

DEMYSTIFYING DAX

An Introduction to Data Analysis eXpressions

Michael Hewitt

May 16, 2024

Nashville Modern Excel & Power BI User Group



Michael Hewitt

BI Analyst / BI Developer / Data Guru



www.MichaelHewitt.net



[@mdhewitt83](https://www.instagram.com/mdhewitt83)



@mdhewitt83



[@mdhewitt83](https://twitter.com/mdhewitt83)



www.linkedin.com/in/mdhewitt83/





Agenda

DAX Overview

Consider the Context

DAX Learning Path

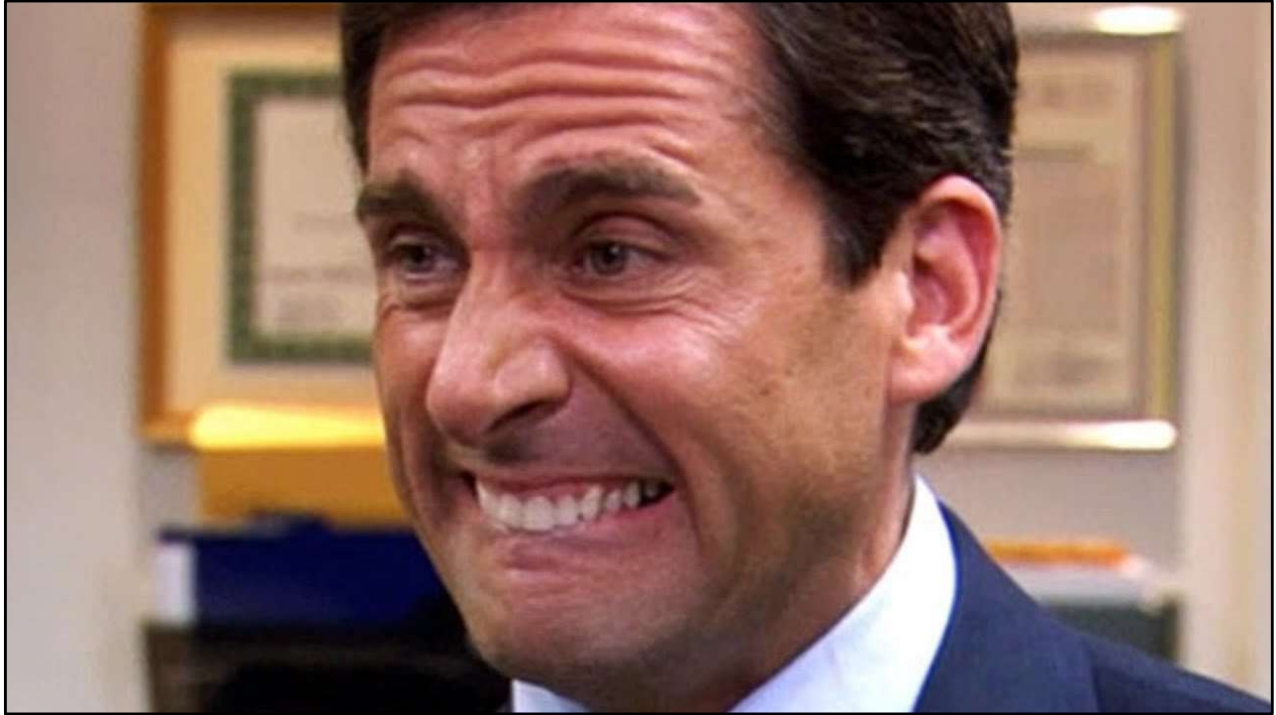
Demo

DAX Resources

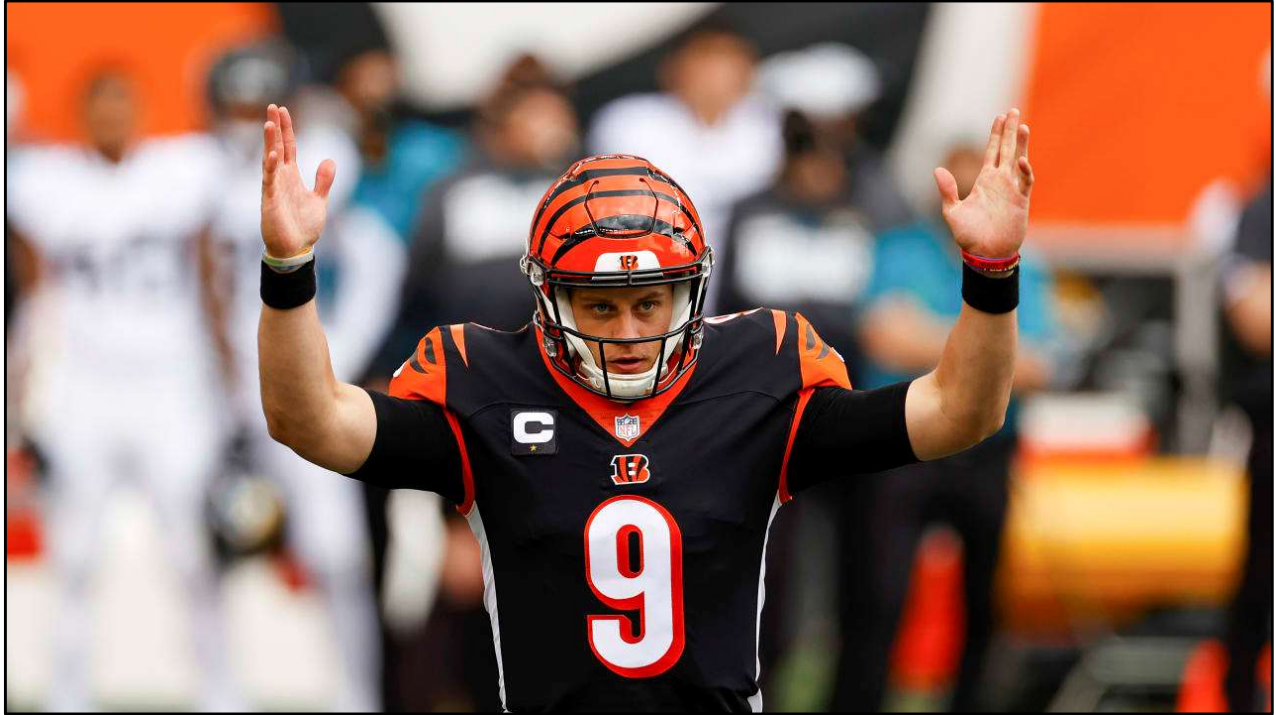


I've had the privilege to teach DAX one on one, in smaller settings, and in training sessions... this is a common reaction...

[This Photo](#) by Unknown Author is licensed under [CC BY-NC](#)



...or this



But this is what we're after. DAX isn't scary. It can be challenging, but if you can write complex Excel formulas, you can learn DAX.




WHAT

is DAX?

DATA ANALYSIS EXPRESSIONS

- Functional language
- Similar syntax to Excel formulas
- Created specifically for working in data models

 DAX Prerequisites?	<p>No prior coding experience necessary!</p> <p>Solid, working knowledge of data modeling & star schemas</p> <p>Experience with Excel formulas is beneficial</p>
--	---

Understanding modelling is important. A good model opens up the full playbook of DAX functions. Writing DAX on flat tables can be difficult.

If you need to deepen your understanding, check out our presentation from last month (April 2024).



Everyone planning to do any data analysis in the Microsoft BI stack should have at least a working knowledge of DAX

[This Photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#)



WHY

should analysts
learn to write
DAX?

Similar to writing formulas in Excel unlocks the full Power of the spreadsheet, writing DAX unlocks the full power of Power BI.



WHY

should analysts
learn to write
DAX?

250+ DAX functions at your disposal







Implement custom business logic

Perform complex calculations

Utilize time intelligence functions

Extend formatting options in visuals

- More DAX functions are being added regularly
- Custom business logic and complex calculations are necessary beyond basic reporting
- Time intelligence is VERY powerful in DAX
- DAX also extends to the creative, visual parts of Power BI

	Power BI	 WHERE can DAX be written?
	Microsoft Fabric	
	Power Pivot for Excel	
	Azure Analysis Services Tabular	
	SQL Server Analysis Services Tabular	

DAX is written across all Microsoft BI tools. DAX can also be written in 3rd party external tools, such as Tabular Editor and DAX Studio.



HOW

should analysts
learn to write
DAX?

There are plenty of books, courses, or videos that will cater to any learning preference.

The best tip for learning DAX is to practice!



HOW

should analysts
learn to write
DAX?

Then practice some more!



HOW

should analysts
learn to write
DAX?

Work on a project with DAX to practice even more!

DAX is Used to Create...

Measures



Flexible calculations that can be used multiple times in Power BI visuals, Excel PivotTables, and more



Calculated Columns



The DAX expression is calculated for every row in the table



Calculated Tables



The DAX expression creates a new table in the data model

Queries



Write DAX to pull data out of a Power BI model or SSAS model in the form of a “temporary” table.

Visual Calculations

Calculations that exist in the context of a single Power BI visual.

DAX functions can be used to create different objects with our data models and can also be used to query data from a model.

Proceed with caution when creating calculated tables or calculated columns! Only create these objects when necessary. These objects are only updated during a refresh and do not benefit from optimal data compression within the model. If possible, push the creation of these objects backward to the data source or Power Query.

Consider the Context

Filter Context

"The set of filters applied to the data model before the evaluation of a DAX expression starts."

- Marco Russo & Alberto Ferrari

Row Context

To complete their aggregations, some DAX functions iterate over every row in a data table and need to know what row they are on. The "current row" is the row context.

Context is important. Because DAX can be used to create different objects in the model and can be quite flexible, we, as analysts and developers, need to learn to think like DAX thinks. In other words, we need to understand how the elements of a visual and filters in the report can affect the results the DAX is giving us.



DAX Learning Path

DAX 101

- Data modeling & DAX syntax
- Basic Aggregations:
COUNTROWS(), SUM(),
COUNT(),
DISTINCTCOUNT(),
AVERAGE(), MIN(), MAX()
- Quick Measures
- IF()
- Basic Operators
- DIVIDE()
- Introduce
CALCULATE()
- Basic filters in
CALCULATE()
- Nesting measures

DAX 201

- Iterator Functions:
SUMX(), AVERAGEX(),
MINX(), MAXX(),
CONCATENATEX()
- DAX Variables
- CALCULATE Modifiers:
FILTER(), ALL(),
ALLSELECTED(), etc.
- Visual Calculations
- SWITCH()

DAX 301

- Time Intelligence
Functions:
TOTALYTD(), TOTALMTD(),
SAMEPERIODLASTYEAR(),
DATEDIFF(),
DATESINPERIOD(), etc.

DAX 401

- Custom Time
Intelligence
- Implement DAX
patterns
- DAX queries
- Context switching
- Calculation Groups

This isn't the only path to follow to learn DAX. What's most important is to lay a good foundation and learn to think like DAX (i.e. understand how the DAX engine executes the code). From that foundation, you can build your knowledge to meet your needs

DEMO



DAX Tips

Keep your DAX measures organized in a metrics table

Use comments to document your DAX

Format your DAX code to keep it readable

Apply formatting to your DAX measures

Currency symbols, decimal places, thousand separator

For info on how organizing DAX, check out this post:

<http://www.michaelhewitt.net/2022/11/18/power-bi-tips-tricks-dax-organization/>



DAX Resources



Microsoft DAX Function Reference

[learn.microsoft.com/en-us/dax/dax-
function-reference](https://learn.microsoft.com/en-us/dax/dax-function-reference)

Official DAX reference guide with
syntax and information for all
DAX functions



DAX Guide

dax.guide/

SQL BI DAX reference guide with
syntax and information for all
DAX functions



SQL BI

www.sqlbi.com/

Marco Russo &
Alberto Ferarri's blog,
training, & resources



DAX Formatter

www.daxformatter.com/

Make your DAX easy
to read with this free
formatting tool!



DAX Patterns

www.daxpatterns.com/

Reusable, complex
DAX for ranking,
cumulative totals,
comparing different
granularities, etc.



Michael Hewitt

✉ Michael@MichaelHewitt.net

🌐 www.MichaelHewitt.net

📷 [@mdhewitt83](https://www.instagram.com/mdhewitt83)

📧 [@mdhewitt83](https://www.facebook.com/mdhewitt83)

✂ [@mdhewitt83](https://www.x.com/mdhewitt83)

[in](https://www.linkedin.com/in/mdhewitt83/) www.linkedin.com/in/mdhewitt83/