Visualising data

Building stories and sharing insights with Power BI

4 WEEKS **140** HOURS **11** LESSONS

In this module, we explore **data storytelling, communication, design, visualisation, dashboards** and **reports**.

Throughout this course, we will use **Microsoft Power BI** to build data models, create new features, and craft interactive dashboards and reports that will enable us to **convey insights, provide actionable recommendations, foster collaboration, influence stakeholders, engage others** in the data process, and **build trust**.

We'll use **real-world data** and **examples** related to the **United Nations Sustainable Development Goals** to contextualise the concepts and demonstrate the practical application of using Power BI to solve problems and share insights.

We'll walk you through the necessary steps to **install Power BI** on a **Windows** system, and then we'll delve into how to **use Power BI** on a **Mac**, ensuring you can use Power BI across different operating systems.

Module objectives

Visual storytelling

Master the fundamentals of **telling stories with visuals**, knowing **when to use which visuals**, and **crafting presentations** for impactful communication.

Visuals in Power BI

Learn the fundamentals of **creating impactful visuals in Power BI**, including **numerical visuals** such as cards and tables, **graphical visuals** such as line, bar, and columns charts, and using **slicers** and custom visuals.

Data in Power BI

Gain a fundamental understanding of **loading and linking datasets** in Power BI, **cleaning data**, creating calculated **columns** and **measures using DAX** (Data Analysis Expressions), and **building data models** that enable interactivity.

Reporting and dashboards

Learn the foundational principles of **planning, designing, and prototyping dashboards and reports** that include **various visuals** and **filters** that enable **interactivity** between visualisations.

Learning activities

By engaging with different types of learning activities, we will develop a **deeper understanding** of visualising data with Power BI and build a range of skills that will help us **succeed** in our **coursework** and **beyond**.

We learn by doing. We'll work on practical problem-solving and real-world projects.

Learn Watch animated videos and read practical slide decks to understand the principles of data visualisation and Power BI features.

- **1** Animated videos
- **26** Slide decks
- **5** Reference cards

Apply Practice creating and customising visualisations in Power BI during step-by-step guides and apply them to real-world scenarios.

- **56** Walk-throughs
- **4** Integrated project

This integrated project spans the entire module. Each week, we'll delve into a specific part of the project and you'll have to complete corresponding multiple-choice questions (MCQs) based on that week's learning. In this way, we build on our visualisation skills cumulatively!

Assess Test and track your understanding of data visualisation, Power BI functionality, and problem-solving.

- **27** KQ assessments
- **4** MCQ assessments

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Week 1

Lesson: Communicating our findings

In this lesson, we'll delve into the **fundamentals of storytelling** and **impactful communication**.

- Describe what a **data story** is, explain why it is useful in data analytics and data science, and list and describe the **three key aspects of data stories** and explain how the combination of these aspects **supports change**.
- Discuss how **good communication** can help us share the insights from our data more effectively.
- List and describe the **four principles of the EPIC framework for communication** and develop and present a data story using the key characteristics of data storytelling and the EPIC framework.

Lesson: Design for impactful communication

In this lesson, we'll explore key elements to **enhance our design skills** in order to create **compelling data visualisations** and presentations that will make a lasting impact.

- Identify and discuss **when visualisations are successful** using the four pillars of effective communication design.
- Describe **the principles of web accessibility** and discuss why web accessibility is important as data professionals.
- Discuss **five principles of layout and composition**, and how they can help us make better design decisions.
- Understand the **importance of presentation design** in conveying information effectively and know how to design clear, concise, and visually engaging slides for data-driven presentations.

Lesson: An introduction to dashboards and reports

In this lesson, we'll explore the **fundamentals of dashboards and reports**, focusing on the **features and functionalities of Power BI** as a leading dashboarding and reporting tool. We will take a look at various **methods of importing and connecting data** to Power BI and delve into **sharing insights and deploying** dashboards and reports using Power BI.

- Define what **dashboards and reports** are and explain their **significance in data visualisations, analysis**, and **storytelling**.
- Know how to **import and connect to data** in Power BI.
- Understand how Power BI **dashboards and reports can be shared and deployed**.

Lesson: Creating visuals in Power BI

In this lesson, we'll take a look at **creating visualisations using Power BI**. We will explore the **creation of various types of visuals**, including line, column, 100% stacked column, 100% stacked area, scatter, and bubble charts. We'll also look at **how the data structure can influence how we create visualisations** in Power BI and how we can leverage filters on visualisations.

- Create and analyse **various data visualisations** in Power BI, such as line, column, 100% stacked column, 100% stacked area, scatter, bubble charts, and maps.
- Know how to **apply filters to visualisations** to limit the number of features included.

Integrated project: Visualising Maji Ndogo's past

In this first part of the integrated project, we are introduced to updated data concerning the gender composition of queues at shared water taps in Maji Ndogo, and some new crime-related data.

We will **create basic visuals**, gradually diving into crime-related data, and some gender parity data related to water, illustrating the correlation between women queueing and being victims of crime. The primary goal is to **visualise the national survey data results**, with the aim of reporting it in the future.

- Create and analyse **line**, **scatter**, and **composition** plots in Power BI.
- Show the ability to create **custom maps** using Shape maps in Power BI.
- Demonstrate the ability to **filter** and slice **data** in a visual.
- Demonstrate an understanding of how **filters interact** on a Power BI page.
- Demonstrate an ability to **interpret meaning** from visuals.

Week 2

Lesson: Formatting visuals in Power BI

In this lesson, we'll explore the **formatting of visuals in Power BI**, including modifying charts, axes, and value labels, numerical precisions, fonts, colours, lines, and tooltips.

- Understand the **importance of formatting** in data visualisation and storytelling.
- Proficiently **format various aspects of data visualisations**, such as charts, axes and value labels, numerical precisions, fonts, colours, lines, and tooltips.

Lesson: Data models in Power BI

In this lesson, we'll take a look at **viewing, creating**, and **managing data models in Power BI**, and explore how our **data model and data granularity impact our reports**.

- Understand the **significance of data models** in enabling comprehensive data analysis and visualisation within Power BI.
- Know how to **establish relationships between tables** to enable seamless cross-table analysis and insights.
- Use the **Data Model view in Power BI** to visualise and validate relationships, hierarchies, and cardinalities.
- Apply best practices for **organising tables, fields**, and **relationships** to create a **logical and user-friendly data model**.
- Understand **common challenges** in data models such as ambiguous paths and circular dependencies, and how to avoid them.

Lesson: Data transformations in Power BI

In this lesson, we'll take a look at how we can **implement various data transformations** in Power BI using **Power Query Editor**, including cleaning data, checking its integrity, and restructuring data to facilitate specific data stories in our reporting.

- Know how to **remove errors, missing values**, and **duplicate values** from tables using Power Query Editor.
- Know how to **analyse and change data types and formats** using Power BI.
- Know how to **restructure data with Power Query Editor**, including removing columns, duplicating tables, splitting values and understanding how different data structures allow different visualisation capabilities.

Integrated project: Moulding data into visual stories in Maji Ndogo

In this second part of the integrated project, we focus on data models. We'll import tables separately, clean data, and set up a **working relational data model** in Power BI. We will also **recreate our visuals with the new data model**, and see how the new model affected our visuals. Our goal is to refine the visuals, customising text, colours, and fonts to make the visuals clear and simple.

- Demonstrate how to use colours, themes, fonts, and layouts to **format visuals**.
- Show an ability to use conditional formatting to **customise visuals**.
- Demonstrate a comprehensive understanding of **data models** in Power BI.
- Demonstrate an ability to use cardinality and directionality to **troubleshoot relationships**.
- Be able to **import** and **clean** data.

Week 3

Lesson: Calculated columns with DAX

In this lesson, we'll delve into **calculated columns in Power BI**, exploring how **DAX** can be harnessed to create calculated columns that dynamically compute values based on existing data.

- Understand the **role of calculated columns** in enhancing data analysis and visualisation within Power BI.
- Create **calculated columns using DAX** to derive new insights from existing data fields.
- Know how to use the **appropriate syntax and functions** of DAX expressions for various calculations.
- Use calculated columns to **enrich your datasets with meaningful metrics**, ratios, and categorisations.
- Effectively **integrate calculated columns into Power BI reports** to provide deeper analytical depth and storytelling possibilities.

Lesson: DAX aggregations

In this lesson, we'll take a look into aggregating data by using **DAX to create tables** and **various types of measures** that allow us to **efficiently summarise** our data for more effective visualisation.

- Understand the **various ways in which aggregation can be achieved** in Power BI.
- Know how to **create summarised tables** using DAX.
- Know how to create **implicit** and **explicit measures** using quick, simple, and compound measures in Power BI.

Lesson: Building reports and dashboards

In this lesson, we'll see how we can **use the various functionalities of Power BI** together to **create impactful, intuitive**, and **interactive reports** and **dashboards**.

- Discuss the **design principles** and **practices** of creating effective reports and dashboards.
- Know how to create **filters**, **slicers**, **cross-visual interactions**, and **drill-downs** to produce interactive reports and dashboards.
- Create **meaningful**, **intuitive**, and **interactive reports** and **dashboards**.

Lesson: Exploratory Data Analysis in Power BI

In this lesson, we'll explore the ways in which we can use Power BI to **unveil insights and patterns hidden** within data.

- Describe what **Exploratory Data Analysis (EDA)** is and know the key approaches to gain insights into data.
- Know how to use Power BI features such as **Key influencers** and **Analyze** to apply EDA.
- Know how to use **statistical summaries**, **grouping and binning**, and **conditional formatting** to analyse data in Power BI.

Integrated project: Communicating our findings in Maji Ndogo

In this third part of the integrated project, we finalise our national survey report. We will use **DAX to create measures and columns** to enrich our data to ensure accurate and useful data representation on the dashboard. We put together all we have learned in the module to create the survey report.

- Demonstrate a comprehensive understanding of **DAX data types**, **operators**, **variables**, and **functions** in PowerBI.
- Demonstrate the ability to use **DAX to create calculated columns** and **DAX functions** to **aggregate**, **count**, and **transform**.
- Demonstrate the ability to **create and use various types of measures**.
- Demonstrate the ability to **create reports**, including the use of **filters**, **slicers**, and **cross-visual interactions**.

Week 4

Integrated project: Transparency in tracking Maji Ndogo's water funds

In this final part of the project, we use all the skills acquired in the course to **build a dashboard**. Our mission is to communicate with transparency: Where did the money go? We will track the total budget against project completion, monitor teams' performance, and compare budgeted versus actual costs to flag potential corruption, promoting transparency and accountability in addressing Maji Ndogo's water crisis.

- Demonstrate a comprehensive understanding of **data transformations**, **control flow**, and **data models**.
- Demonstrate the ability to **use DAX to create calculated columns** and **DAX functions to aggregate**, **count**, and **transform**.
- Demonstrate the ability to create intuitive, impactful, and interactive **reports**, including the use of various types of **visualisations**, **filters**, **slicers**, and **cross-visual interactions**.

Module summary

Throughout this module, we've harnessed the power of Power BI to **transform raw data into compelling visual narratives**. We've navigated the rich landscape of data visualisation, learning to craft **interactive dashboards** and **reports** that not only inform but also engage and persuade.
We've refined our ability to **create and interpret a variety of visualisations**, from the foundational charts to custom visuals and maps, all tailored for maximum impact. We've tackled data models, learning to craft calculated columns and measures with DAX to reveal deeper insights.

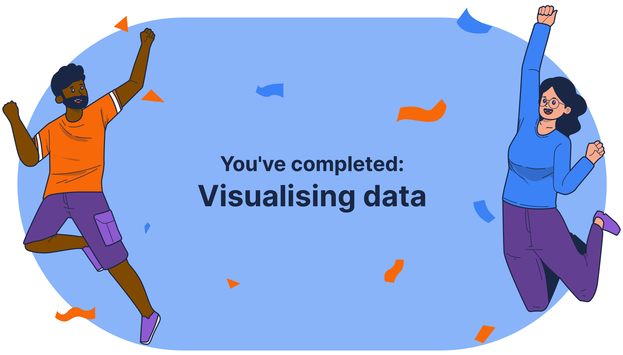
By completing this module, we're equipped not just with **Power BI proficiency** but with a reinforced ability to **influence** and **lead with data-driven storytelling** in our professional endeavours.

What's next?

Next, we'll delve into the dynamic world of Python to further enrich our technical expertise and enhance our analytical thinking. We will harness the power of Python to **manipulate data**, **perform complex analyses**, and take advantage of **Python's extensive libraries** to uncover deeper insights. Armed with the foundational knowledge from programmatic thinking, SQL, and visualising data, we will now learn to write code that can **automate and extend what we can achieve with data**.

Prepare to embrace the challenges and opportunities that Python presents as we continue to grow as data scientists. This is a step towards deepening our **data fluency**, a skill increasingly sought across industries.

Our continuous learning path equips us with an increasingly sophisticated toolkit, sharpening our abilities to **distil complexity into clarity** and **influence the landscape of data-driven decision-making**.



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