Which Shoe?

Annotation

Luke is able to draw a valid conclusion, using supporting evidence from statistical graphs and by using wider knowledge of the context. He is able to recognise whether data needed to be cleaned and to discuss appropriate reasons for variations in the data.

Problem: Which Shoe?

The teacher poses this problem:

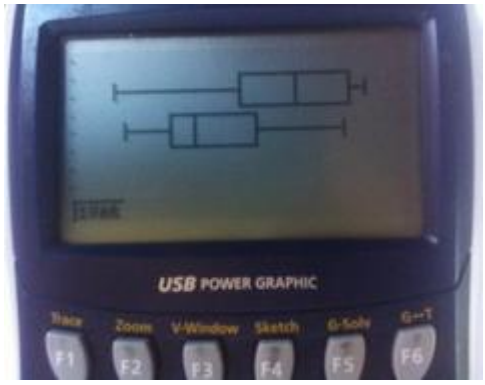
Anna is training for a 10 km road race. She has two good pairs of running shoes. One pair is a traditional shoe and the other is a barefoot style. She wants to use the pair that she is fastest in for the race. She looks at the times (to the nearest minute) for her recent 10 km training runs for these two pair of shoes.

Barefoot (minutes)	*Traditional (minutes)*
59	*54*
54.25	*56.75*
55.75	*56.75*
56	*58*
58	*58*
57.75	*57.75*
56.5	*58.25*
55.75	*59.5*
55.5	*59.25*
55.5	*56.75*
54.75	*58*
55	*59*
56.25	*59.25*

Construct and use a box and whisker graph to compare Anna's 10 km runs in her different shoes and suggest which pair she should wear for her race.

Student Response

Teacher:	Tell me about your investigation.
Luke:	I've put Anna's data into my calculator and drawn two box and whisker graphs. The top one is the traditional shoe which has both the slowest and the fastest times. So just looking at the numbers in the table, I couldn't tell which type of shoe is best. But then on the graphs it's very clear.



Teacher: Why is it very clear?

Luke: Well, the traditional show box is a lot further up the scale than the barefoot one. There is a bit of overlap, but both the medians are outside the overlap. This means it is clear that the traditional shoe gives bigger times (so is slower) than the barefoot shoe. So, I would claim that the barefoot shoes tend to give faster times for the 10 km race.

Teacher: Did any of the data need to be 'cleaned'?

Luke: No. All of the times were similar and realistic. If there **was** a time like 5.5 minutes I would have obviously taken that out because it would be impossible. But there's lots of reasons for slightly different times within the range that she got.

Teacher: Such as…?

Luke: It could be really windy that day, or she could be on a hilly course or injured or just tired. There are lots of reasons why she might be slow one day.

Teacher: So which pair of shoes should Anna race in?

Luke: The barefoot shoe because these times tend to be faster than the traditional shoes and this is shown in the graphs.