

## **Introducing Data Literacy**

### **Course overview**

A103 is a nine-week, online course for anyone who wants to understand the basics of using, managing and interpreting data, particularly in education and assessment contexts. The course will appeal particularly to exam board staff, teachers, school leaders and civil servants.

### **Data in life, society and education**

The aim is to introduce you to the role of data in education and assessment specifically, and in the workplace and world more generally. We will cover what it means to be data literate and why it matters.

### **What is data and where does it come from?**

We will consider where you encounter data in your life. You will be introduced to different sources and types of data, including distinctions between raw and derived data, structured and unstructured data, discrete and continuous data, and big data. Distinctions between opportunistic and designed data collection will be introduced. Specific variable types will be discussed, including numeric and categorical and the difference between qualitative and quantitative categorisation.

### **Working with data**

We will consider good practice in storing and managing data. We will provide some information about alternatives to spread sheets and why and when these should be used, but, given spread sheets' ubiquity, the main focus will be on spread sheets, with data arranged into columns (variables) and rows (observations).

Data structures and usage of 'long' and 'wide' formats will be introduced. Good practices to adopt and bad practices to avoid (for example why data should not be encoded via formatting) will be covered. Key aspects of staying legal and ethical will also be discussed, as will general 'data hygiene'.

### **Turning data into information**

You will be introduced to ways that data can be turned into information. Initially, the focus will be on visualisations: scatter plots, bar charts, line graphs, box plots and histograms. We will consider the types of data required for each, how to interpret them, and when they would be used.

We will then focus on simple summaries and descriptors: frequency tables, mean, mode, median, and measures of spread. You will be introduced to what these mean, how to calculate them, and some common risks or misinterpretations.

Examples will use Excel, but alternatives will be sign-posted with suggestions for how to find out more.

### **Telling a story with data**

We will view simple case studies that tell a story with data, and think about where the data has come from, how it has been analysed, and how the visualisations and summaries tell a story.

### **More about statistics**

The concept of descriptive vs. inferential statistics will be discussed. You will have the opportunity to consolidate your understanding of fundamental statistics or learn about more advanced statistics - including confidence intervals, tests for comparing groups (e.g. t-test), and correlation and regression (noting the difference). The focus will be on conceptual understanding, interpretation and on avoiding misunderstandings, rather than on calculation.

The aim is to equip you with the knowledge you need to understand and critique statistical information you encounter in your professional life.

### Becoming a data sceptic

We will explore case studies that use more complex methods. We will think about where the data might have come from, whether the questions can really be answered by the data, and whether the interpretation is supported. We will also consider how you might interpret or summarise information in a report.

### How does data literacy apply to you?

We will review the topics covered and reflect on what has been learned, once again asking how you can most effectively use data in your work. The course offers the opportunity to do an assignment to show you understand and can apply the knowledge learned.

### Pre-requisites for A103

You should be numerate and comfortable using Excel.

Potential participants should check the list of specific skills/knowledge below and refresh/revise where necessary, using the recommended resources below, before the course begins.

| Skills/knowledge  | Resources   |
|---|---|
| <ul style="list-style-type: none"> <li>Know that the order of operations (addition, subtraction, multiplication and division) matters</li> </ul>  | <a href="#">BBC Bitesize revision</a><br><a href="#">Khan Academy revision</a>  |
| <ul style="list-style-type: none"> <li>Know how to round a number to a given number of decimal places</li> <li>Know how to round a given number to a given level (e.g., to the nearest million)</li> <li>Be able to estimate the results of calculations by using rounding</li> </ul> | <a href="#">BBC Bitesize revision</a><br><a href="#">Khan Academy revision</a>  |
| <ul style="list-style-type: none"> <li>Know that proportions can be expressed as fractions, percentages and decimal numbers between 0 and 1</li> <li>Be comfortable interpreting proportions</li> <li>Be able to convert between percentages, fractions and decimals</li> </ul>       | <a href="#">BBC Bitesize revision</a><br><a href="#">Khan Academy revision</a><br><br><a href="#">MathCentre</a>  |
| <ul style="list-style-type: none"> <li>Be able to calculate a given percentage of a given value (e.g., 16% of 345,000)</li> <li>Be able to calculate percentage increase and decrease</li> </ul>  | <a href="#">BBC Bitesize topic</a><br><a href="#">BBC Bitesize revision</a><br><a href="#">MathCentre</a><br><a href="#">Khan Academy revision</a>              |
| <ul style="list-style-type: none"> <li>Be able to add, subtract, multiply and divide values in Excel using cell references</li> </ul>   | Microsoft support:<br><a href="#">Excel - Multiply and divide numbers</a><br>Microsoft support:<br><a href="#">Excel - Calculation operators and precedence</a> |