



Using DAX Efficiently & Effectively

An Intro to DAX

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Presentation Outline



- DAX Overview
- Common uses
 - Calculated Measures
 - Calculated Columns
 - Calculated Tables
- DAX Tips and Best Practices
- Dynamic Titles
- Discussion/ Questions

Let's Chat



What is Dax?

DAX (Data Analytics eXpressions) is a collection of functions, operators, and constants that can be used in a formula, or expression, to calculate and return one or more values.

DAX helps you create new information from data already in your model.



Why is Dax important?

By using DAX, you can create smarter calculated columns and/or measures by which you can limit the data the dashboard has to fetch and visualize.

Learning how to create effective DAX formulas will help you get the most out of your data.

With the correct data, you can begin to solve important business problems.



Dax Fast Facts

It was created in 2010 for use with Microsoft Excel.

It is the programming language of:

Microsoft Power BI

Microsoft Analysis Services

Microsoft Power Pivot for Excel

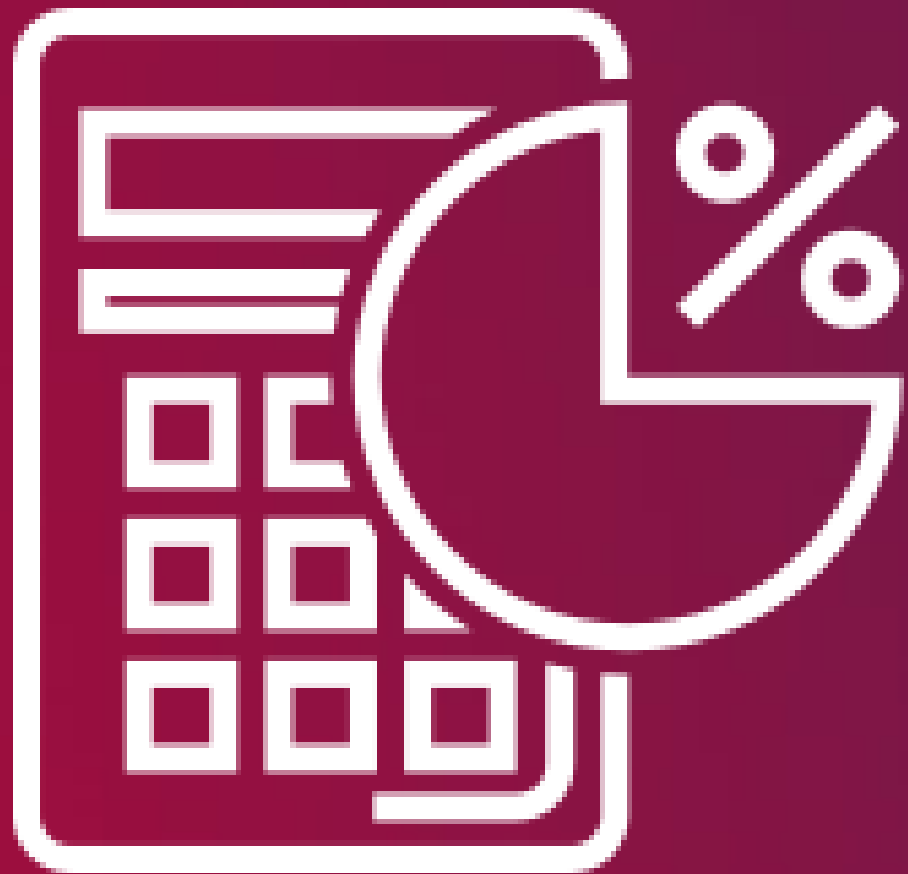
While it's a simple language,
it's different from most programming languages.

Dax Simplified

- Similar to the Excel formula language
- Less of a learning curve
- Quickly build
 - Calculated Measures
 - Calculated Columns
 - Calculated Tables



Calculated Column

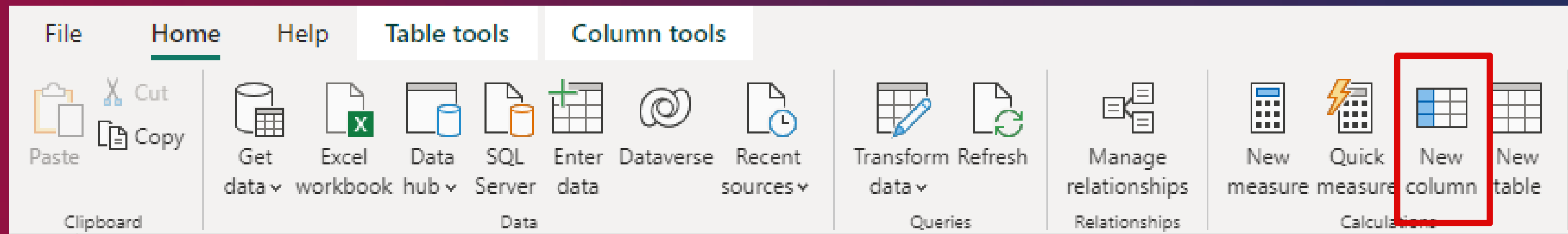


A calculated column is an extension of a table that's evaluated for each row.

A calculated column is virtually the same as a non-calculated column except their values are calculated using DAX formulas and values from other columns.

Calculated Column

Click the New Column button on the Home Menu to create a new column.



Calculated Column

`TableName[ColumnName] = <DAX expression for calculated column>`

`Sales[GrossMargin] = Sales[SalesAmount] - Sales[TotalProductCost]`

Calculated Column

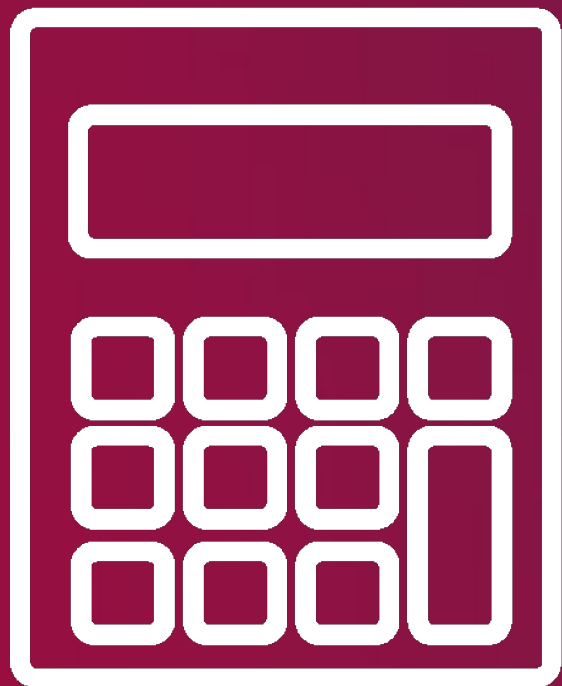
1 MAX_DC = LOOKUPVALUE(All_Matriculate[Max_DC],All_Matriculate[EMPLID],enrl_comp_succ[EMPLID])

Instructional Mode	Divisions_join	Grade	faculty join	Grade Points	Honors Enrollment	Section	Late Registration	Credit Hours	gpa gradepoint	MAX_DC
In Person	CF-1198-CHEM-1405		1198CHEM14055007	0	No	5007	No	4	0	1198
In Person	CF-1198-CHEM-1405		1198CHEM14055031	0	No	5031	No	4	0	1198
In Person	CF-1198-CHEM-1405		1198CHEM14055037	0	No	5037	No	4	0	1198
In Person	CF-1198-CHEM-1405		1198CHEM14055015	0	No	5015	No	4	0	1198
In Person	CF-1198-CHEM-1405		1198CHEM14055007	0	No	5007	No	4	0	1198
In Person	CF-1198-CHEM-1405		1198CHEM14055017	0	No	5017	No	4	0	1198
Hybrid	CF-1198-CHEM-1405		1198CHEM14055025	0	No	5025	No	4	0	1198
Hybrid	CF-1198-CHEM-1405		1198CHEM14055025	0	No	5025	No	4	0	1198
Hybrid	CF-1171-CHEM-1405	A	1171CHEM14055025	4	No	5025	No	4	16	1198
In Person	CF-1181-CHEM-1405	A	1181CHEM14055047	4	No	5047	No	4	16	1198
In Person	CF-1178-CHEM-1405	A	1178CHEM14055005	4	No	5005	No	4	16	1198
In Person	CF-1191-CHEM-1405	B	1191CHEM14055017	3	No	5017	No	4	12	1198
In Person	CF-1191-CHEM-1405	B	1191CHEM14055033	3	No	5033	No	4	12	1198
In Person	CF-1191-CHEM-1405	B	1191CHEM14055049	3	No	5049	No	4	12	1198
In Person	CF-1191-CHEM-1405	C	1191CHEM14055033	2	No	5033	No	4	8	1198
In Person	CF-1188-CHEM-1405	A	1188CHEM14055005	4	No	5005	No	4	16	1198
In Person	MC-1198-CHEM-140		1198CHEM14054215	0	No	4215	Yes	4	0	1198
In Person	MC-1198-CHEM-140		1198CHEM14054003	0	No	4003	No	4	0	1198

Calculated Column Functions

- FORMAT
- CONCATENATE
- LOWER
- UPPER
- LEFT
- RIGHT
- MID
- REPLACE
- SUBSTITUTE
- LOOKUPVALUE
- AND
- OR
- IF
- IFERROR
- ISBLANK
- ISNONTTEXT
- ISNUMBER
- ISTEXT

Calculated Measure

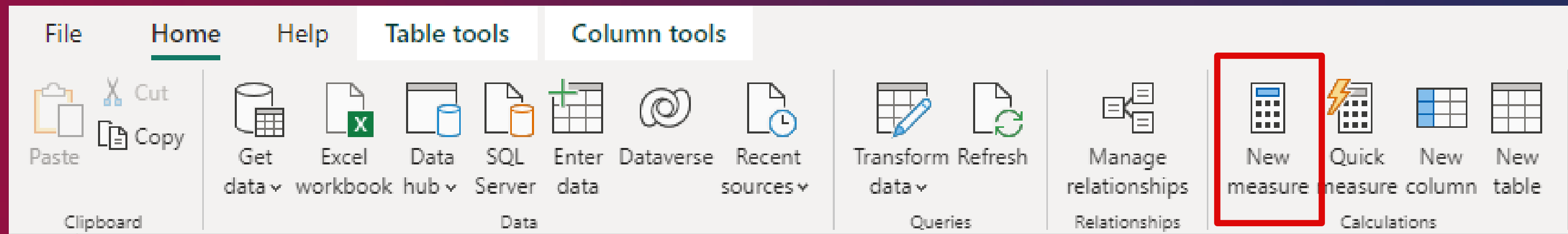


A calculated measure is an extension of a model that evaluates a field from many rows in a table.

Every calculated measure must contain an function such as AVG or SUM. Without an function resulting in a single value, the measure's formula will display an error.

Calculated Measure

Click the New Measure button on the Home Menu to create a new column.



Calculated Measure

`TableName[MeasureName] = <DAX expression for measure>`

`Gross Margin % =
DIVIDE (SUM (Sales[GrossMargin]), SUM (Sales[SalesAmount]))`

Calculated Measure Functions

- AVERAGE
- COUNT
- COUNTBLANK
- COUNTROWS
- DISTINCTCOUNT
- MAX
- MIN
- PRODUCT
- SUM
- SUMX

[HTTPS://DAX.GUIDE/FUNCTIONS/AGGREGATION/](https://dax.guide/functions/aggregation/)

Calculated Measure

1 Headcount = DISTINCTCOUNT(enr1_comp_succ[hc_column])

Instruction Mode	Divisions_join	Grade	faculty join	Grade Points	Honors Enrollment	Section	Late Registration	Credit Hours	gpa gradepoint	MAX_DC	EMPLID_DC_Join
In Person	CF-1198-CHEM-1405		1198CHEM14055007	0	No	5007	No	4	0	1198	7554621Yes
In Person	CF-1198-CHEM-1405		1198CHEM14055031	0	No	5031	No	4	0	1198	7416085Yes
In Person	CF-1198-CHEM-1405		1198CHEM14055037	0	No	5037	No	4	0	1198	7527098Yes
In Person	CF-1198-CHEM-1405		1198CHEM14055015	0	No	5015	No	4	0	1198	7446638Yes
In Person	CF-1198-CHEM-1405		1198CHEM14055007	0	No	5007	No	4	0	1198	7527167Yes
In Person	CF-1198-CHEM-1405		1198CHEM14055017	0	No	5017	No	4	0	1198	7564298Yes
Hybrid	CF-1198-CHEM-1405		1198CHEM14055025	0	No	5025	No	4	0	1198	7517526Yes
Hybrid	CF-1198-CHEM-1405		1198CHEM14055025	0	No	5025	No	4	0	1198	7517530Yes
Hybrid	CF-1171-CHEM-1405	A	1171CHEM14055025	4	No	5025	No	4	16	1198	7378172Yes
In Person	CF-1181-CHEM-1405	A	1181CHEM14055047	4	No	5047	No	4	16	1198	7385142Yes
In Person	CF-1178-CHEM-1405	A	1178CHEM14055005	4	No	5005	No	4	16	1198	7448161Yes
In Person	CF-1191-CHEM-1405	B	1191CHEM14055017	3	No	5017	No	4	12	1198	7453684Yes
In Person	CF-1191-CHEM-1405	B	1191CHEM14055033	3	No	5033	No	4	12	1198	7565296Yes
In Person	CF-1191-CHEM-1405	B	1191CHEM14055049	3	No	5049	No	4	12	1198	7583130Yes
In Person	CF-1191-CHEM-1405	C	1191CHEM14055033	2	No	5033	No	4	8	1198	7565297Yes
In Person	CF-1188-CHEM-1405	A	1188CHEM14055005	4	No	5005	No	4	16	1198	7560261Yes
In Person	MC-1198-CHEM-140		1198CHEM14054215	0	No	4215	Yes	4	0	1198	7470474Yes

Data

Search

- Developmental
- Divisions_join
- Dual Credit Enrollment
- EMPLID
- EMPLID_DC_Join
- Enrollment
- faculty join
- FTIC_JOIN
- GPA
- gpa gradepoint
- Grade
- Grade Points
- hc_column
- Headcount

Columns vs. Measures

COLUMN

- Calculates when the report is refreshed and is saved to memory
- Normally, the calculation is done row by row. Depletes memory.
- The value may be viewed in the column. In the vast majority of circumstances, Power Query can be used.

MEASURE

- Isn't saved anywhere and it is calculated on the fly.
- CPU usage is high. Is a result of aggression, in most cases.
- When adding to the report, value can be viewed. DAX is best for measure.

Calculated Table

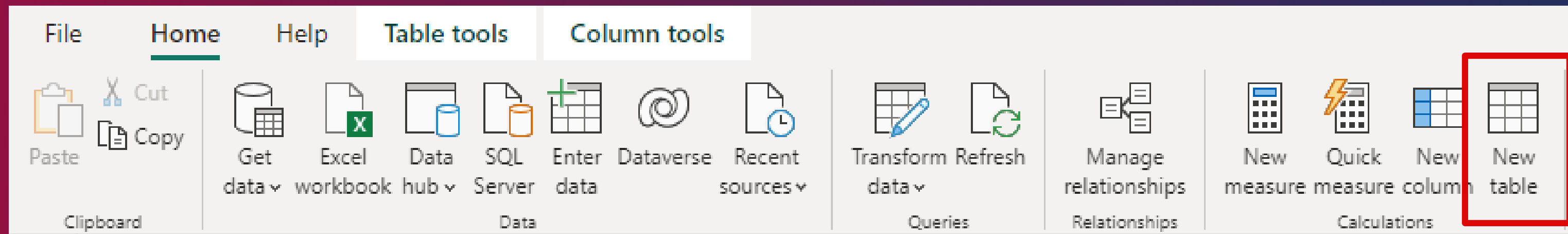


A custom or calculated table from the existing table.

Instead of querying and loading values into your new table's columns from a data source, you create a DAX formula to define the table's values

Calculated Table

Click the New Table button on the Home Menu to create a new column.



Calculated Table

Table =

GENERATESERIES(<StartValue>, <EndValue>, [IncrementValue])

Date Table =

GENERATESERIES(MIN(Demographics[BIRTHDATE]),
MAX(Demographics[BIRTHDATE]))

Calculated Table

1 Date Table =
2 GENERATESERIES(MIN(D_Person[Birthdate]), MAX(D_Person[BIRTHDATE]))

Value
3/9/1912 12:00:00 AM
3/10/1912 12:00:00 AM
3/11/1912 12:00:00 AM
3/12/1912 12:00:00 AM
3/13/1912 12:00:00 AM
3/14/1912 12:00:00 AM
3/15/1912 12:00:00 AM
3/16/1912 12:00:00 AM
3/17/1912 12:00:00 AM

Best Practices

- Use DAX Formatter to format your code.
- Start with the important functions first.
 - SUM, AVERAGE, MIN, MAX, COUNT, COUNTROWS, CALCULATE, FILTER, IF
- Skip memorizing and focus on understanding concepts.
 - Build a library of useful examples, books, & articles.

Best Practices

- Keep your functions as readable as possible.
 - If you don't need it, delete it.
 - User friendly names and add descriptions for measures
- Sort your measures by category.
 - Simple aggregates
 - Time variances
 - Ratios & differentials
 - Business-specific calculations

Dynamic Titles

Dynamic title is that the name of the title changes automatically to reflect any filters that may be applied.

By creating Data Analysis Expressions (DAX) based on fields, variables, or other programmatic elements, your visuals' titles can automatically adjust as needed.

Dynamic Titles



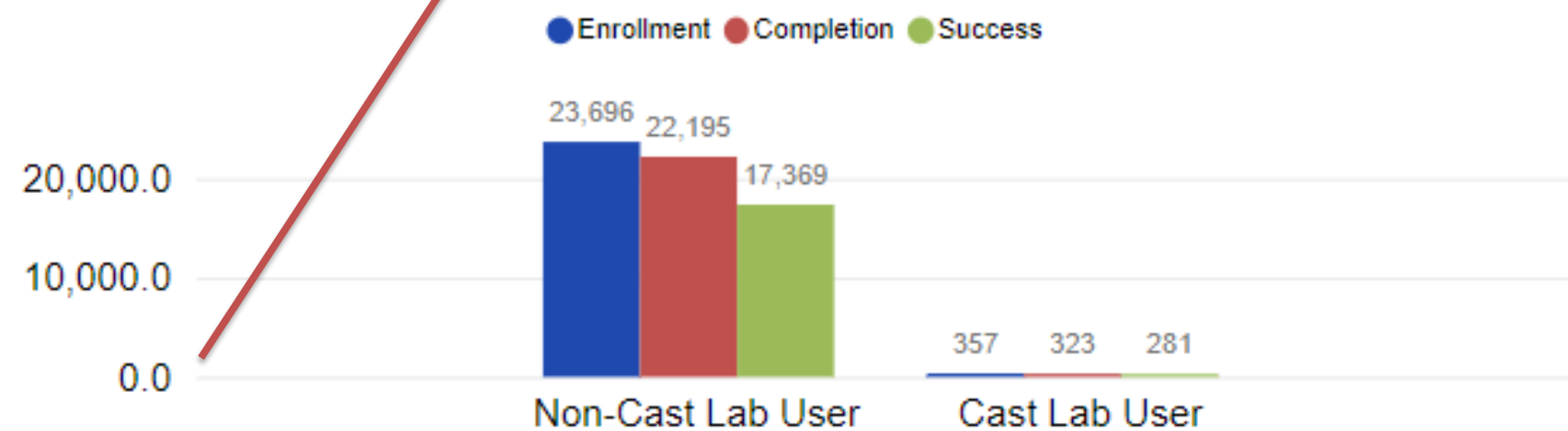
ANALYTICS & INSTITUTIONAL RESEARCH (AIR)

LSC-NH Cast Lab Users Vs. Non-Cast Lab Users Enrollment, Completion and Success

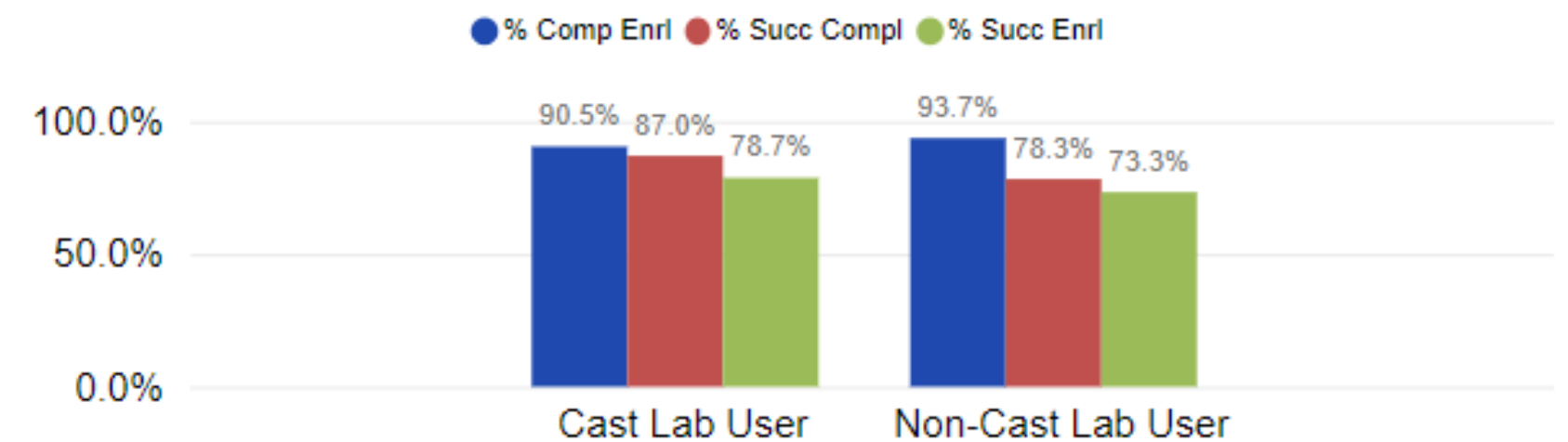
Fall 2022

Academic Year: 2023
Term: 2022 Fall
Co-Req: All
Subject: All
Catalog Number: All
Gender: All
Race/Ethnicity: All

Enrollment, Completion and Success - #



Enrollment, Completion and Success - %



Dynamic Titles

```
1 __Title 1 =  
2 "International Students Reports for "  
3 &  
4 IF(ISFILTERED('International Students'[CAMPUS_NAME])  
5     , MAX('International Students'[CAMPUS_NAME])  
6     , "LSC-System"  
7     )
```

International Students Reports for LSC-System

International Students Reports for LSC-CyFair

Dynnnamic Titles in 4 Steps

1. Identify Filters/ Slicers
2. Create Measures
3. Create Title Measure
4. Add Title Measure to Text Box

Questions

Contact Info



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