Data processing, presentation & interpretation (AS)

L1 Interpret diagrams for single-variable data, including understanding that area in a histogram represents frequency. Connect to probability distributions.

L2 Interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population (calculations involving regression lines are excluded). Understand informal interpretation of correlation. Understand that correlation does not imply causation.

L3 Interpret measures of central tendency and variation, extending to standard deviation. Be able to calculate standard deviation, including from summary statistics.

L4 Recognise and interpret possible outliers in data sets and statistical diagrams. Select or critique data presentation techniques in the context of a statistical problem. Be able to clean data, including dealing with missing data, errors and outliers.

For a brief commentary on this content go to the MEI outline SoW.

Pre-requisites

- GCSE: General data handling content.
- GCSE: Understand how box plots & histograms are constructed.

Common student errors

- Forgetting to use frequency density for histograms with unequal widths.
- Using incorrect formulae for the standard deviation or using the root mean square deviation instead.
- Confusing ‘association’ with ‘correlation’ and misuse of the term ’data’ to represent ‘underlying population’.

Teaching it!

- **Coming soon** A series of videos designed to support students on this topic.
- Histogram reconstruction: Students build histograms from partial information.
- Averages inquiry: An Inquiry Maths prompt where students generate examples & counter-examples.
- Anscombe’s quartet, Datasaurus Dozen & Which list is which? (from Nrich): A selection of tasks focusing on the importance not just relying on summary statistics to analyse data.
- Understanding standard deviation: A lesson plan focussed on developing understanding.
- Data Matching: Nrich activity exploring probability distributions of data sets (data sets in Desmos)
- Casio graphic calculator student task: Mean & standard deviation, Single variable data, Bivariate data

Getting them thinking

- A set of 11 data values has a mean of 8 and a standard deviation of 2. At least one of the data items is the value 8. This single value is removed from the set. What will happen to the standard deviation of the remaining values? The standard deviation: A) Increases B) decreases C) Is unchanged D) insufficient information is given.
- In 2013 12.3% (you could look up latest figure) of sixth form students do A level Maths – compare this to the figure for your school/college. How many would you need to have doing A level Maths in your school/college to have unusually many (or unusually few)?
- What events are these?: A set of graphs with clues to help student’s with their guesses.