Building Interactive Dashboards with Power BI

From Data to Decisions

Day - 2

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Agenda

Day 2: Interactivity, DAX & Dashboard Design

- Quick recap of Day 1 concepts
- Introduction to DAX measures
- Creating business metrics (Sales, Orders, Quantity)
- Using slicers for interactivity
- Drill-down and drill-through analysis
- Report design best practices
- Publishing reports to Power BI Service (overview)

Learning Outcomes

- Create DAX measures
- Understand the interactivity in the report
- Implement and check in the report
- Understand end-to-end Power BI usage

Data Analysis and Expression (DAX)

What is DAX in Power BI?

DAX (Data Analysis Expressions) is a formula language used in:

- Power BI
- Excel Power Pivot
- SQL Server Analysis Services (Tabular models)

DAX is used to create:

- Calculated Columns
- Measures
- Calculated Tables

Why DAX Exists

Power BI is not Excel.

In Excel:

- Formulas work row by row
- Calculations happen immediately in cells

In Power BI:

- Data is stored in a compressed data model
- Visuals change dynamically based on filters, slicers, and relationships
- Calculations must respond to user interaction

DAX exists to:

- Calculate values based on filters
- Handle aggregations dynamically
- Work across related tables
- Perform time intelligence (YTD, MTD, YoY, etc.)

How do we make sense of DAX

DAX calculations depend heavily on:

- Table relationships
- Filter context (what the user selects)

Row Context

- Happens row by row
- Used mainly in calculated columns

Example: “For this row, multiply Quantity × Price”

Filter Context

- Happens based on filters, slicers, visuals
- Used mainly in measures

Example: “Calculate total sales only for 2024 and only for Europe”

Measures vs Calculated Columns

Feature	Calculated Column	Measure
Calculated when	Data refresh	Query time (when visuals render)
Uses	Row context	Filter context
Stored in model	Yes	No
Used for	Categorization	Aggregations

What DAX Looks Like (Syntax Basics)

```DAX
Total Sales = SUM(Sales[SalesAmount])
```

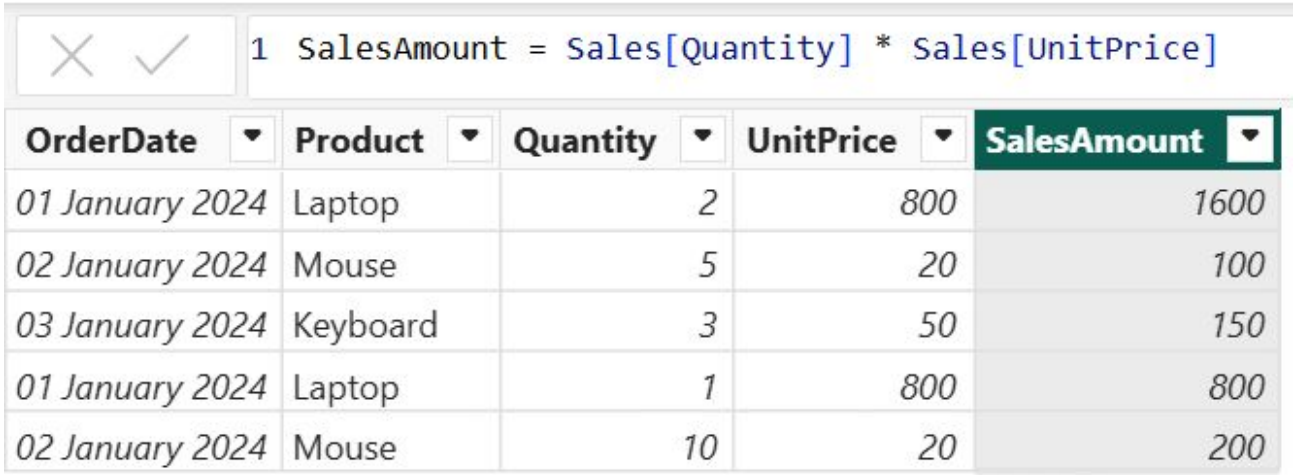
- `Total Sales` → Measure name
- `SUM()` → DAX function
- `Sales[SalesAmount]` → Column reference

Data Analysis and Expression (DAX) Deep Dive

Creating a Calculated Column (Row Context)

Objective: Create SalesAmount = Quantity × UnitPrice

Steps: Data view → Sales table → New column → DAX Formula → Enter



```
1 SalesAmount = Sales[Quantity] * Sales[UnitPrice]
```

OrderDate	Product	Quantity	UnitPrice	SalesAmount
01 January 2024	Laptop	2	800	1600
02 January 2024	Mouse	5	20	100
03 January 2024	Keyboard	3	50	150
01 January 2024	Laptop	1	800	800
02 January 2024	Mouse	10	20	200

Create a Measure (Filter Context)

Objective: Calculate Total Sales dynamically

Steps: Report view → Select Sales table → Click New measure → DAX Formula → Enter

```
Total Sales = SUM(Sales[SalesAmount])
```

Product	Total Sales
Keyboard	150
Laptop	2400
Mouse	300
Total	**2850**

Add a Slicer → Drag `OrderDate` into the slicer → Select only January 2024

CALCULATE() Vs. FILTER()

What CALCULATE Does

`CALCULATE()`:

- Modifies the filter context
- Re-evaluates a measure
- Works at the model level

```
Laptop Sales (FILTER) =
SUMX(
    FILTER(
        Sales,
        Sales[Product] = "Laptop"
    ),
    Sales[SalesAmount]
)
```

What FILTER Does

`FILTER()`:

- Takes a table
- Evaluates a condition row by row
- Returns a new table

```
Laptop Sales (CALCULATE) =
CALCULATE(
    [Total Sales],
    Sales[Product] = "Laptop"
)
```

```
1600 + 800 = 2400
```

Making Report Interactive
Deep Dive

Slicers: User-Controlled Filtering

What a Slicer Does? A slicer lets the user decide which data is visible.

Add a Slicer step by step:

Step 1

- Go to Report View
- Click anywhere on the canvas

Step 2

- From Visualizations pane
- Click Slicer icon

Step 3

- Drag Region into the slicer

Step 4

- Add a Table visual
- Drag:
    1. Product
    2. Sales

Cross-Filtering: Default Power BI Magic

What Cross-Filtering Is Selecting data in one visual automatically filters other visuals.

Add a cross-filter step by step

1. Add a Clustered Column Chart
2. Axis → Product
3. Values → Sales
4. Click Laptop bar
5. Watch the table update automatically

No DAX required
Cross-filtering is on by default

Drill Down: Go Deeper in the Same Visual

What Drill-Down Is? Zooming into lower levels of detail within the same chart.

Add a drill down step by step:

Step 1: Create Hierarchy

1. In Fields pane
2. Right-click Year → Create hierarchy
3. Drag Month into that hierarchy

Step 2: Use Hierarchy in Visual

1. Add a Column Chart
2. Axis → Year hierarchy
3. Values → Sales

Step 3: Enable Drill-Down

1. Click the visual
2. Click the Drill-down arrow (↓) in top-right
3. Click on a Year bar

Drill Through: Go to Another Page

What Drill-Through Is? “Right-click navigation to a detailed page, keeping context.”

Add a drill through step by step:

Step 1: Create New Page

- Click + New Page
- Rename it: Product Details

Step 2: Enable Drill-Through

- Click on blank area of Product Details page
- In Visualizations pane
- Drag Product into Drill-through filters

Step 3: Design Detail Page

- Add a Table visual
- Drag:
    1. Date
    2. Region
    3. Sales

Step 4: Use Drill-Through

- Go back to Main page
- Right-click Laptop in a chart or table
- Select: Drill through → Product Details

Tooltip: Basic, Very Powerful

What Tooltips Are? Extra information shown when users hover over data.

Step-by-Step: Add Tooltip

1. Select Column Chart
2. In Visualizations pane
3. Drag Sales into Tooltips

Hover over a bar → Extra info appears

Implementing in the Report
Deep Dive

Complete Dashboard at a glance