

Next Generation Higher National Unit Specification

Data Visualisation (SCQF level 8)

Unit code: J6CF 48
SCQF level: 8 (16 SCQF credit points)
Valid from: session 2023–24

Prototype unit specification for use in pilot delivery only (version 1.0) June 2023

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

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Unit purpose

This specialist unit introduces learners to the principles and practice of data visualisation in the context of the wider data science process. It is particularly suitable for learners who are studying the Higher National Diploma (HND) in Data Science or related subjects.

Although no previous knowledge or experience of data visualisation is required, previous experience of handling datasets is assumed.

Learners experience a wide range of types of data visualisation, and the contexts in which they are most useful, and learn to recognise and critique misleading visualisations. They acquire and clean data, use software to create visualisations, and demonstrate competence in incorporating them in storytelling through data.

On completing this unit, learners can use visualisation techniques to an advanced level and have experience of selecting and applying them to create insights into datasets.

Unit outcomes

Learners who complete this unit can:

- 1 explain the role and purpose of data visualisation
- 2 explain the role of visual perception in visual design
- 3 select visual representations in line with context and data type
- 4 create visualisations using software
- 5 create reports and stories using data visualisation to produce insights

Evidence requirements

Learners must provide product evidence to collectively demonstrate that they can:

- ◆ select visualisations to match datasets
- ◆ create visualisations using software
- ◆ create interactive dashboards
- ◆ create stories using data
- ◆ present stories

The role and purpose of data visualisation is inferred from the above evidence.

The evidence takes the following forms:

- ◆ A portfolio of work:
 - a dataset that learners transform into a form suitable for data visualisation
 - critiques of two given misleading data visualisations
 - a set of data visualisations demonstrating each of the following uses: trends; extremes; comparisons; correlation; and geospatial
 - a data dashboard with three interactive visualisations created from a given dataset
- ◆ A presentation that tells a story using data:
 - You supply learners with source data that is already transformed and analysed, although they may need to carry out additional analysis to aid storytelling.
 - The source data must be a large, unfamiliar dataset, with a range of data types.
 - The presentation must be based on the given data and must have a narrative, including at least three visualisations that support the narrative.
 - Presentations must provide insights, make recommendations and be delivered to an audience of two or more persons (either face-to-face or remotely).

Evidence can be produced over an extended period, under lightly controlled conditions and authentication is required, or be holistically generated in conjunction with other units in a group award. Learners must create evidence without assistance.

The standard of evidence should be consistent with the SCQF level of this unit.

You should use appropriate level descriptors when making judgements about the evidence.

Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

Knowledge	Skills
<p>Learners should understand:</p> <ul style="list-style-type: none"> ◆ the origins of visualisations and the factors that enable its current forms ◆ the purpose of data visualisation and its range of applications ◆ the role of visualisation in the analysis and interpretation of data ◆ the key characteristics of a visualisation ◆ Gestalt principles of visual perception ◆ a range of visual elements and cues to aid perception ◆ the significance of colour and colour palettes ◆ best practice in visual design ◆ types of data and datasets ◆ preparation of data for use in visualisations, including transformation and cleansing ◆ types of visualisations and their purpose ◆ selecting visualisations to match data and context or purpose ◆ data visualisation software capabilities ◆ the role of visualisation and narrative in storytelling with data ◆ the importance of audience in storytelling with data ◆ dashboard design and interactivity 	<p>Learners can:</p> <ul style="list-style-type: none"> ◆ critique data visualisations ◆ prepare datasets for use in visualisation ◆ select and use software to produce a range of visualisations ◆ select and justify visualisation to match data and purpose ◆ create a story that incorporates data visualisations and narrative ◆ select and use software to create an interactive dashboard from given data ◆ communicate, collaborate and share using digital technology

Meta-skills

Throughout the unit, learners develop meta-skills to enhance their employability in the data science sector.

Self-management

Successful learners must take personal responsibility for organising their workflow in acquiring, transforming and presenting data, in a timely manner. There is an opportunity for them to demonstrate self-motivation in selecting datasets of personal interest.

Social intelligence

The focus of this unit is on presenting visual information to, and persuading an audience of, the insights that their analysis has revealed. This requires an awareness of others and the ability to understand the contexts that are important to the audience. In storytelling with data, learners demonstrate effective communication skills.

Innovation

Learners demonstrate curiosity and imagination by translating information into accessible insight through visualisation and storytelling. Through tinkering and composing, they demonstrate the creative skills needed to develop the most appropriate form of representation of data. They classify information based on key features and see the big picture. In organising, manipulating, pruning, and filtering data into cohesive structures for information building, they make sense of complex information.

Learners demonstrate critical thinking skills in their critiques of the data visualisations produced by themselves and others.

Literacies

Throughout this unit, learners have opportunities to develop their literacy skills.

Numeracy

Numeracy is developed through a number of knowledge and skills, including data gathering, data analysis and data visualisations.

Communication

Communication is developed through collaboration and presentation. The data storytelling element develops high levels of competence in communicating to selected audiences.

Digital

Digital skills are developed through opportunities for learners to understand the progression of data through its cycle of gathering, to analysis, and eventually to its presentation. Using software to create a tidy dataset, generate visualisations and tell stories also develops their digital skills.

Delivery of unit

This unit provides foundational knowledge and skills, and you can deliver it on its own or as part of a group award. You can also deliver this unit alongside other more specialised units.

We suggest the following distribution of time:

Outcome 1 — Explain the role and purpose of data visualisation
(10 hours)

Outcome 2 — Explain the role of visual perception in visual design
(10 hours)

Outcome 3 — Select visual representations in line with context and data type
(30 hours)

Outcome 4 — Create visualisations using software
(15 hours)

Outcome 5 — Create reports and stories using data visualisation to produce insights
(15 hours)

Learners with pre-existing digital skills can advance quickly through the unit. For example, learners with previous experience of spreadsheets and statistics may not need additional learning and teaching. They may have some of the required evidence (see 'Evidence requirements' section). However, this needs to be authenticated.

Additional guidance

The guidance in this section is not mandatory.

It is important that learners experience using a range of tools to collate data into one location, such as spreadsheets, databases (relational and non-relational) and other storage applications.

They need some familiarity with spreadsheets at a basic level, and you should focus on increasing their skills over time with, for example, reading in data, selecting, copying, deleting, filtering, sorting, and other typical operations.

It is important that learners appreciate the value of data for decision-making and innovation. You should introduce them to the data analysis process and apply that process to a dataset using contemporary data analysis tools such as Excel, Power BI, and Tableau.

Where learners are familiar with a coding language such as Javascript or Python, you can use tools such as Jupyter or Observable notebooks with powerful data analysis and visualisation libraries.

The level of treatment should be sufficient for learners to understand the relevant stages in the data analysis process, as well as measures of centrality, spread and correlation.

There are opportunities to integrate learning across outcomes, by using the same software tool to store data, organise it, analyse it and finally display the information.

You should make use of the many websites that carry examples of powerful data visualisations, as well as examples of misleading or incorrect visualisations. These include observablehq, makeovermonday, and visme.

The portfolio of digital artefacts can be in any appropriate form, including:

- ◆ word processed document(s)
- ◆ spreadsheet(s)
- ◆ graphs and charts
- ◆ presentation(s)

Equality and inclusion

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the [assessment arrangements web page](#).

Information for learners

Data Visualisation (SCQF level 8)

This section explains:

- ◆ what the unit is about
- ◆ what you should know or be able to do before you start
- ◆ what you need to do during the unit
- ◆ opportunities for employment

Unit information

This introductory unit should improve your confidence using digital technology for a wide range of personal and vocational purposes.

Although you don't need previous knowledge or experience of data visualisation before you start this unit, you should have experience of handling datasets.

Creating a data visualisation involves gathering, organising and manipulating basic data, and selecting a suitable representation of that data, such as a line chart, a bar chart, a tree map or a geographic map. A good data visualisation uses elements of visual design such as colour and symbols to clearly present information in an attractive way.

During the unit you learn to use a wide range of software tools such as databases, spreadsheets, and visualisation software. You also learn how to load data and process it to make it suitable for the purpose of your analysis and subsequent visual representation. The aspect of storytelling with data helps you draw together the data, its analysis and visualisations into a narrative presentation that highlights your insights of the data.

Assessment may take several forms. You maintain a portfolio of your work, where you keep your spreadsheets, charts, and various other outputs. As part of this you might carry out practical assignments. You make a presentation that tells a particular story using visualisations that you have chosen to represent a given dataset.

The unit helps you develop a range of meta-skills and literacies. The meta-skills you develop cover self-management, social intelligence, and innovation. For example, you improve your self-management skills by working with data and making decisions based on that data and how to represent it. You also develop your numerical, communication and digital literacies throughout this unit, particularly your digital literacy.

Administrative information

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Superclass: RB

History of changes

Version	Description of change	Date

Note: please check [SQA's website](#) to ensure you are using the most up-to-date version of this document.