long jump results from near to far and draw a table.

01:54 Student D: You can also calculate the average to know the approximate average physical test of our class.

02:02 Teacher: This requires us to learn the central tendency of the data. (Write on the blackboard: Central tendency of data)

02:07 Students: (Some students read aloud) The central tendency of the data.

02:48 Teacher: The central tendency of data is a statistic that describes the “centre” or “typical value” of the data. It can help us understand the overall situation of the data.

03:03 Teacher: (Show the PowerPoint slide) Common central tendency statistics include mean, median and mode. First, let’s look at averages. The average is the sum of all the data and then divided by the number of data. It represents the “average” of the data.

03:29 Teacher: Look at the average calculation process of physical fitness test data (teacher show the PowerPoint slide). There are 36 students in our class who took the physical fitness test. The teacher first added up the 36 scores and got their sum as this. Then, divided by the number of people taking the test, 36, the final result is the average of the physical fitness test data. This is very familiar to you. Have you studied it before? do you remember?

05:38 Students: Yes.

05:50 Teacher: Next, let’s look at the median. (Show the PowerPoint slide) The median is the number in the middle after sorting the data from small to large. If the number of data is an odd number, the median is the middle number; if the number of data is an even number, the median is the average of the two middle numbers. It represents a “moderate level” of data. Is the median the same as the mean?

08:02 Student B: It’s different. The average may not be in the middle. For example, if we average the 100-meter running results of everyone in our class with Bolt, the final result may be shorter than many people’s. But for the median, even adding a Bolt might not change much.

08:38 Teacher: Very good! In fact, the median is to measure the middle level and avoid some values that are too high or too low from affecting our judgment of the entire set of data. How to calculate the median?

09:15 Student E: The data should be arranged from small to large, and then the middle number should be taken.

09:43 Student F: I have something to add. For example, if there are 10 data, the median should be the average of the 5th and sixth data.

10:03 Teacher: Very good addition! Please see how the median of our class’s physical health test data is calculated (showing the calculation process in the PowerPoint slides)

15:20 Teacher: Finally, let’s look at the mode. The mode is the number that appears most frequently in the data. It represents the “typical value” or “most common value” of the data. Please look at the mode of the physical fitness test data. Which data appears the most?

15:59 Student D: Standing long jump is 2.26m, the most common one, with 3 people; sit-ups, 40m is the most common, with 5 people.

18:38 Teacher: Yes, so 2.26 is the mode of these 36 standing long jump data, and 40 is the mode of these 36 sit-up data.

19:22 Teacher: Now, let’s do a group activity. Please use the physical fitness test data we collected to calculate the mean, median and mode of boys’ 1000-meter long-distance running and girls’ 800-meter long-distance running data and analyse what these data can tell us.

19:51 (Students use calculators to perform calculations; teachers inspect and provide guidance)

28:30 Student G: I calculated that the average time of boys’ long-distance running is 210 seconds, and the median is 208 seconds. There is no mode because each data only appears once.

30:11 Student H: I calculated that the average time of girls’ long-distance running is 219 seconds, the median is 217 seconds, and the mode is 262 seconds. Each data appears twice.

31:28 Teacher: Very good, so what information do you get from these statistics?

31:58 Student I: There is not much difference between the mean and the median, but the mode is very different, which may not be suitable for analysing this data.

32:48 Teacher: Great analysis! Through these statistics, we can better understand the central tendency of the data and draw some meaningful conclusions. (Show the PowerPoint slide) The average can help us understand everyone’s overall physical level. The median can tell us that half of the students have a higher or lower physical level than this value. The mode may indicate that a specific physical index is higher or lower among everyone. It is relatively common.

35:29 Students: (copying, taking notes).

39:48 Teacher: Through today’s activities, we learned how to calculate and analyse the central tendency of data. I hope everyone can apply this knowledge to real life and solve problems through data analysis.