



# CREATING AND PUBLISHING INTERACTIVE DASHBOARDS WITH EXCEL POWER PIVOT, POWER BI, AND SHAREPOINT ONLINE

CAIR 2016 Annual Conference - Workshop

Ken Nelson MD, MS  
*Loma Linda University*  
[wknelson@llu.edu](mailto:wknelson@llu.edu)

# This is a Workshop

## Our Task Today

- Import data to a data model in Excel
- Create a dashboard in Excel Power Pivot
- Export to SharePoint
- Import a data model into Power BI
- Create a dashboard in Power BI
- Publish Power BI to a URL that anyone can view

# Everything is Free

- Wouldn't that be awesome?
- Actually at this workshop the software is.
- Really, everything you see being used here today (for an educational institution) is FREE!!!

The screenshot shows the Microsoft homepage with a red navigation bar. Below it, a section titled "Office 365 Education plans and pricing" is displayed. A green button labeled "Get started for free" is visible. The main content area features a dark grey box with the title "Office 365 Education". Inside, two red arrows point to the text "For students: FREE" and "For faculty and staff: FREE". At the bottom, it says "Unlimited". A small note at the bottom left states: "Microsoft reserves the right to verify eligibility at any time and suspend the service for ineligible customers."

The screenshot shows the Microsoft homepage with a yellow background. The top navigation bar includes "Power BI" and other links like "Products", "Solutions", "Partners", and "Learn". On the right, there are "Sign in" and "Sign up free" buttons. The main headline reads "Bring your data to life". Below it, a sub-headline states: "Power BI transforms your company's data into rich visuals for you to collect and organize so you can focus on what matters to you." Two red arrows point from the left towards a central "Get started free" button. At the bottom, there is a preview of the Power BI interface showing various charts and data visualizations.

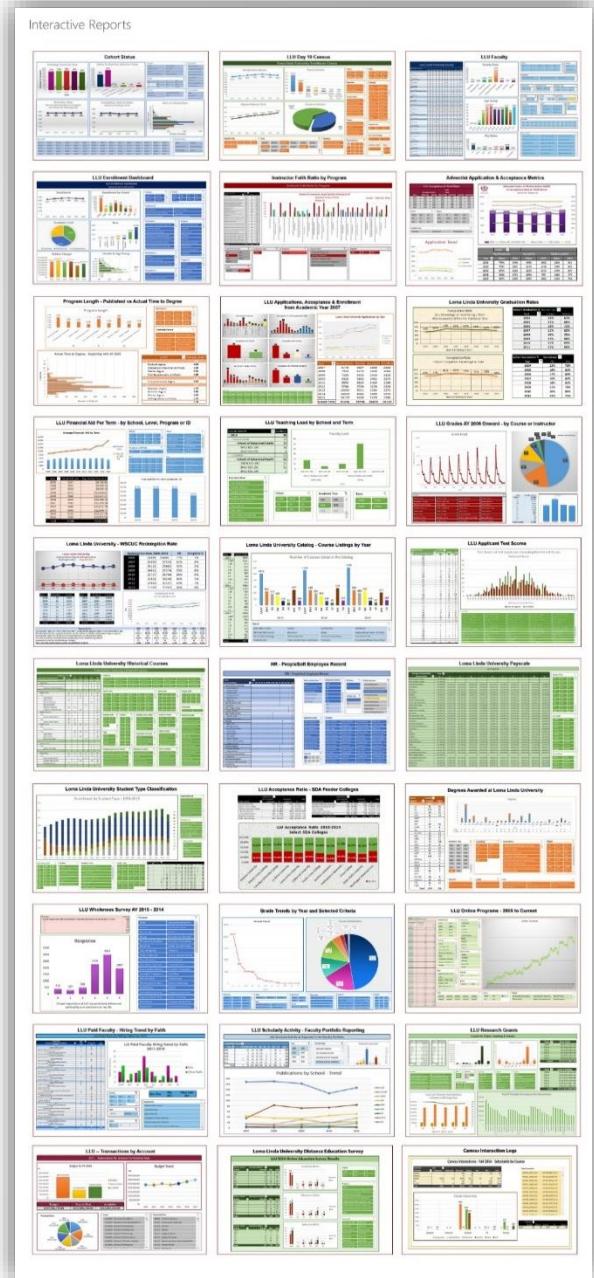
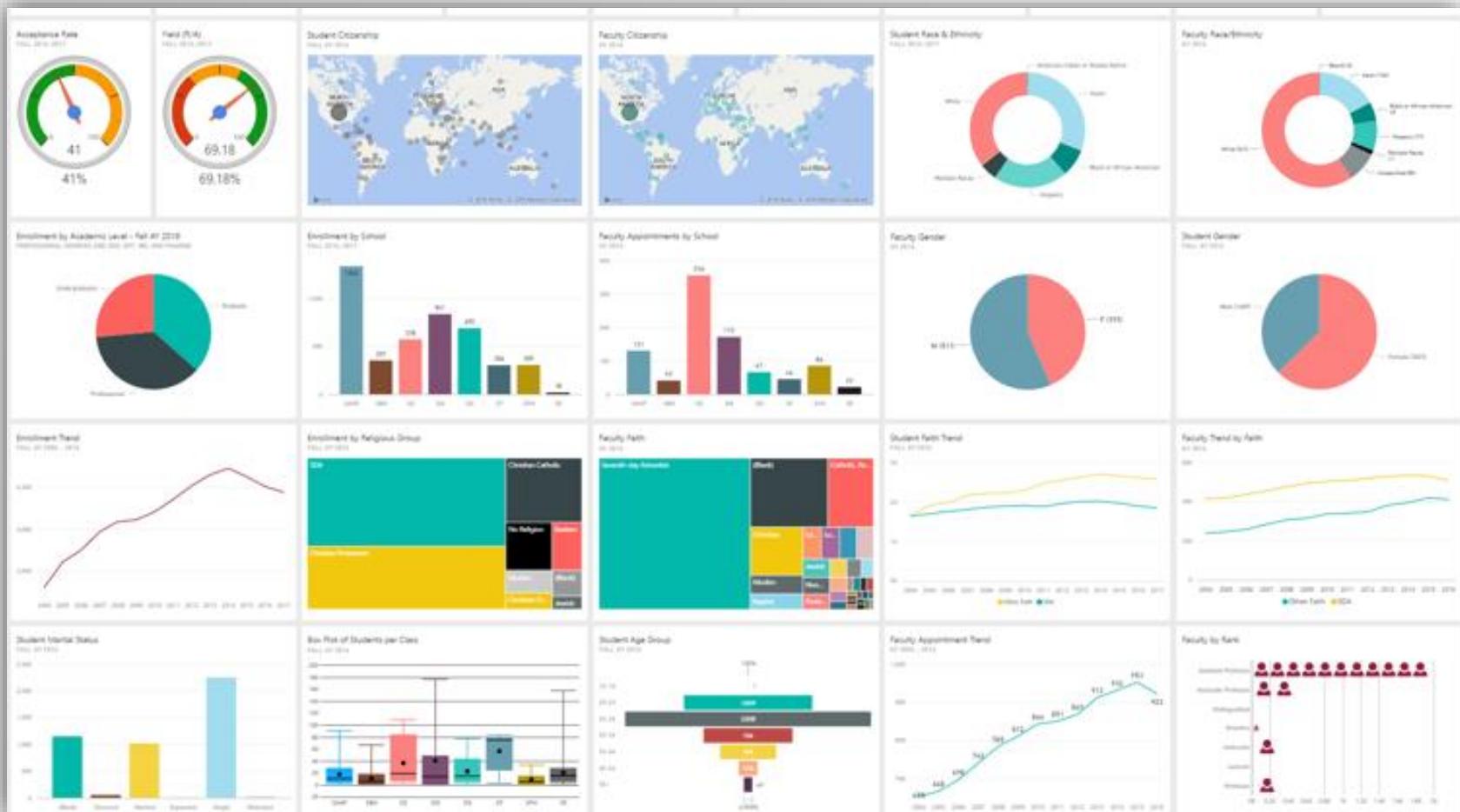
# Content for this Workshop

- Data files
  - Dataset Census.xlsx
  - Dataset Demographics.xlsx
- Step by step guide – CAIR2016.pdf

<http://cair2016.lluh.us>

Dashboards being built today  
are basic but provide  
the foundation for  
you to develop  
complex reports  
based on your data.

# Be Creative

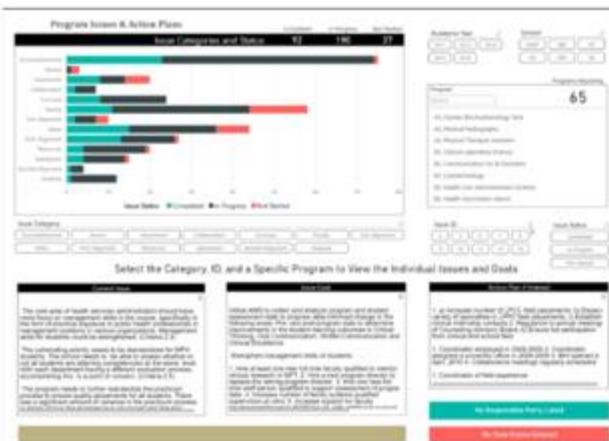


# Sample - Program Review Dashboard

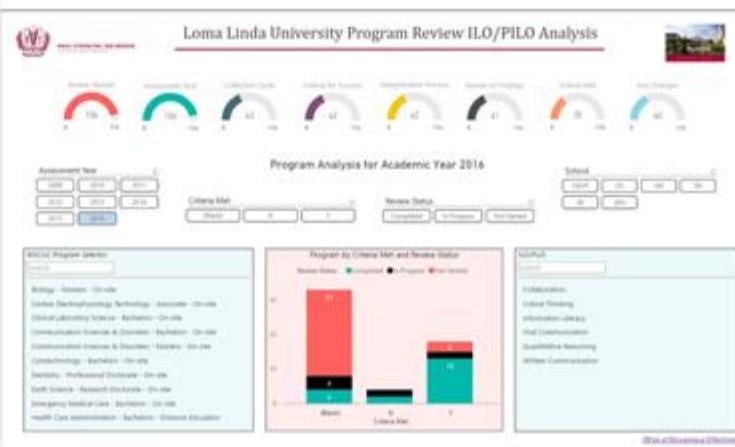
[Click Here to View the LLU Assessment Guide](#)



[Click to View the Program Status Report](#)



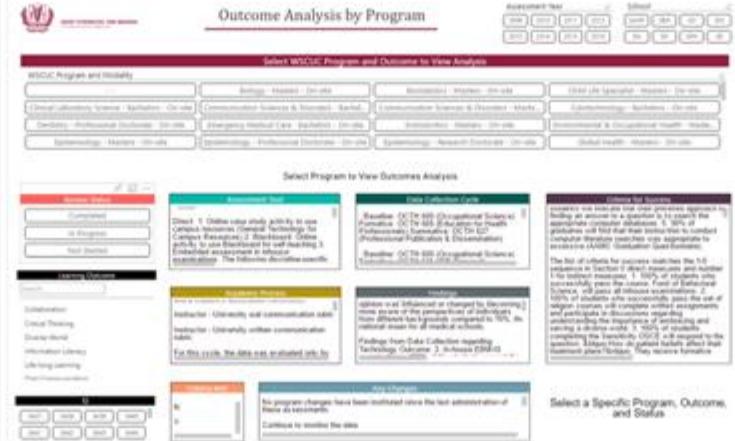
[Click to View the ILO Reporting Summary](#)



[Click to View Detail Analysis](#)



[Click to View Outcome Analysis](#)



[Click to View the Action Plan Review](#)





Issue Category	
Accomplishments	Assessment
Collaboration	Curricula
Faculty	Inst. Alignment
Other	Prof. Alignment
Resources	Satisfaction
Societal Alignment	Students

Academic Year		
Academic Year		
2014	2015	2016

Issue Status	
Completed	
In Progress	
Not Started	

Issue Action ID				
6	7	8	9	10
11	12	13	14	15
16	17	20	21	22
23	24	25	26	27

Issues by School and Program	
9 BS, Nursing	
8 DNP, Nursing	
Other (1)	
SD	<input checked="" type="checkbox"/>
10 DDS, Dentistry	<input checked="" type="checkbox"/>
SPH	<input checked="" type="checkbox"/>
8 MPH, Global Health	
7 DrPH, Health Policy and Leadership	
7 MPH, Biostatistics	
6 DrPH, Preventive Care	
Other (20)	
SBH	<input checked="" type="checkbox"/>
7 MS, Counseling	
6 PhD, Social Policy/Social Research	
3 MS, Child Life Specialist	
1 MS, Marital and Family Therapy	
SAHP	<input checked="" type="checkbox"/>
6 BS, Clinical Laboratory Science	
6 MOT, Occupational Therapy (Entry-Le...	
5 AS, Medical Radiography	
4 BS, Radiation Sciences	
Other (10+)	
SR	<input checked="" type="checkbox"/>
2 MSChap, Chaplaincy	

Visitors made some minor recommendations for two courses that needed higher cognitive learning objectives. This was addressed and submitted to the Review Committee and the program received the full seven year accreditation. This action is in response to: Program Seeks Re-accreditation from the

Assessment resulted in adding a presentation given to the students in the junior year by a library representative. The presentation is currently scheduled for spring quarter, but the faculty will determine if there is an This action is in response to: Students will meet the criteria for success for the

have revised the first PLO. Basic Knowledge has been separated from Technical Ability since the BOC exam is a better tool to assess basic knowledge and the bench records used by clinical faculty is a better tool to assess students' technical ability. A rubric has been developed to assess the second CLS PLO.

**BS, Clinical Laboratory Science**

**In Progress, Issue ID #239**

Katherine Davis • Oct. 18, 2016

Revised CLS PLOs - The faculty have revised the first PLO. Basic Knowledge has been separated from Technical Ability since the BOC exam is a better tool to assess basic knowledge and the bench records used by clinical faculty is a better tool to assess students' technical ability. A rubric has been developed to assess the second CLS PLO, technical ability, and assessment data is being entered into LiveText during the 2015-2016 academic year for this PLO. The final analysis of this assessment will occur at the end of the 2015-2016 academic year. This action is in response to: Use the BOC scores for summative assessment of Basic Knowledge and use the student bench records from the clinical year to assess Technical Ability. This issue was identified by - Program director - The issue goal is: PLO #1 needs to be revised from Basic Knowledge and Technical Ability to two separate PLOs.

# Sample - Dashboards with Hyperlinked Tiles

The dashboard consists of six distinct sections:

- Loma Linda University Foundation**: A home page featuring a circular chart, a table of recent news items, and a timeline.
- Ledger by Time Parameters**: A detailed ledger table with filters for Transaction Date and Account.
- Loma Linda University Investment Accounts**: A treemap visualization showing the market value of assets across different categories.
- Balancing Values with Percent of Previous and First**: A section showing pyramid charts for Total Revenue and Market Value, along with a table of recent news items.
- Loma Linda University Foundation**: A section showing a table of recent news items and a large central image.
- Matrix**: A table showing financial data with columns for Account Name, Expected Income, Actual Value, Year Ended, and Ending Balance.

# Sample - Financial Aid – Funds are Purpose Searchable

Market Value of Assets  
[REDACTED]

Total Funds Available  
[REDACTED]

Current Ending Balance  
[REDACTED]

Account  
Search

P1103  
P1105  
P1110  
P1111  
P1118

Entity

Search

SN  
• 62

SM  
• 57

SAHP  
• 44

Beneficiary

(Blank)  
 Any Program  
 Any Program, Allied Health  
 Any Student  
[Add Condition](#) [Add Condition](#)

Purpose

3.0 GPA or Higher  
3rd year student of the entry level Doctor of OT program showing compassion, ie  
40% for School operating & 30% added back to Principal

Entity

FA GA SAHP SBH SD SM SN SP SPH SR

Fund Info Sheets

P1163 - MITCHELL (J. RUSSELL) SCHOLARSHIP ENDOWMENT  
SDA Students w/financial needs

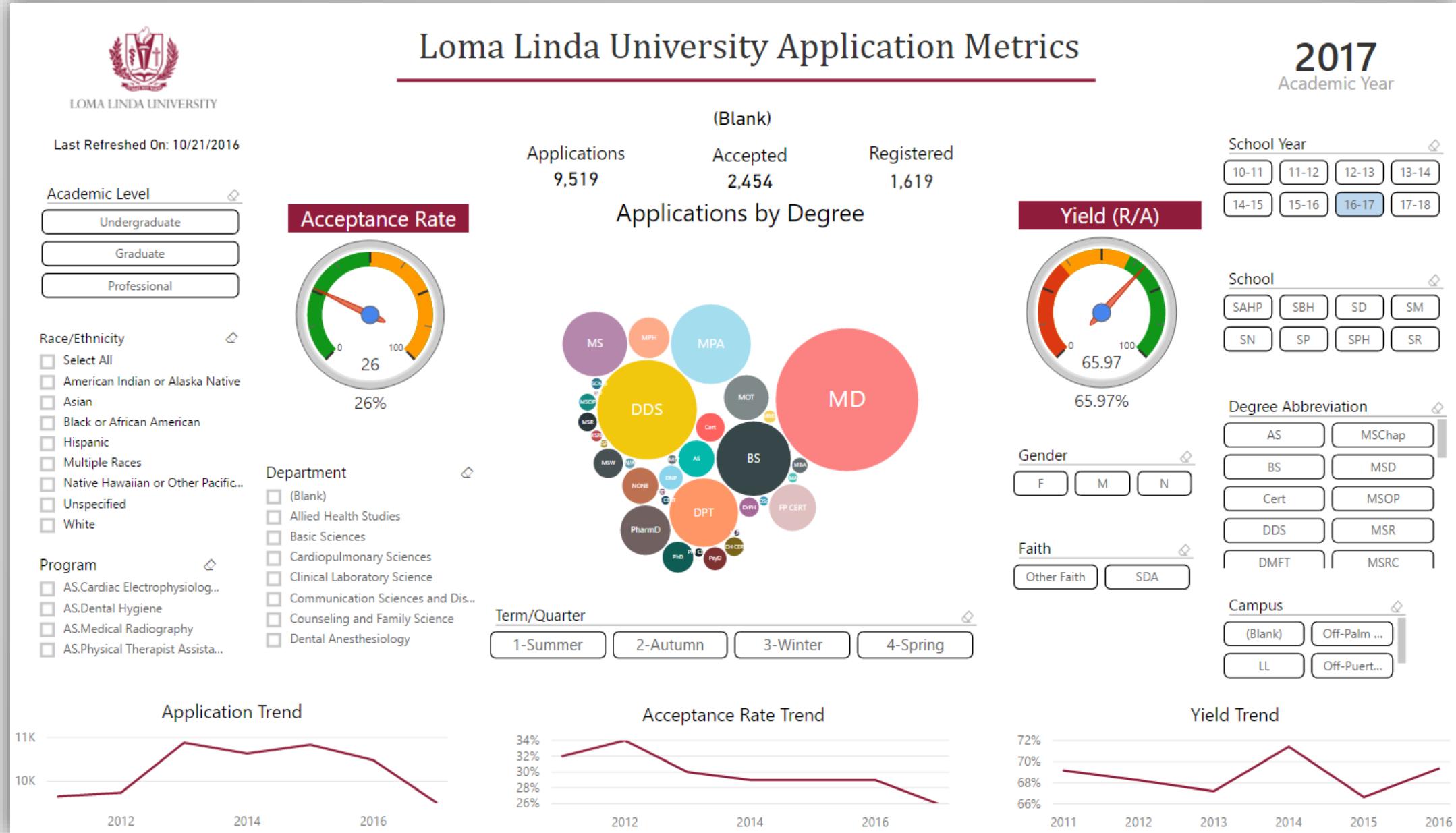
P1164 - CLASS OF 1969 SCHOLARSHIP SN  
Having no other scholarships, jr. or sr. w/financial need and compassionate/caring spirit

P1171 - JETTON (JAMES & MARGE) ENDOWED STUDENT AID FUND  
Needy students

P1164 - CLASS OF 1969 SCHOLARSHIP SN

The CLASS OF 1969 SCHOLARSHIP SN was setup for Having no other scholarships, jr. or sr. w/financial need and compassionate/caring spirit. The original gift amount was: [REDACTED]. The fund was opened on: 10/20/2010. The current investment pool percent is: STF 100%.

# Sample - Application Metrics Dashboard



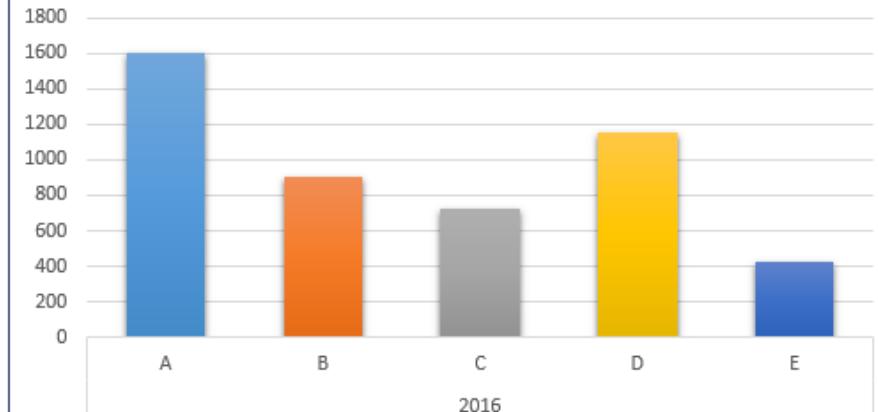
# Today's Dashboard - Excel Power Pivot Example

## Alphabet University Enrollment

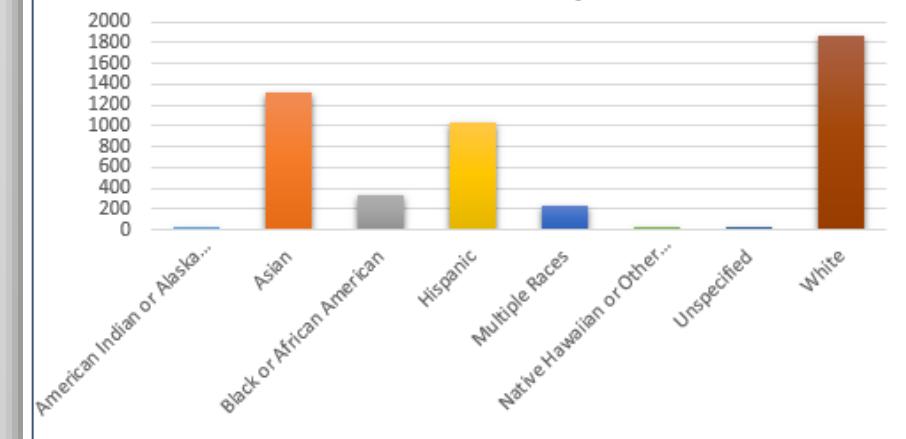
### Enrollment Trend



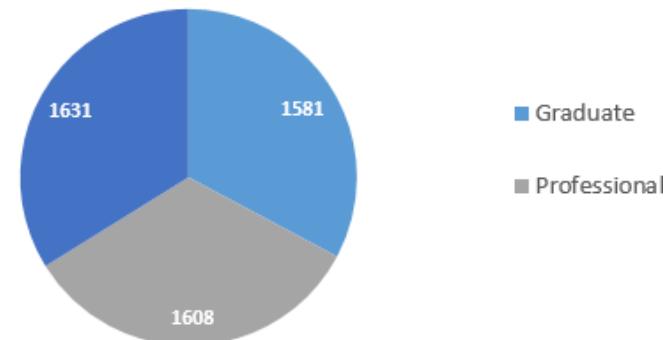
### School Enrollment by Selected Year



### Race/Ethnicity



### Academic Level



### Academic Year

2012	2013	2014
2015	2016	

### Quarter

1	2	3	4
---	---	---	---

### School

A	B	C	D	E
---	---	---	---	---

### Academic Level

Graduate
Professional
Undergraduate

### Degree

BS	MS
----	----

### Gender

Female	Male
--------	------

### Citizenship

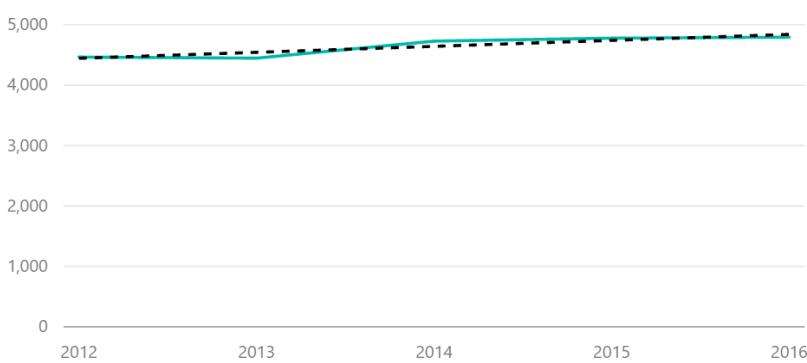
Argentina	
Armenia	
Austria	
Bangladesh	
Belarus	
Bermuda	(...)
Brazil	
Cameroon	
Canada	
Chile	

# Today's Dashboard - Power BI Example

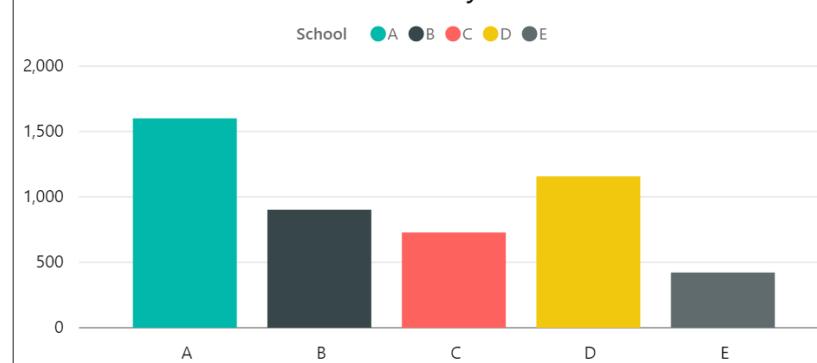
## Alphabet University Enrollment

Selected Students = 4794

Enrollment Trend



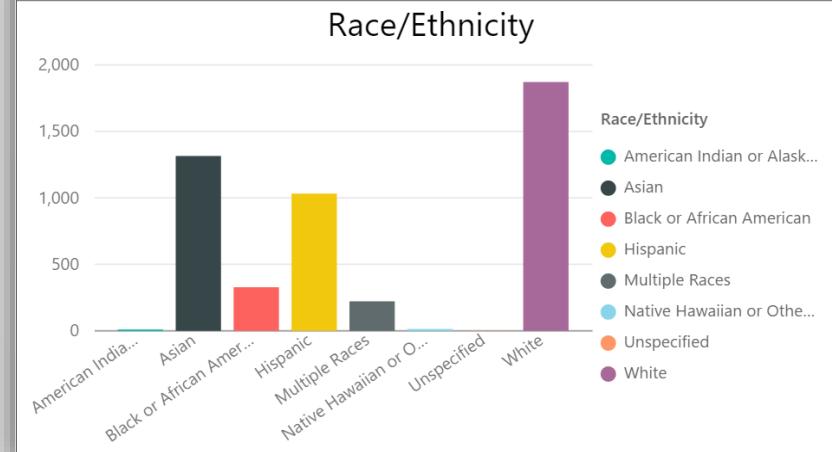
School Enrollment by Selected Year



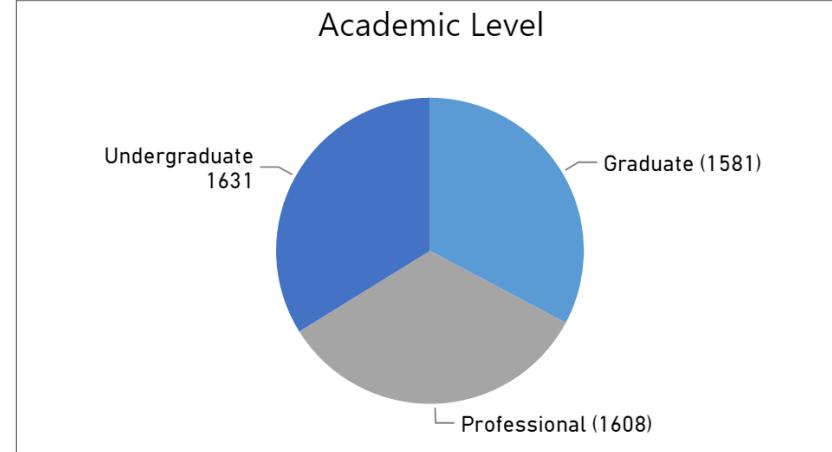
Student Citizenship



Race/Ethnicity



Academic Level



School

Academic Year

2012  
 2013  
 2014  
 2015  
 2016

Degree

BS  
 MS

Gender

Female  
 Male

Academic Level

Graduate  
 Professional  
 Undergraduate

Quarter

1  
 2  
 3  
 4

Citizenship

Argentina  
Armenia  
Austria  
Bangladesh  
Belarus  
Bermuda  
(UK)  
Brazil  
Cameroon

# Based on an Underlying Data Model

Screenshot of Microsoft Excel showing the Power Pivot ribbon tab selected. The data is displayed in a PivotTable.

The PivotTable displays the following data:

	Student ID	Academic Year	Quarter	County	State	Country	Status	School	Academic Level	Prog
1	166959633072710		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
2	167812269210776		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
3	169749814917892		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
4	170298791620710		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
5	166174890255015		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
6	167432699716314		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
7	168265749969900		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
8	168437278001200		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
9	171996573474750		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
10	168677177127920		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
11	168435826798368		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
12	168940323967802		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
13	169948245442944		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
14	170353612104192		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
15	170846954914500		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
16	169036090380067		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
17	170386130628262		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
18	170036919576615		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
19	170843842524044		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
20	171314844080162		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
21	171380064314546		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
22	166774263149075		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr
23	168168665421064		2012	4 San Bernardino	CA	United States	FT	E	Graduate	E-Pr
24	160706005124840		2012	4 San Bernardino	CA	United States	PT	E	Graduate	E-Pr

# Let's Start by Opening Excel

The screenshot shows the Microsoft Excel interface with the following elements:

- Top ribbon:** File, Home, Insert, Draw, Page Layout, Formulas, Data, Review, View, Developer, Power Pivot, and a search bar.
- Power Pivot ribbon tab:** Manage, Measures, KPIs, Add to Data Model, Update All, Detect, and Settings.
- Excel window title:** Book1 - Excel.
- User Name:** Nelson, W. Kenneth (LLU).
- Worksheet area:** A1 is selected.
- Callout boxes:** One red callout box labeled "Select Manage" points to the Manage button in the Power Pivot ribbon. Another red callout box labeled "Select Power Pivot" points to the Power Pivot ribbon tab.
- COM Add-ins dialog box:** This box lists available add-ins:
  - Acrobat PDFMaker Office COM Addin
  - Inquire
  - Microsoft Power BI Publisher for Excel
  - Microsoft Power Map for Excel
  - Microsoft Power Pivot for Excel** (this item is checked and highlighted with a blue arrow)
  - PDF Converter 8 ExcelAddin
  - Power View
  - TableauPowerPivotConnectorLocation: C:\Program Files\Microsoft Office\Root\Office16\ADDINS\PowerPivot Excel Add-in\PowerPivotExc... Load Behavior: Load at Startup.

**Select Manage**

**Select Power Pivot**

COM Add-ins

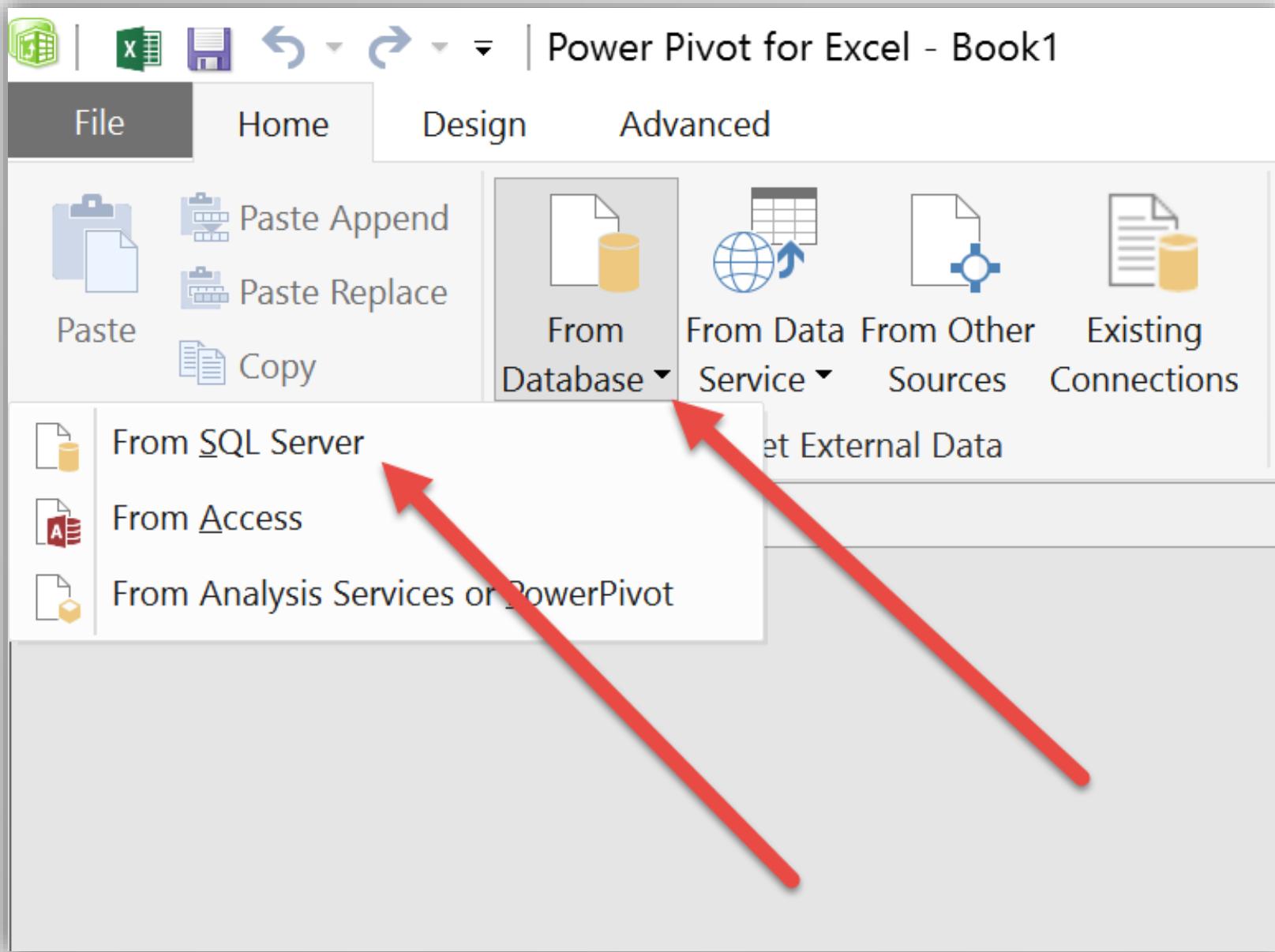
Add-ins available:

- Acrobat PDFMaker Office COM Addin
- Inquire
- Microsoft Power BI Publisher for Excel
- Microsoft Power Map for Excel
- Microsoft Power Pivot for Excel**
- PDF Converter 8 ExcelAddin
- Power View
- TableauPowerPivotConnector

Location: C:\Program Files\Microsoft Office\Root\Office16\ADDINS\PowerPivot Excel Add-in\PowerPivotExc...

Load Behavior: Load at Startup

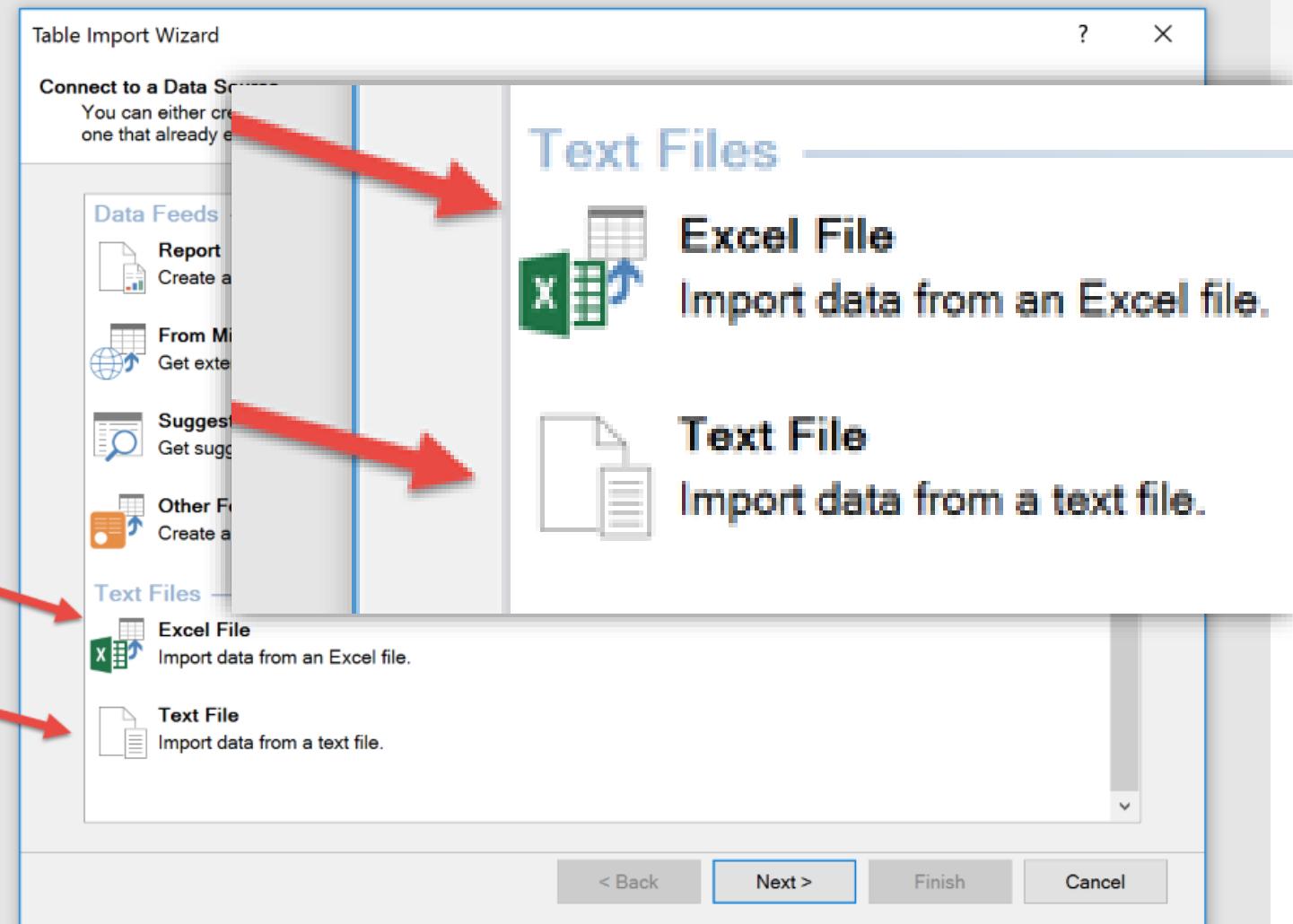
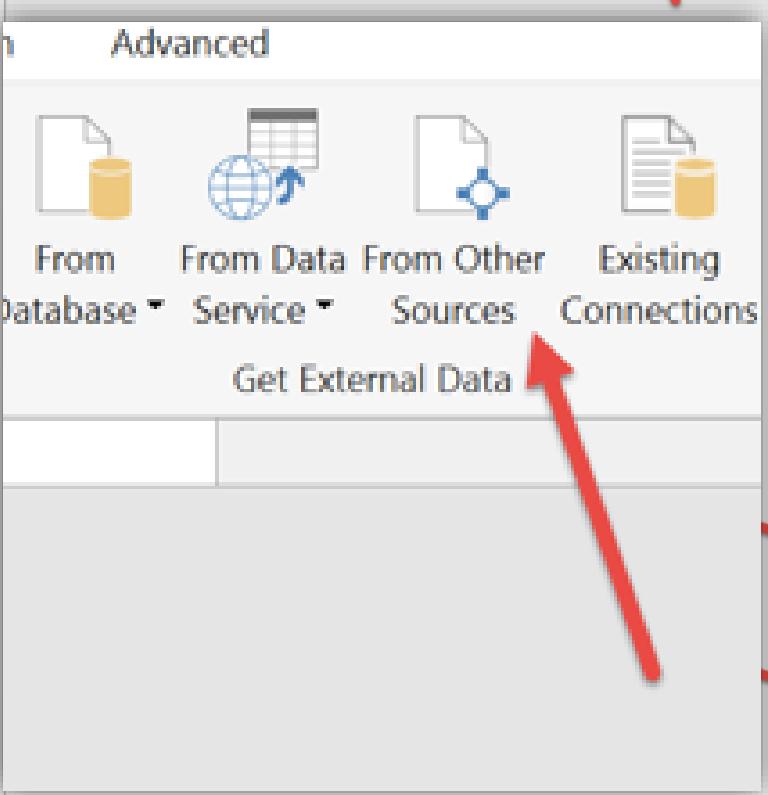
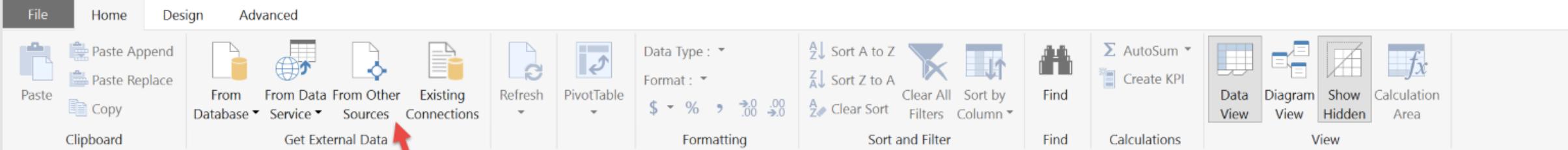
# Import Data



Multiple data sources can be imported.

Commonly encountered are:

- SQL
- Excel
- Text



## Table Import Wizard

## Connect to a Microsoft Excel File

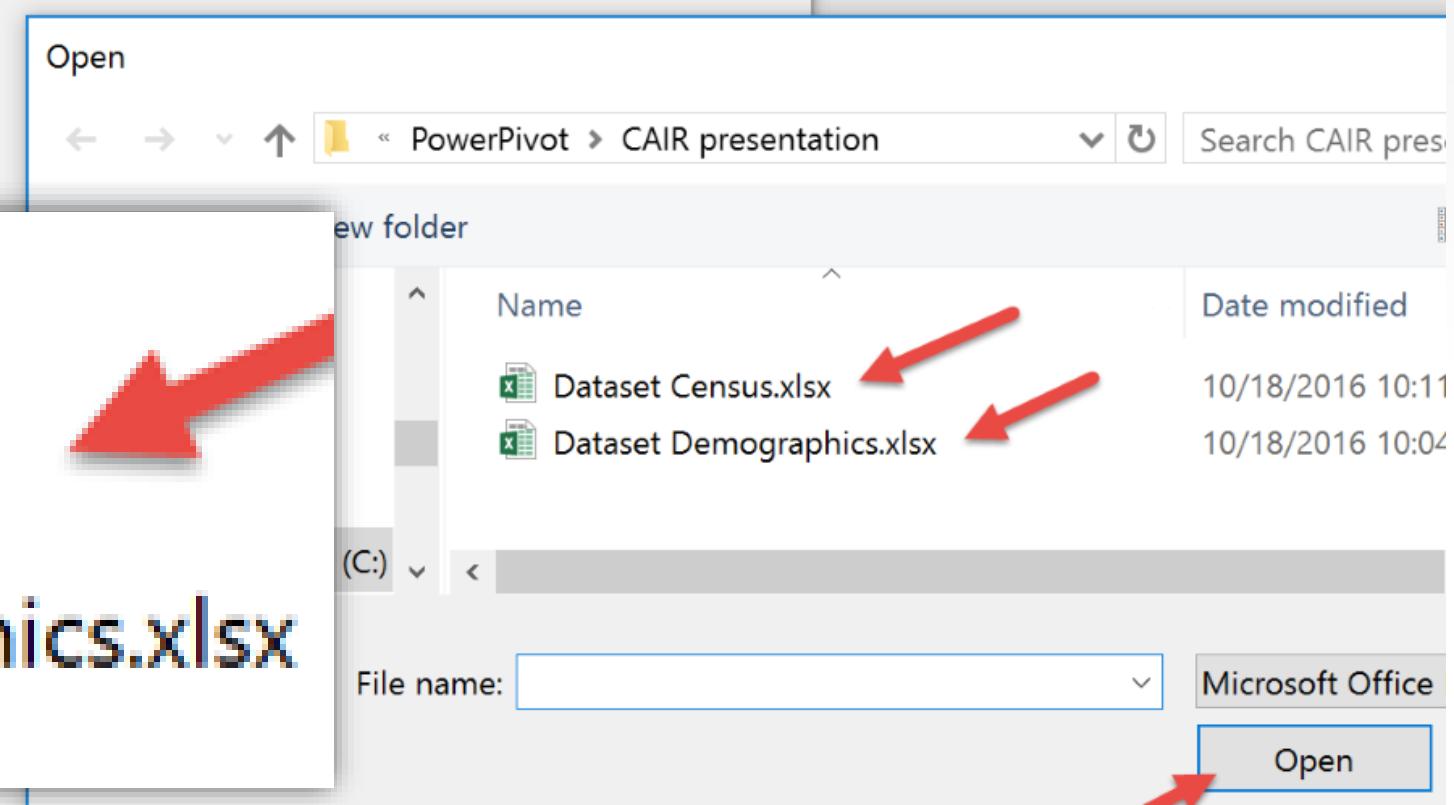
Enter the information required to connect to the Microsoft Excel file

Friendly connection name:

**Excel File Path:**

Use first row as column headers

[Browse..](#)



[< Back](#)

[Next >](#)

Finish

Cance

**Select Tables and Views**

Select the tables and views that you want to import data from.

**File Name:** C:\Office Documents\OEE\PowerPivot\CAIR presentation\Dataset Census.xlsx

Tables and Views:

	Source Table	Friendly Name	Filter Details
<input checked="" type="checkbox"/>	Census\$	Census	

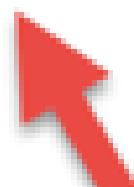


**File Name:** C:\Office Document

Tables and Views:

<input checked="" type="checkbox"/>	Source Table
-------------------------------------	--------------

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Census\$
-------------------------------------	--



Select Related Tables

Preview & Filter

< Back

Next >

Finish

Cancel



**Importing**

The import operation might take several minutes to complete. To stop the import operation, click the Stop Import button.

**Success**

Total: 1 Cancelled: 0

Success: 1 Error: 0

**Details:**

Work Item	Status	Message
<input checked="" type="checkbox"/> Census	Success. 70,608 rows transferred.	

We have successfully imported the data file



Stop Import

Close

# Repeat Steps to Import the 2<sup>nd</sup> Data File

The screenshot shows a Microsoft Excel interface with the 'Data' tab selected in the ribbon. The ribbon also includes 'File', 'Home', 'Design', and 'Advanced' tabs. Under the 'Data' tab, the 'Get External Data' group is visible, containing icons for 'Paste Append', 'Paste Replace', 'From Database', 'From Service', 'From Other Sources', 'Existing Connections', 'Refresh', and 'PivotTable'. A red arrow points from the 'From Other Sources' icon to the 'Table Import Wizard' dialog box.

**Table Import Wizard**

**Connect to a Data Source**

You can either create a connection to a data source, or you can use one that already exists.

**Data Feeds**

- Report
- From Microsoft Azure Marketplace
- Suggest Related Data
- Other Feeds

**Text Files**

- Excel File** (highlighted with a blue background and a red arrow)
- Text File

**Buttons at the bottom:**

- < Back
- Next >** (highlighted with a blue border and a red arrow)
- Finish
- Cancel

**Red arrows:**

- A red arrow points from the 'From Other Sources' button in the ribbon to the 'Table Import Wizard' dialog box.
- A red arrow points from the 'Excel File' option in the 'Text Files' list to the 'Next >' button.
- A red arrow points from the 'Census' tab in the bottom left corner of the main Excel window to the 'Census' tab in the ribbon.

**Connect to a Microsoft Excel File**

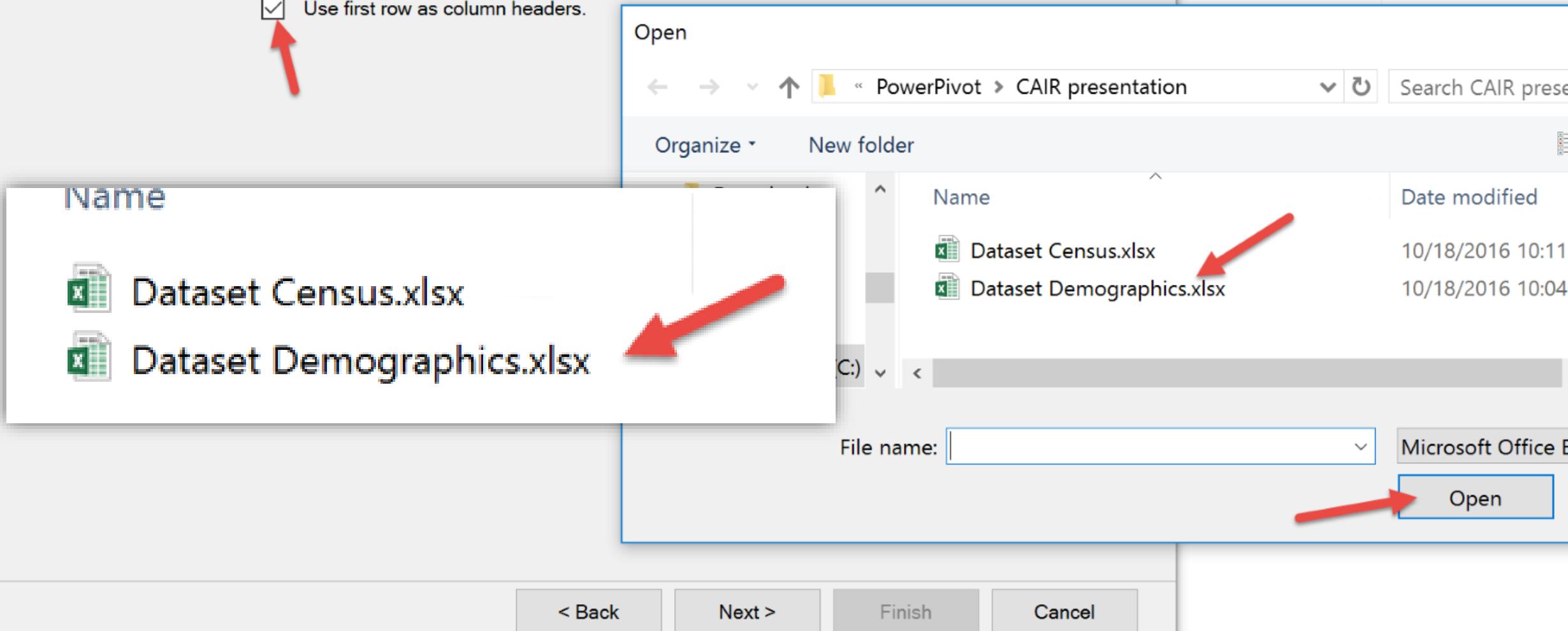
Enter the information required to connect to the Microsoft Excel file.

Friendly connection name:

Excel File Path:

**Browse...**

Use first row as column headers.



< Back

Next >

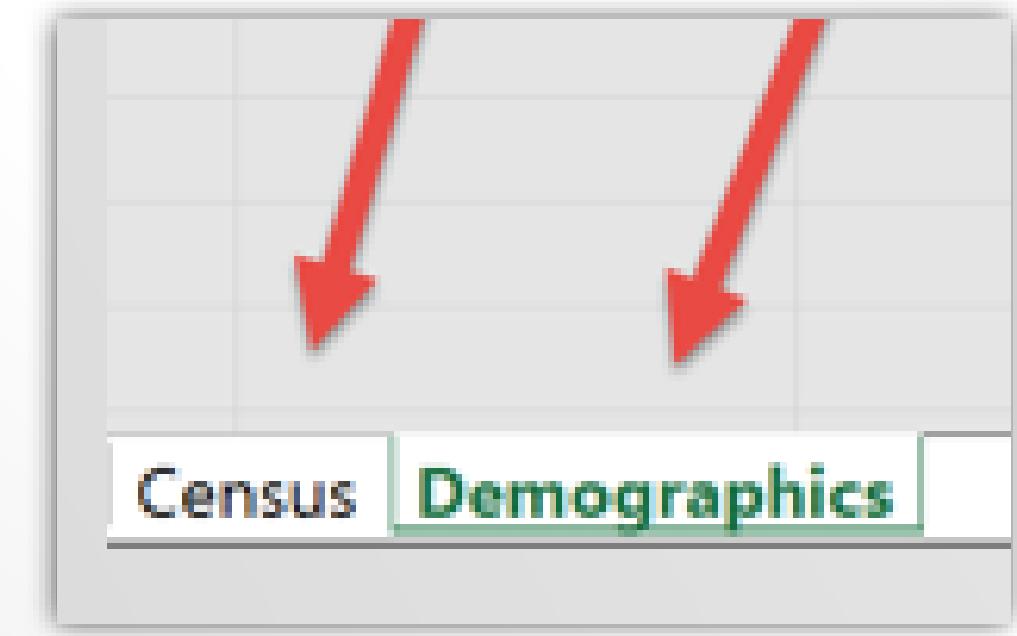
Finish

Cancel

	Student ID	Age Group	Birth Country	Citizenship	Race_Ethnicity	Gender
1	7856461041...	20-24	United States	United States	White	Female
2	7929833041...	20-24	United States	United States	White	Female
3	1685401477...	20-24	United States	United States	White	Female
4	1700807900...	20-24	United States	United States	White	Female
5	1701443053...	20-24	United States	United States	White	Female
6	1701836563...	20-24	United States	United States	White	Female
7	1702705999...	20-24	United States	United States	White	Female
8	1702836405...	20-24	United States	United States	White	Female
9	1702859973...	20-24	United States	United States	White	Female
10	1702883470...	20-24	United States	United States	White	Female
11	1703060808...	20-24	United States	United States	White	Female
12	1703476440...	20-24	United States	United States	White	Female
13	1703875473...	20-24	United States	United States	White	Female
14	1703925975...	20-24	United States	United States	White	Female
15	1703932354...	20-24	United States	United States	White	Female
16	1704164782...	20-24	United States	United States	White	Female
17	1704336733...	20-24	United States	United States	White	Female
18	1704373334...	20-24	United States	United States	White	Female
19	1704415094...	20-24	United States	United States	White	Female
20	1704552747...	20-24	United States	United States	White	Female
21	1704872164...	20-24	United States	United States	White	Female
22	1705182406...	20-24	United States	United States	White	Female

Census Demographics

- We have now imported two datasets:
- Census
  - Demographics



# Table Joins

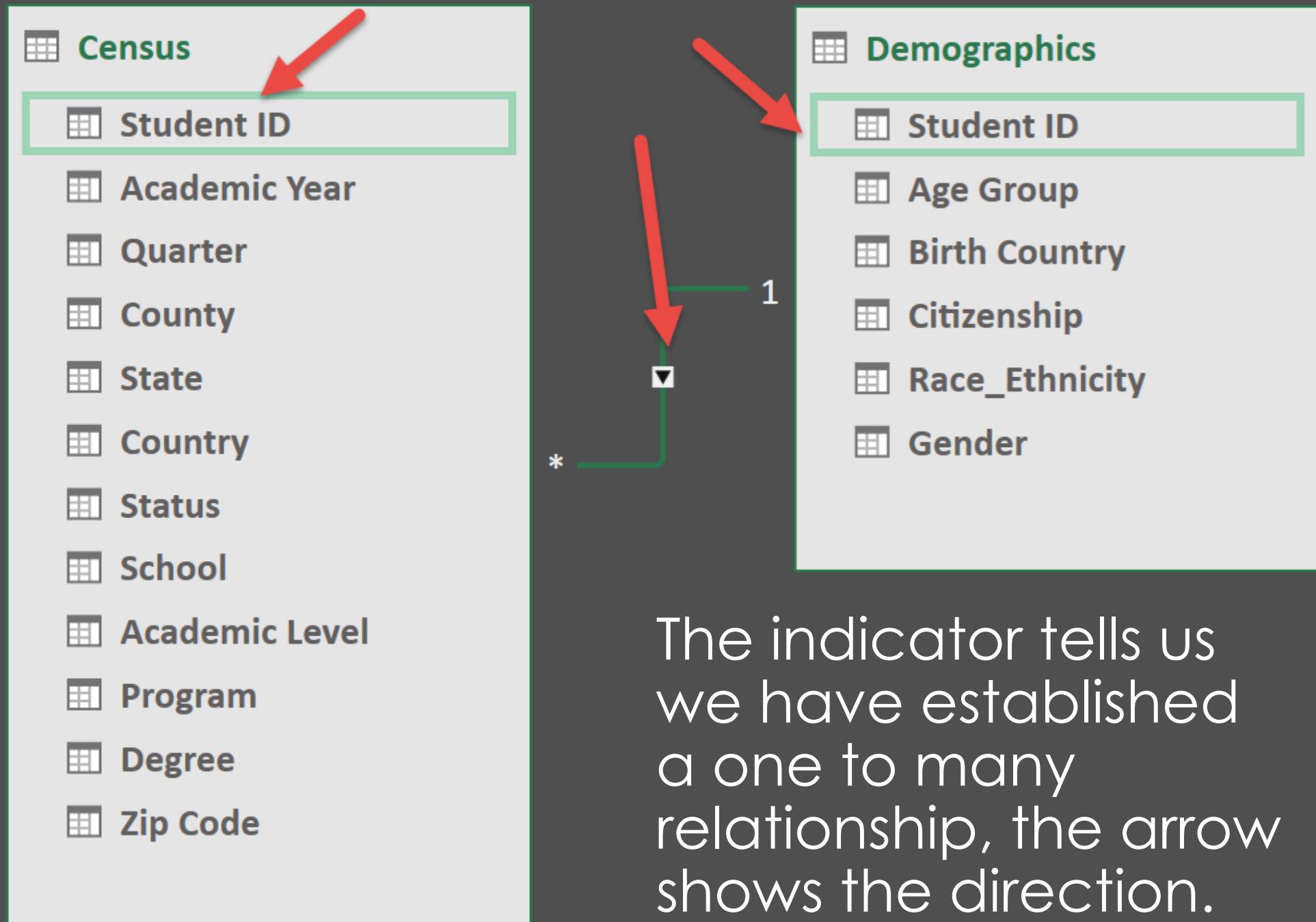
The screenshot shows the Microsoft Power Pivot ribbon interface. The 'Data View' tab is selected, indicated by a red arrow pointing to its icon. Two tables are currently selected: 'Census' and 'Demographics'. Red arrows point from the table names to their respective icons in the ribbon's 'Get External Data' section. The 'Census' table includes columns: Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, and Zip Code. The 'Demographics' table includes columns: Student ID, Age Group, Birth Country, Citizenship, Race\_Ethnicity, and Gender.

We can join these two tables on a column. One column needs to be a unique list.

Census
Student ID
Academic Year
Quarter
County
State
Country
Status
School
Academic Level
Program
Degree
Zip Code

Demographics
Student ID
Age Group
Birth Country
Citizenship
Race_Ethnicity
Gender

Drag one  
column title to  
the other



The indicator tells us we have established a one to many relationship, the arrow shows the direction.

# Adding a New Column

	Degree	Zip Code	Race/Ethnicity
am	MS	92354	
...			

Let's add a column to our census table based on a column from the demographics table



Introducing Data Analysis Expressions – DAX

Powerful language for Power Pivot and Power BI

When we start to type suggestions are displayed

A screenshot of Microsoft Excel showing a formula bar with the text '=rel'. Below the formula bar, a dropdown menu displays three suggestions: 'RELATED', 'RELATEDTABLE', and 'USERELATIONSHIP'. Red arrows point from the text in the formula bar to each of these suggestions. The background shows a table with columns for 'Academic Year', 'Year', 'Semester', and 'Status'.

Academic Year	Year	Semester	Status
2011	2011	ern...	CA
2012	4	San Bern...	CA

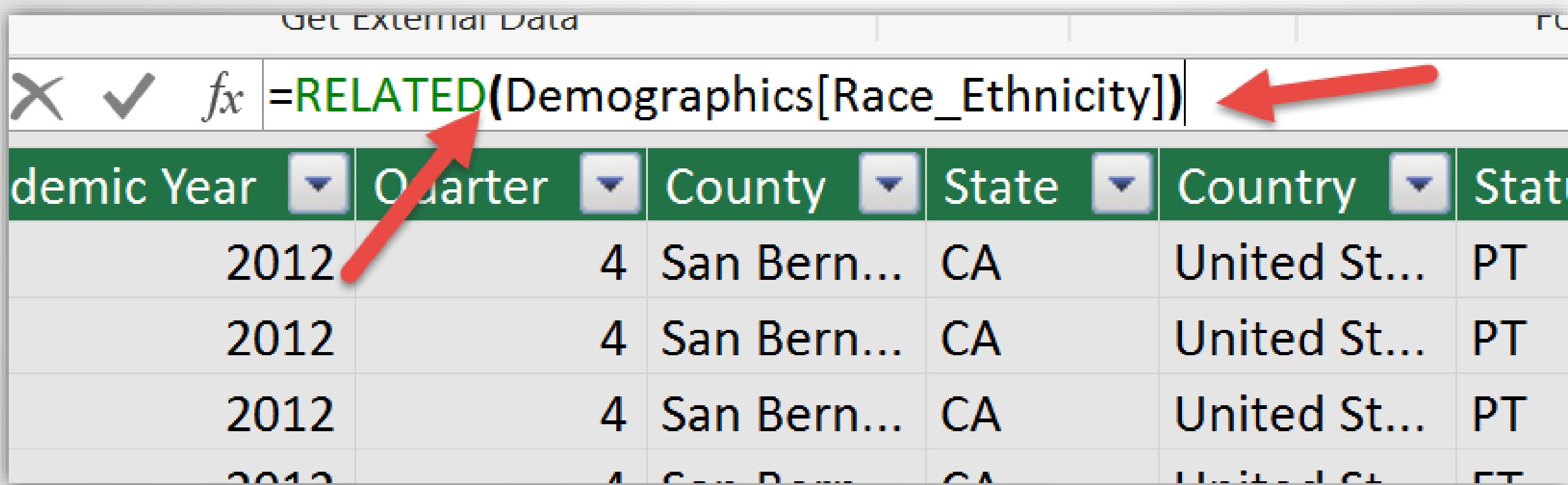
X ✓ fx =RELATED( ←

RELATED(Column Name) ↴

Academic Year	Quarter	Demographics[Age Group]	Status
2012		Demographics[Birth Country]	St... PT
2012		Demographics[Citizenship]	St... PT
2012		Demographics[Gender]	St... FT
2012		Demographics[Race_Ethnicity]	St... PT
2012		Demographics[Student ID]	St... PT
2012	4	San Bern...	United St... PT
2012	4	San Bern...	United St... PT
2012	4	San Bern...	United St... FT

# Complete DAX Formula

=RELATED(Demographics[Race\_Ethnicity])



The screenshot shows the Power BI Data View interface. At the top, there's a formula bar with the DAX formula =RELATED(Demographics[Race\_Ethnicity]). Two red arrows point to this formula: one from the left side of the formula bar and another from the right side, both pointing towards the closing parenthesis. Below the formula bar is a table with six columns. The columns are labeled: Academic Year, Quarter, County, State, Country, and Status. The first three columns have dropdown arrows indicating they are filterable. The data in the table consists of four rows, all of which show the same values: Academic Year 2012, Quarter 4, County San Bern..., State CA, Country United St..., and Status PT.

Academic Year	Quarter	County	State	Country	Status
2012	4	San Bern...	CA	United St...	PT
2012	4	San Bern...	CA	United St...	PT
2012	4	San Bern...	CA	United St...	PT
2012	4	San Bern...	CA	United St...	PT

# Our New Column Has Been Created

Degree	Zip Code	Race/Ethnicity	Ad
MS	92373	White	
MS	92373	White	
MS	92373	White	
MS	92373	Hispanic	

# Lookup Table Example

Lookup tables support requests like listing students in a particular region while retaining multivariate filtered charts.

Use a slicer, create the list. This can then be used in another report keyed on zip code to filter students.

The screenshot shows the 'PivotTable Fields' ribbon in Excel. On the left, there's a list of fields: County, State, Country, Status, School, Academic Level, Program, Degree, Zip Code (which is checked), and Race/Ethnicity. Below this is a section for 'Demographics'. On the right, under 'Drag fields between areas below:', there's a 'Filters' section which currently contains nothing. At the bottom, there's a 'Rows' section with 'Zip Code' listed. In the center, there's a PivotTable grid with columns O, P, Q, R, and S. To the left of the grid, there's a 'Row Labels' dropdown menu and a 'County' slicer. The 'County' slicer has options: (blank), Alameda, Amador, Butte (which is selected and highlighted in blue), Calaveras, Contra Costa, Del Norte, and El Dorado. The PivotTable grid itself is mostly empty, with only the column headers visible.

# Building the Dashboard

File

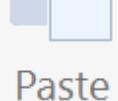
Home

Design

Advanced



Paste Append



Paste Replace



Copy

From Database  
▼From Data Service  
▼From Other Sources  
▼Existing Connections  
▼Refresh  
▼PivotTable  
▼

Clipboard

Get External Data



PivotTable



PivotChart



Chart and Table (Horizontal)



Chart and Table (Vertical)



Two Charts (Horizontal)



Two Charts (Vertical)



Four Charts



Flattened PivotTable

Data Type : ▼

Format : ▼

\$ % , .00 .00

Formatting

Student ID Gender

1 Female

2 Female

3 Female

4 Female

5 Female

6 Female

7 Female

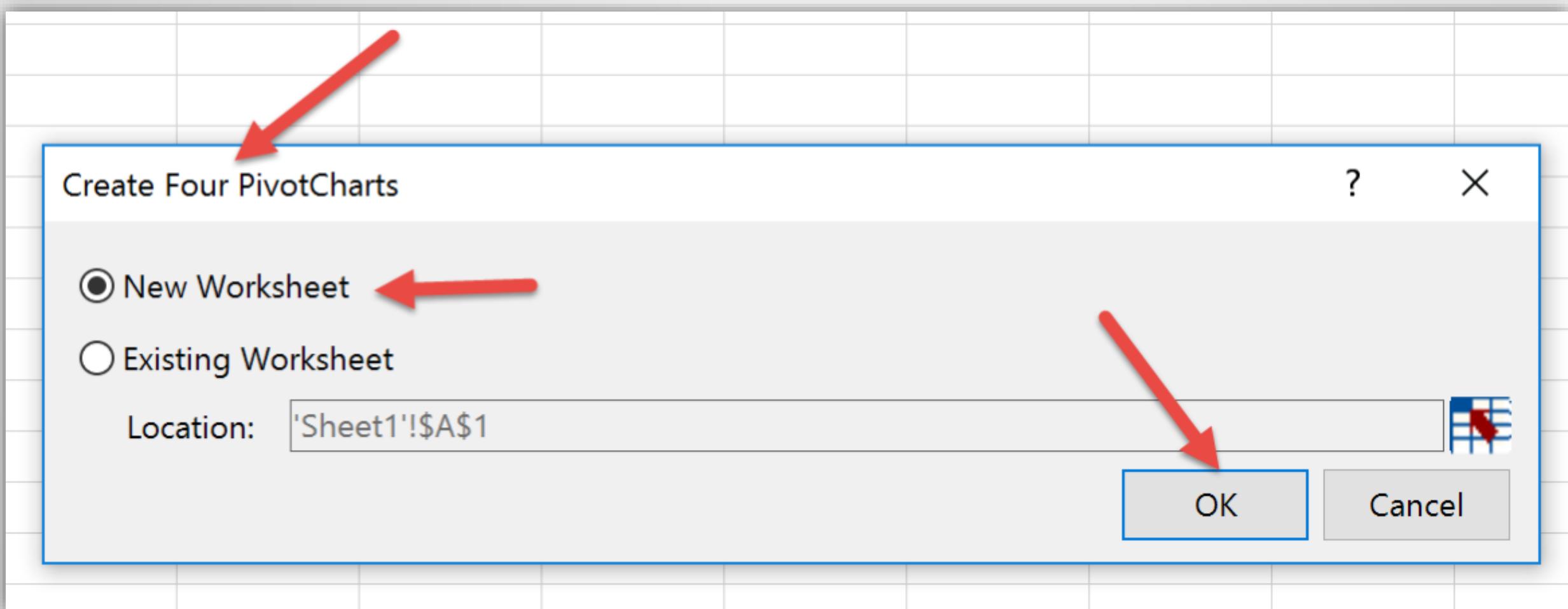
8 Female

9 Female

10 Female

	[Student ID]	Age Group	Birth Country
1	7856461041...	20-24	United States
2	7929833041...	20-24	United States
3	1685401477...	20-24	United States
4	1700807900...	20-24	United States
5	1701443053...	20-24	United States
6	1701836563...	20-24	United States
7	1702705999...	20-24	United States
8	1702836405...	20-24	United States
9	1702859973...	20-24	United States
10	1702883470...	20-24	United States

# Selecting the Location for Charts



# Selecting Content for Chart

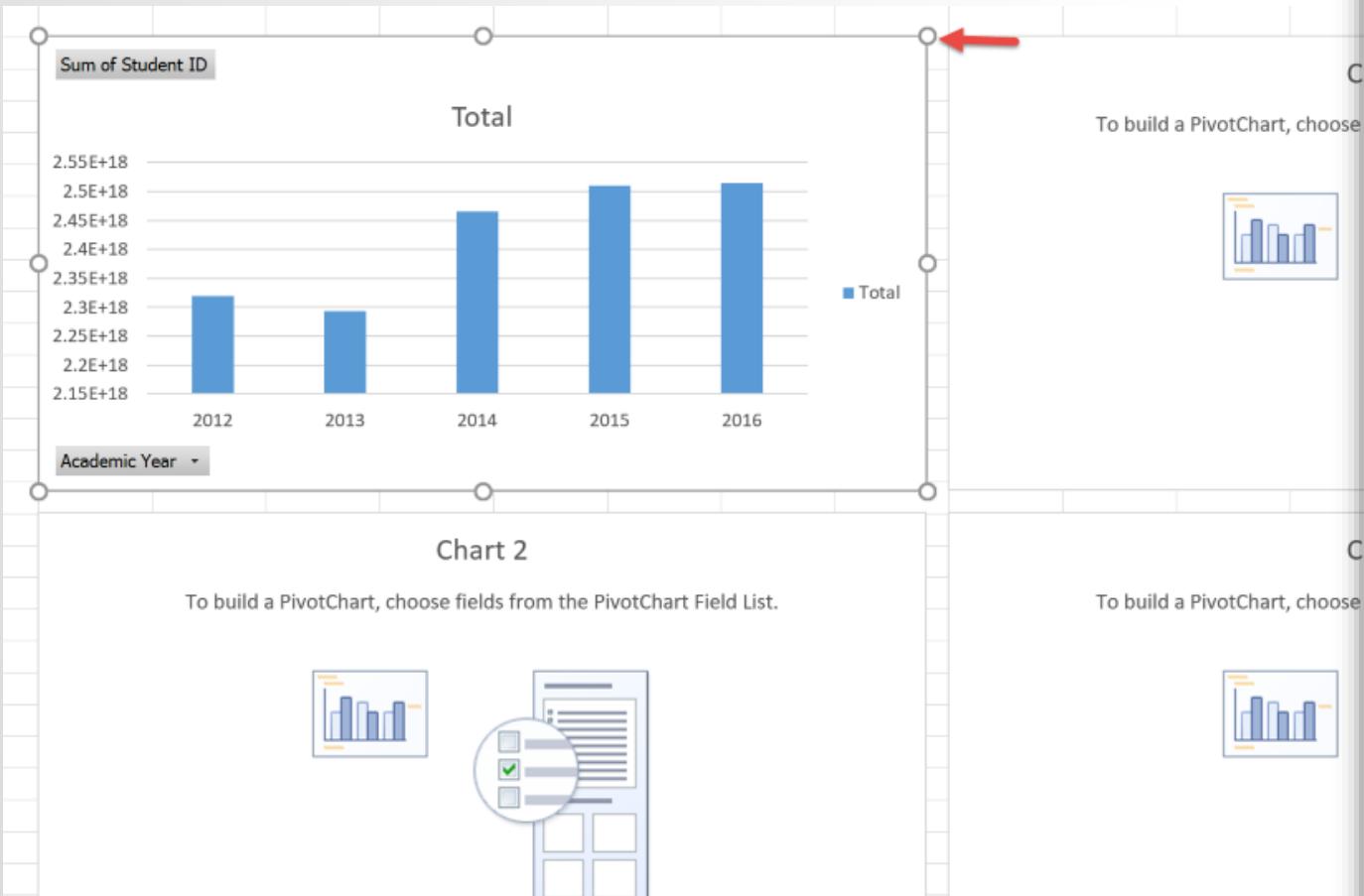
The screenshot shows the Power BI desktop interface with a PivotChart being created. The main area displays a grid with a chart placeholder labeled "Chart 1". A tooltip indicates: "To build a PivotChart, choose fields from the PivotChart Field List." Below the grid, two data tables are visible: "Census" and "Demographics".

The top ribbon has tabs: Manage, Measures, KPIs, Calculations, Data Model, Tables, Relationships, Add to Data Model, Update, Detect, and Settings.

The PivotChart Field List pane on the right contains sections for "Filters", "Axis (Category)", and "Σ Values". The "Axis (Category)" section is currently active, showing the "Census" and "Demographics" tables. Red arrows point from the "Census" and "Demographics" table names in the field list to their respective entries in the "Axis (Category)" section. Another red arrow points from the "Census" table icon in the field list to the "Census" entry in the "Axis (Category)" section.

The "Σ Values" section is also visible in the field list pane.

# We will drag Student ID to Values and Academic Year to Axis



The screenshot shows the PivotChart Field List and the ribbon. Red arrows point to the checked checkboxes for "Student ID" and "Academic Year" in the list. Another red arrow points to the "Σ Values" button in the ribbon. The ribbon also shows "Axis (Legend...)" and "Sum of St...".

Active | All

Choose fields to add to report:

Search

Student ID

Academic Year

Quarter

County

State

Country

Status

School

Academic Level

Drag fields between areas below:

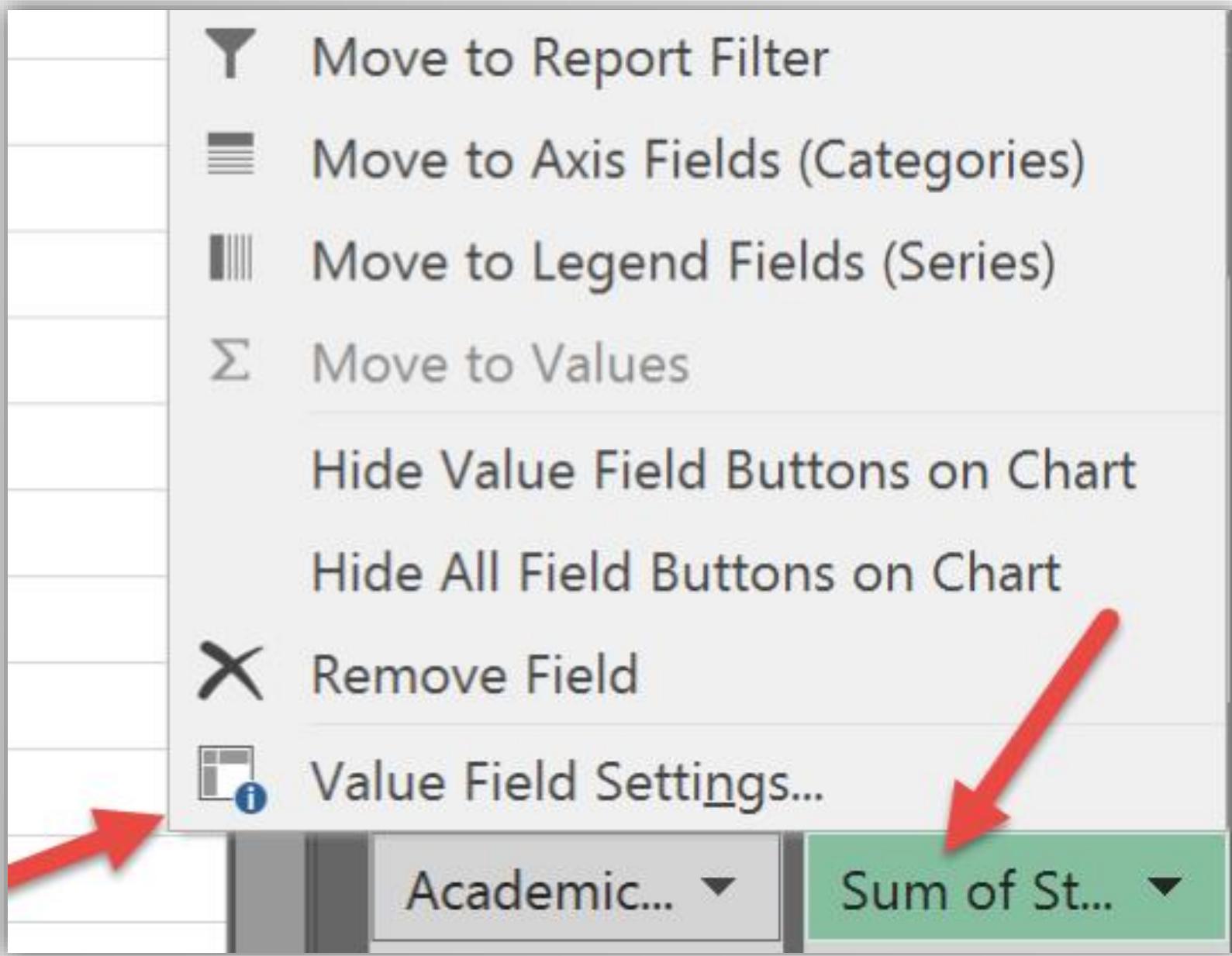
Filters Legend (Ser..)

Axis (Legend...)

Σ Values

Academic... ▾

Sum of St... ▾



Sum doesn't work for our purpose, we want a distinct count of student ID

Value Field Settings

Source Name: Student ID

Custom Name: **Sum of Student ID**

Summarize Values By Show Values As

**Summarize value field by**

Choose the type of calculation that you want to use to summarize data from the selected field

- StdDev
- StdDevP
- Var
- VarP
- Distinct Count

Number Format OK Cancel

Academic Year

Quarter

County

State

Country

Status

School

Academic Level

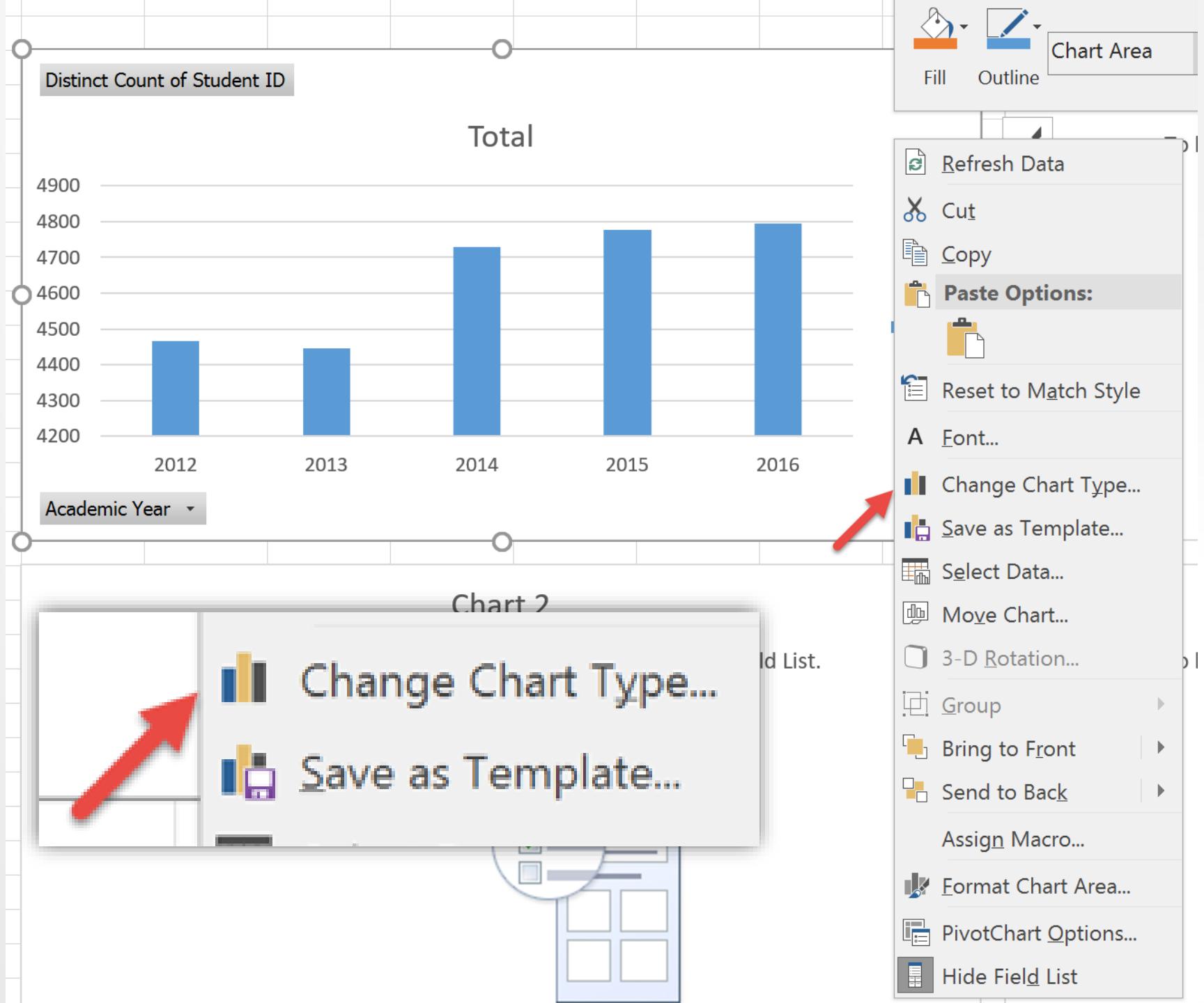
Drag fields between areas below:

Filters Legend (Ser...)

Axis (Categ... ) Σ Values

Academic... Sum of St...

For this display it would be nice to use a line chart for showing the trend instead of a bar chart



F G H ? X

Total

4

2015 2016

part 2

elds from the PivotChart Field List.

Change Chart Type

All Charts

Recent

Templates

Column

Line

Pie

Bar

Area

X Y (Scatter)

Stock

Surface

Radar

Treemap

Sunburst

Histogram

Box & Whisker

Waterfall

Funnel

Combo

Clustered Column

Clustered Column

Total  
4900  
4800  
4700  
4600  
4500  
4400  
4300  
4200  
2012 2015 2014

Column

Line

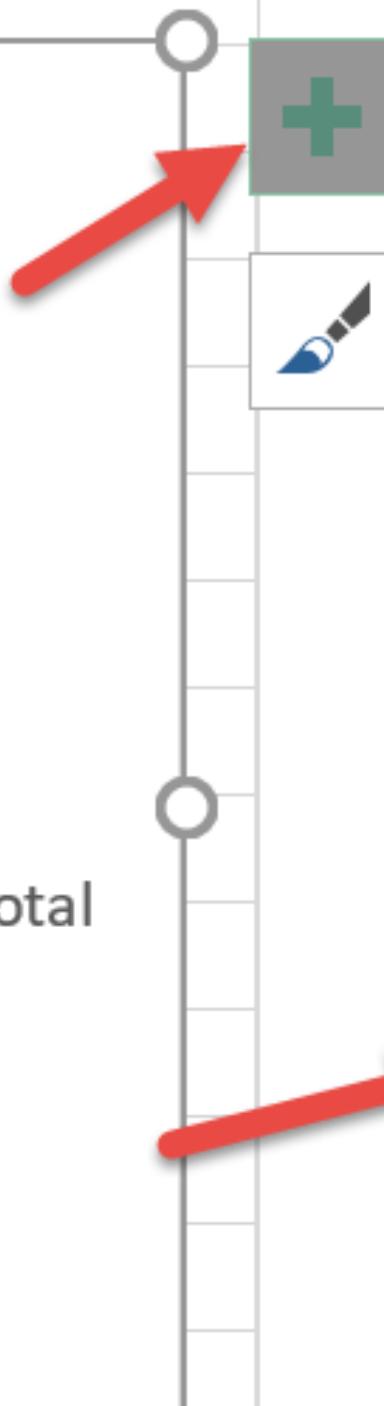
Pie

Bar

We can also  
add a trendline



— Total



## Chart Elements

- Axes
- Axis Titles
- Chart Title
- Data Labels
- Data Table
- Error Bars
- Gridlines
- Legend
- Trendline
- Up/Down Bars

# Formatting the Trendline

Distinct Count of Student ID

Total

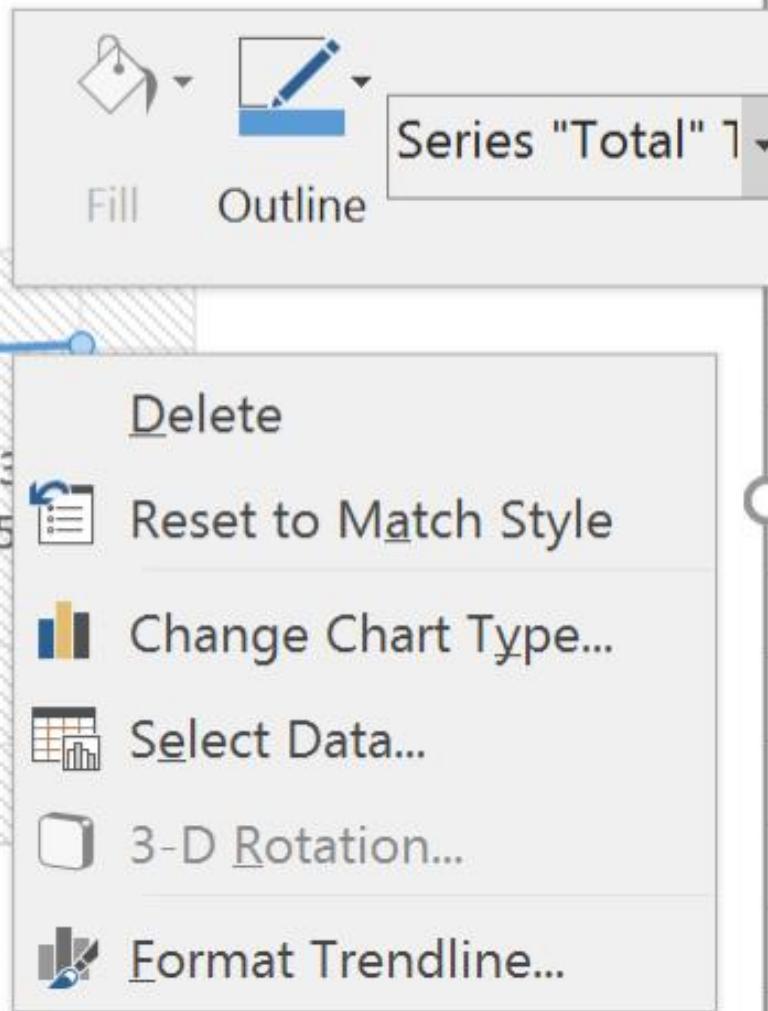
6000  
5000  
4000  
3000  
2000  
1000  
0

2012 2013 2014 2015 2016

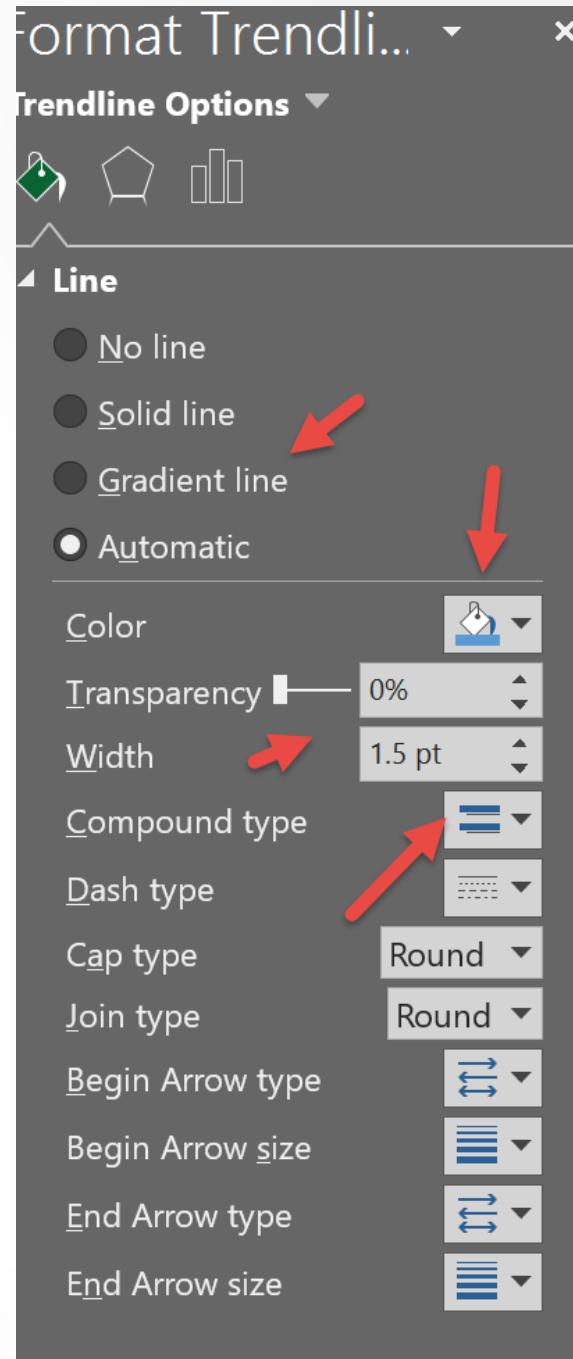
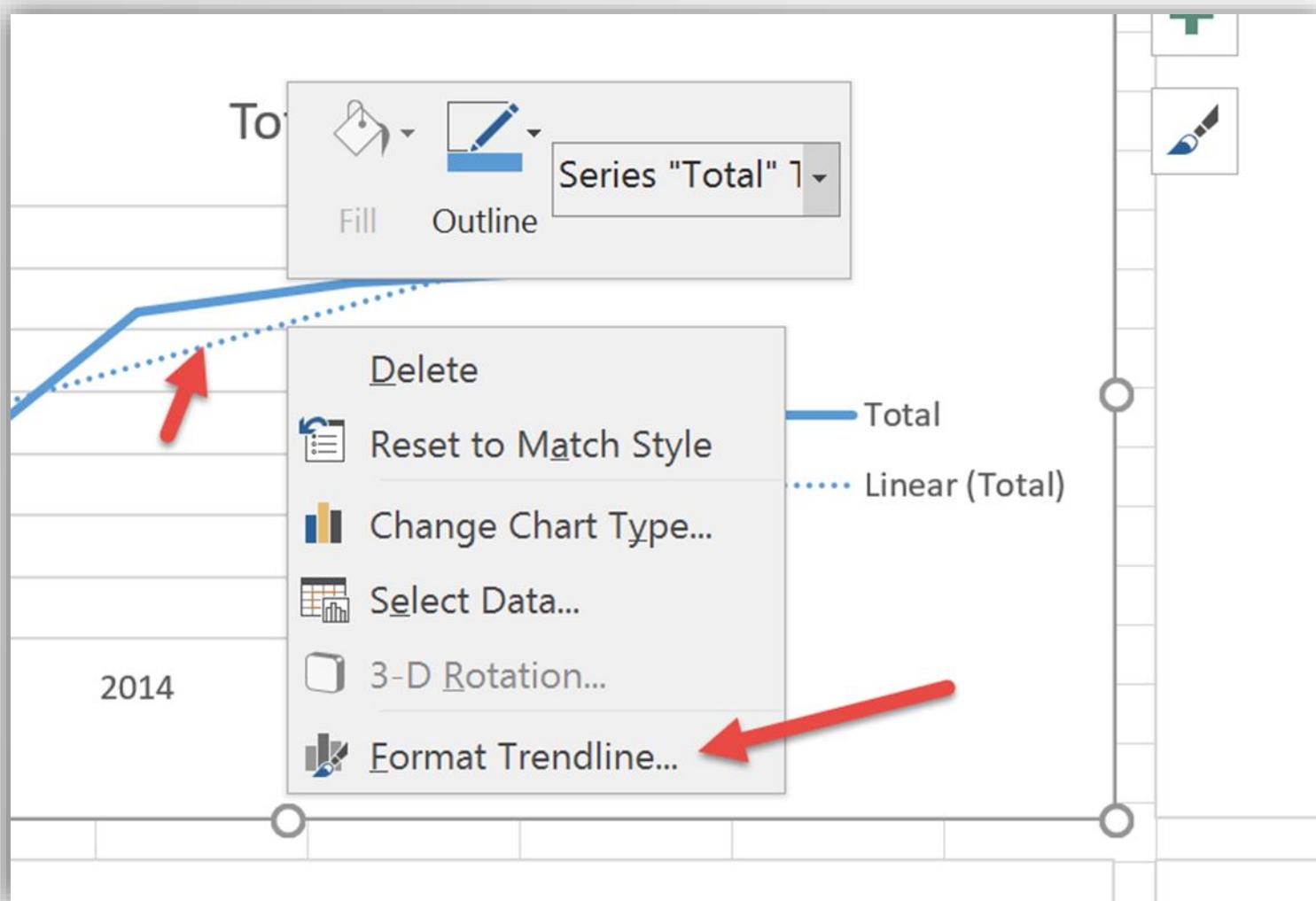
Academic Year ▾

$$y = 98.9x + 4337$$

$R^2 = 0.825$



# The trendline can be formatted to look different from the data line



The trendline can forecast forward on periods. You also have the option to add the equation and R-squared value.

PivotChart F.. ▾ × Format Trendli... ▾ ×

Active | All

Choose fields to add to report:

Search

Student ID  
 Academic Year  
 Quarter  
 County  
 State  
 Country  
 Status  
 School  
 Admin

Drag fields between areas below:

Filters Legend (Ser...)

Axis (Categ... ) Σ Values

Academic... ▾ Distinct C... ▾

Trendline Options ▾

Exponential  
 Linear  
 Logarithmic  
 Polynomial Order [ ]  
 Power  
 Moving Average Period [ ]

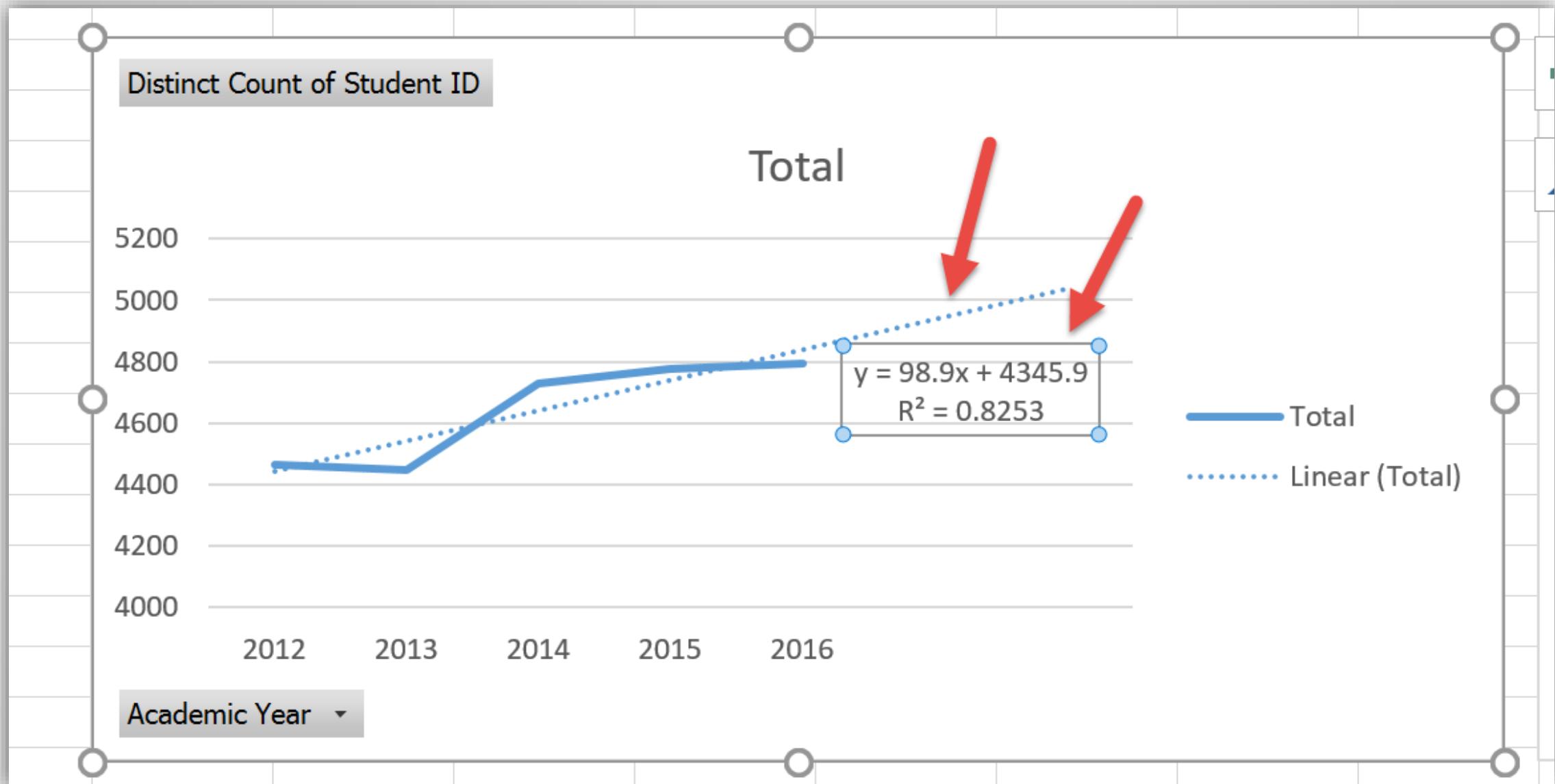
Trendline Name:  Automatic  Custom Linear (T)

Forecast:

- Forward  p
- Backward  p
- Set Intercept

Display Equation on chart  
 Display R-squared value on ch

# Chart with Trendline and Default Range



# Formatting axis by selecting minimum and maximum ranges

The screenshot shows a Microsoft Excel chart area with a vertical axis. A context menu is open on the axis, listing options like Delete, Reset to Match Style, Font, Change Chart Type, Select Data, 3-D Rotation, Add Minor Gridlines, Format Major Gridlines, and Format Axis. A red arrow points to the 'Format Axis...' option at the bottom of the menu. Above the menu, a floating 'Vertical (Value)' format box is visible, showing 'Fill' and 'Outline' buttons. To the right, the 'Format Axis' dialog box is open, specifically the 'Axis Options' tab. It displays the current axis settings: Minimum at 4000.0 and Maximum at 5200.0, both set to 'Auto'. Red arrows point to the 'Maximum' value and the 'Format Axis...' button in the dialog box. Other tabs in the dialog include 'Text Options' and sections for 'Bounds', 'Units', 'Major', 'Minor', 'Horizontal axis crosses', 'Display units', and 'Logarithmic scale'.

Format Axis

Axis Options Text Options

Vertical (Value)

Fill Outline

Vertical (Value)

Format Axis...

Delete

Reset to Match Style

A Font...

Change Chart Type...

Select Data...

3-D Rotation...

Add Minor Gridlines

Format Major Gridlines...

Format Axis...

Bounds

Minimum 4000.0 Auto

Maximum 5200.0 Auto

Units

Major 200.0 Auto

Minor 40.0 Auto

Horizontal axis crosses

Automatic

Axis value

Maximum axis value

Display units None

Show display units label on chart

Logarithmic scale Base 10

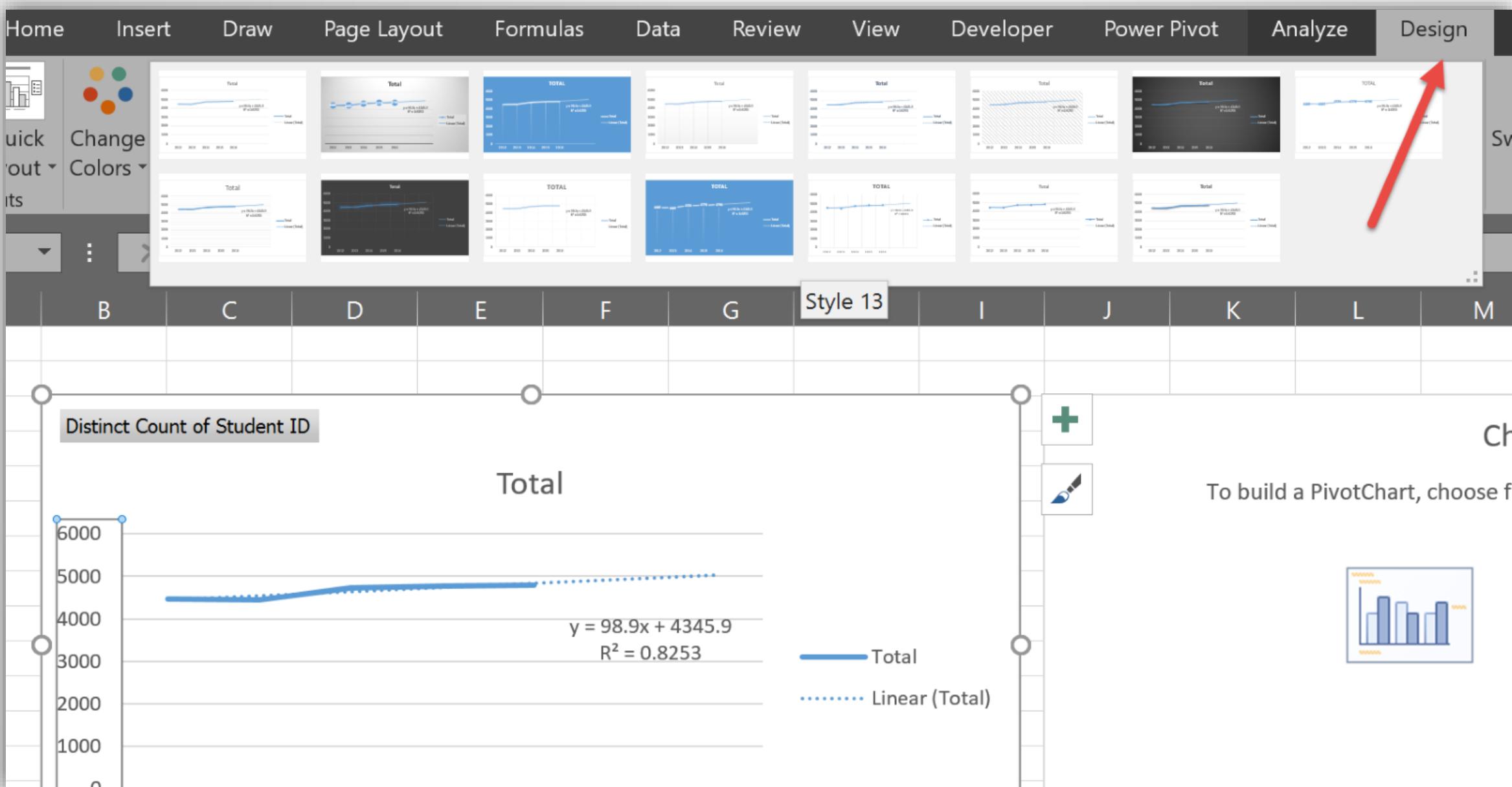
Values in reverse order

Tick Marks

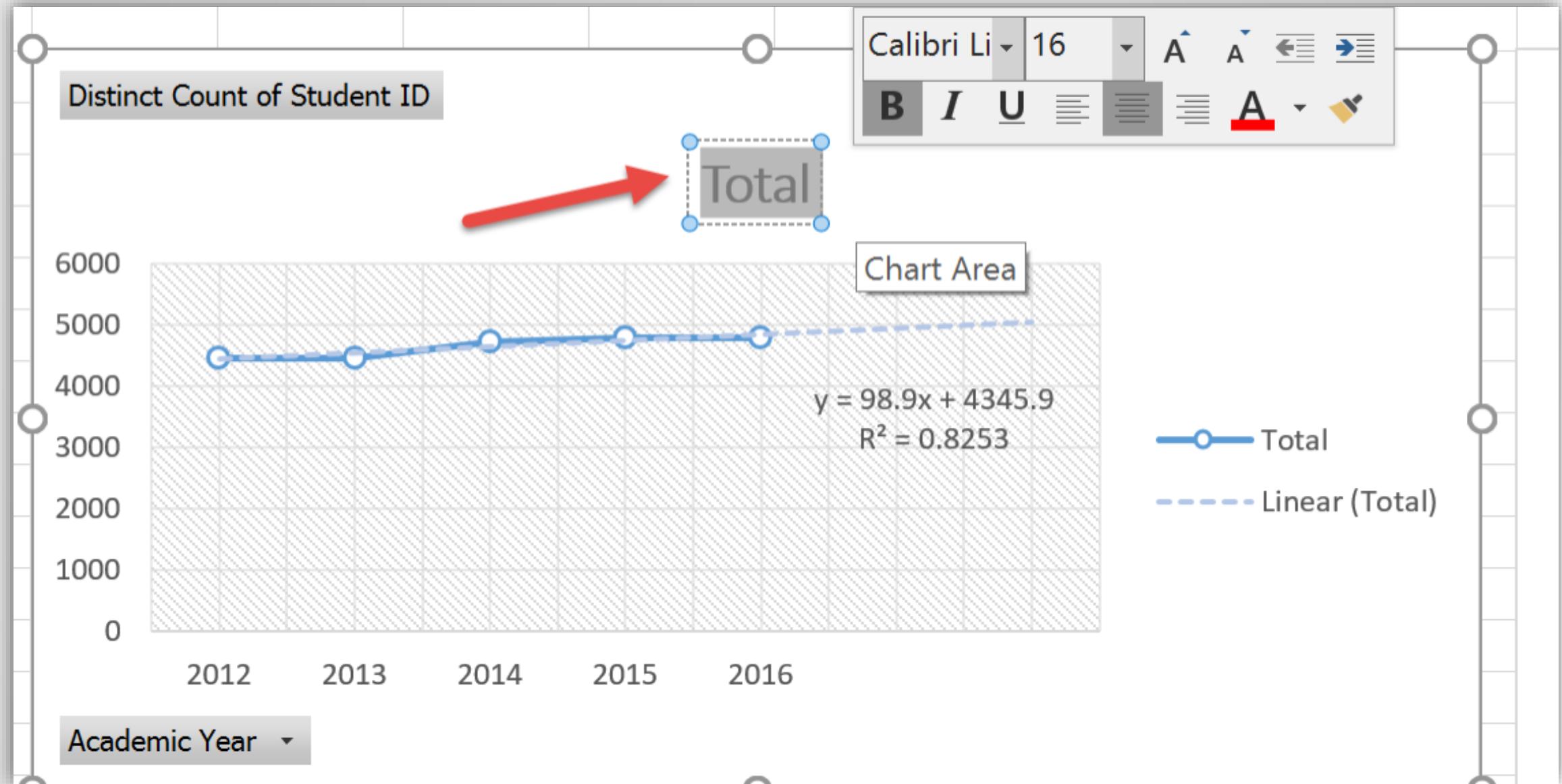
Labels

Number

# The Design Menu Offers Multiple Choices for Chart Style



# By Highlighting the Title We Can Add Our Own Text



Depending on preference charts can look cleaner by removing field buttons.

The screenshot shows the Microsoft Power BI ribbon with the 'Format' tab selected. A context menu is open over a chart area, listing the following options:

- Move Up
- Move Down
- Move to Beginning
- Move to End
- Move to Report Filter
- Move to Axis Fields (Categories)
- Move to Legend Fields (Series)
- Move to Values
- Hide Value Field Buttons on Chart
- Hide All Field Buttons on Chart
- Remove Field
- Value Field Settings...

A red arrow points to the 'Remove Field' option in the menu. To the right of the menu, a portion of a line chart is visible, showing data for the years 2014 and 2015.

# Adding Filters “Slicers”

Academic Year

Gender

Citizenship

Quarter

School

Academic Level

Degree

report:

Search

Census

Student ID

Academic Year

Add to Report Filter

Add to Axis Fields (Categories)

Add to Legend Fields (Series)

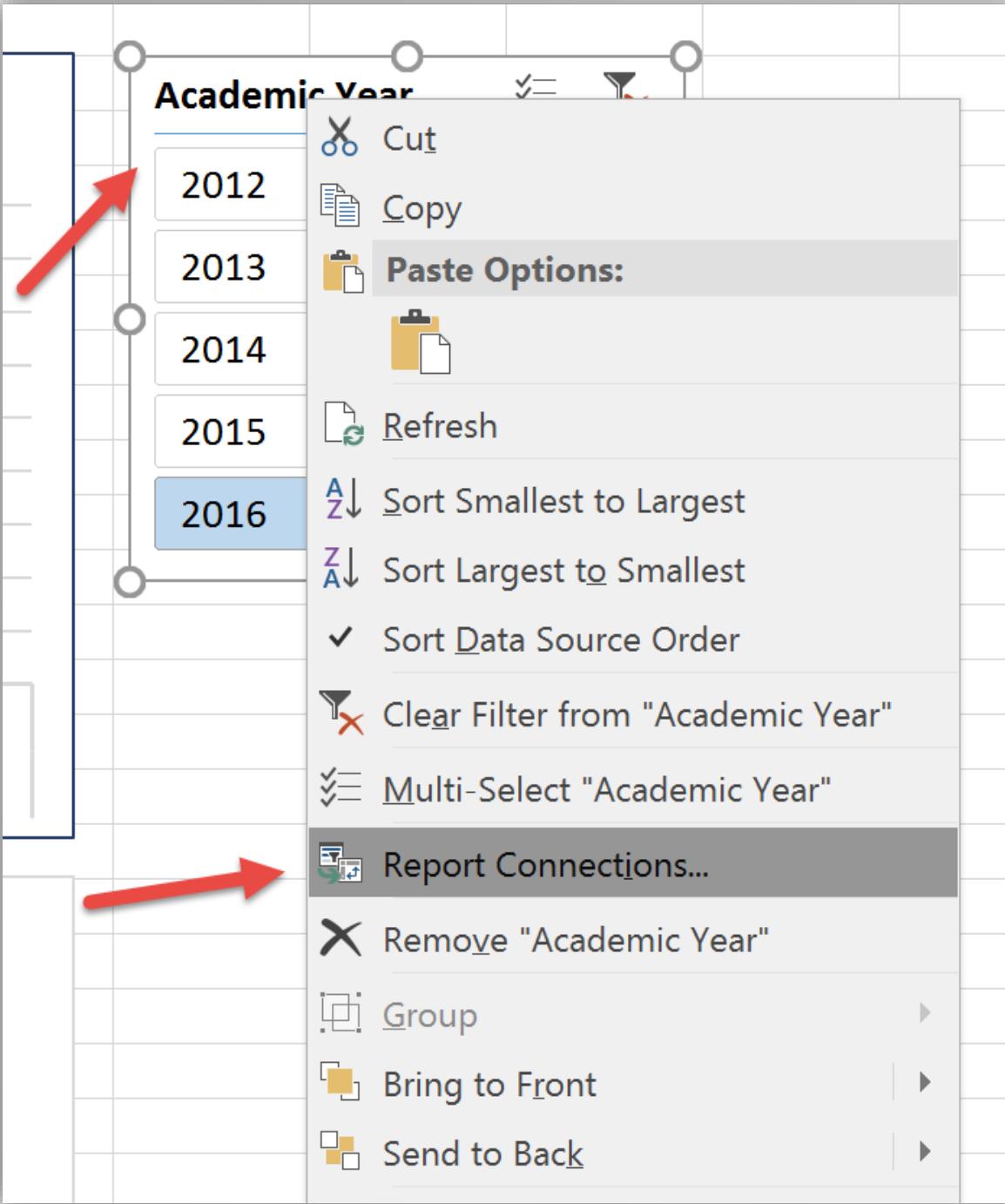
Add to Values

Add as Slicer

Add as Timeline

School

Drag fields between areas below:



When adding a filter you should select which visualizations are to be impacted by the filter.

This is selected under “Report Connections” as shown on left.

# Adding the Enrollment Bar Chart

### Alphabet University Enrollment

#### School Enrollment by Selected Year

A bar chart titled "School Enrollment by Selected Year" showing enrollment counts for five schools (A, B, C, D, E) in the year 2016. The y-axis ranges from 0 to 1800. School A has the highest enrollment at approximately 1600, followed by School D at approximately 1100, School B at approximately 900, School C at approximately 700, and School E at approximately 400.

School	Enrollment (2016)
A	~1600
B	~900
C	~700
D	~1100
E	~400

2016

Academic Year: 2012, 2013, 2014, 2015, 2016

Quarter: 1, 2, 3, 4

School: A, B, C, D, E

Academic Level: Graduate, Professional, Undergraduate

Degree: BS, MS

Gender: Female

Citizenship: Argentina, Armenia, Austria, Bangladesh, Belarus, Bermuda, Brazil, Cameroon, Canada, Chile

PivotChart Fields

Active | All

Choose fields to add to report:

Search

Census

- Student ID
- Academic Year
- Quarter
- County
- State
- Country
- Status
- School
- Academic Level
- Program
- Degree

Drag fields between areas below:

Filters

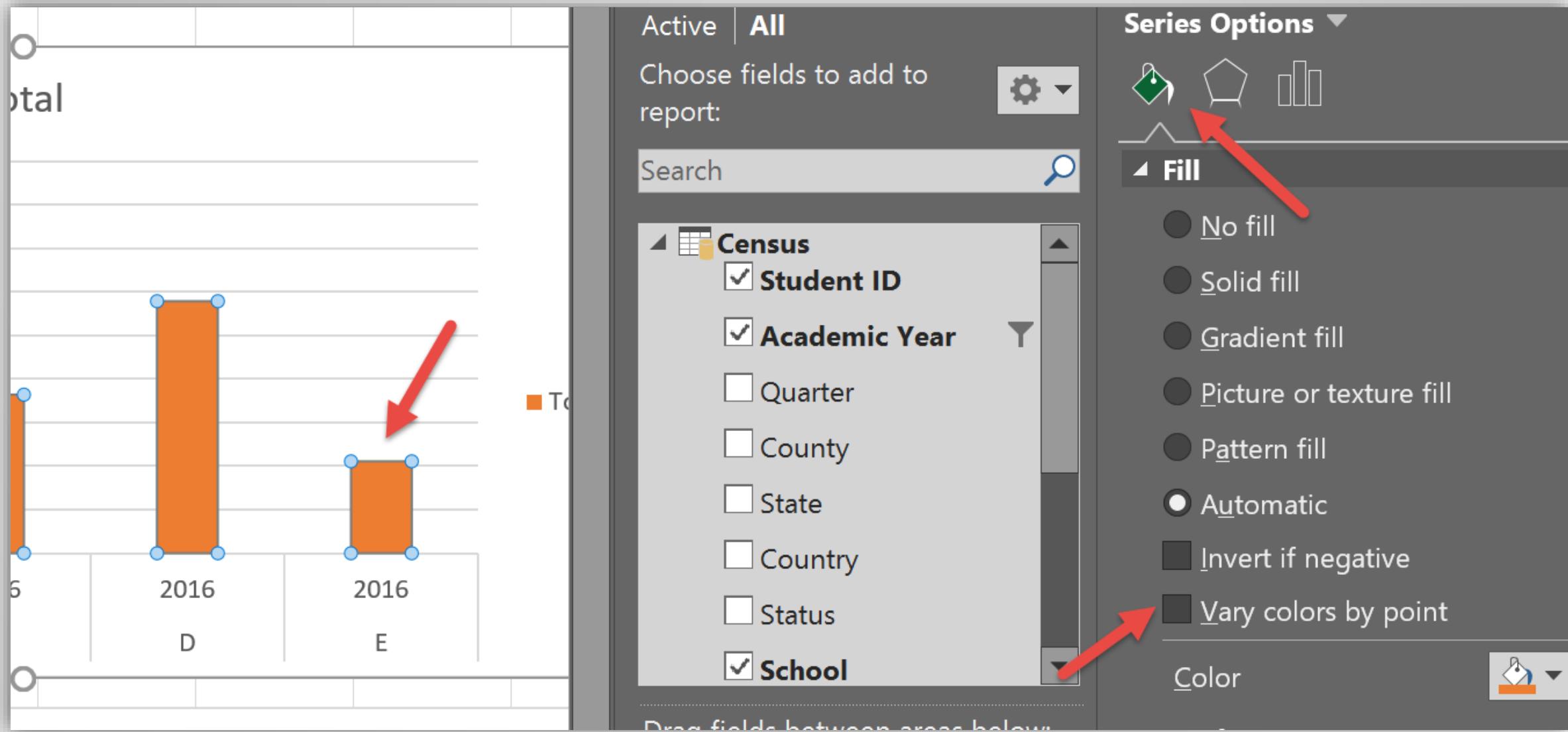
Legend (Series)

Axis (Categories)

Values

Distinct Count of Student ID

# Vary Colors in the Bar Chart



# Adding the Pie Chart for Academic Level

Alphabet University Enrollment

### School Enrollment by Selected Year

A bar chart titled "School Enrollment by Selected Year" showing enrollment counts for categories A through E across five years. The Y-axis ranges from 0 to 1800. The data is as follows:

Category	2012	2013	2014	2015	2016
A	1631				
B		850			
C		700			
D			1150		
E				400	

### PivotChart Fields

Active | All

Choose fields to add to report:

Search

Census

- Student ID
- Academic Year
- Quarter
- County
- State
- Country
- Status
- School
- Academic Level
- Program
- Degree
- Zip Code

Drag fields between areas below:

Filters

Legend (Series)

Axis (Categories)

Σ Values

Distinct Count of Student ID

Academic Level

A pie chart titled "Academic Level" showing the distribution of students by academic level. The data is as follows:

Level	Count
Graduate	1631
Professional	1581
Undergraduate	1608

Legend:

- Graduate (Blue)
- Professional (Grey)

Red arrows point to the "Academic Level" field in the PivotChart Fields pane and the "Σ Values" field in the Axis (Categories) section of the Drag fields between areas below pane.

# Adding the Race/Ethnicity Chart

The screenshot shows a dashboard interface with two main charts and a PivotChart Fields pane.

**Enrollment Trend:** A line chart titled "Enrollment Trend" showing student enrollment from 2012 to 2016. The y-axis ranges from 0 to 6000. The data shows a slight upward trend with a regression line equation  $y = 98.9x + 4345.9$  and  $R^2 = 0.8253$ .

**Race/Ethnicity:** A bar chart titled "Race/Ethnicity" showing the count of students by race/ethnicity category. The categories on the x-axis are: American Indian or Alaska Native, Asian, Black or African American, Hispanic, Multiple Races, Native Hawaiian or Other Pacific Islander, Unspecified, and White. The y-axis ranges from 0 to 2000. The "White" category has the highest count at approximately 1800.

**PivotChart Fields:** This pane lists various fields available for reporting. Two fields are checked: "Student ID" and "Race/Ethnicity". Red arrows point to both of these checked items.

**Fields in PivotChart Fields pane:**

- Student ID
- Academic Year
- Quarter
- County
- State
- Country
- Status
- School
- Academic Level
- Program
- Degree
- Zip Code
- Race/Ethnicity

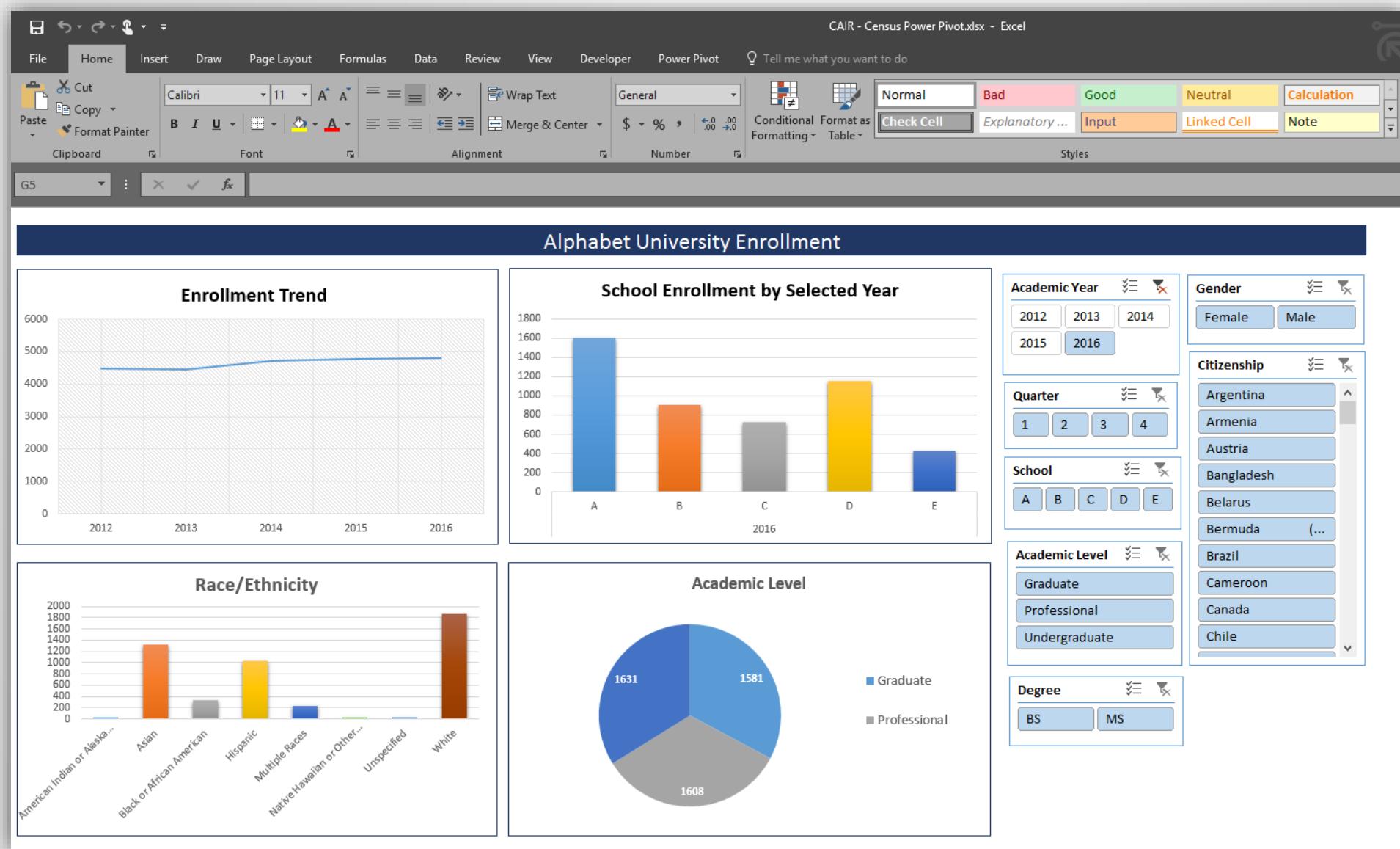
**Drag fields between areas below:**

**Filters:** A section for applying filters to the data.

**Axis (Categories):** A dropdown menu currently set to "Race/Ethnicity". A red arrow points to this field.

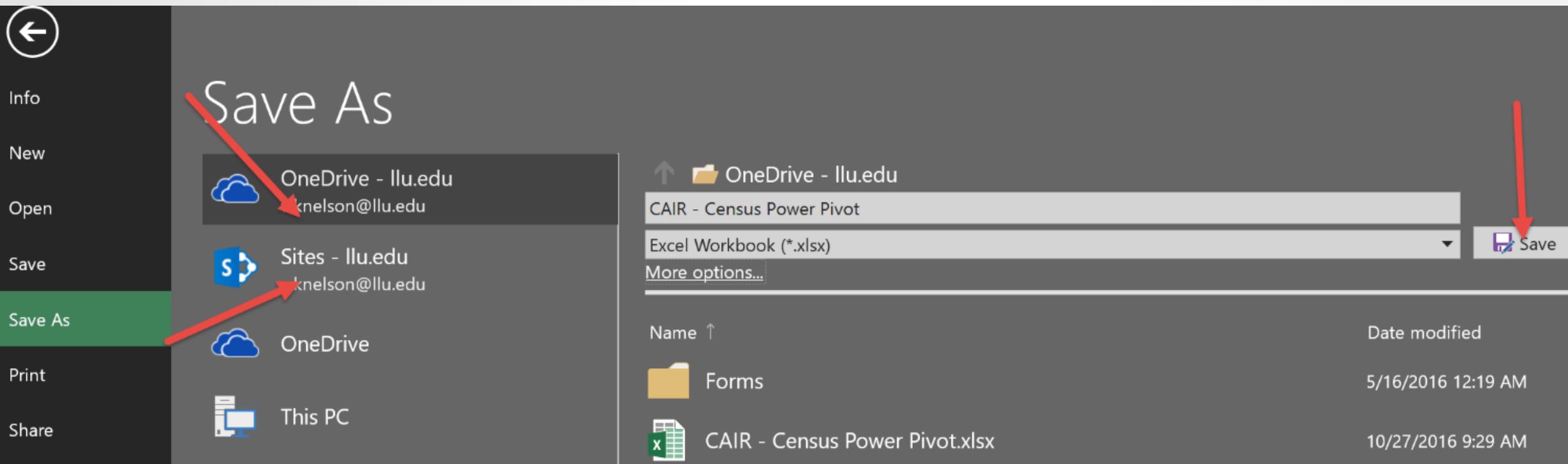
**Values:** A dropdown menu currently set to "Distinct Count of Student ID". A red arrow points to this field.

# Dashboard should now look something like this

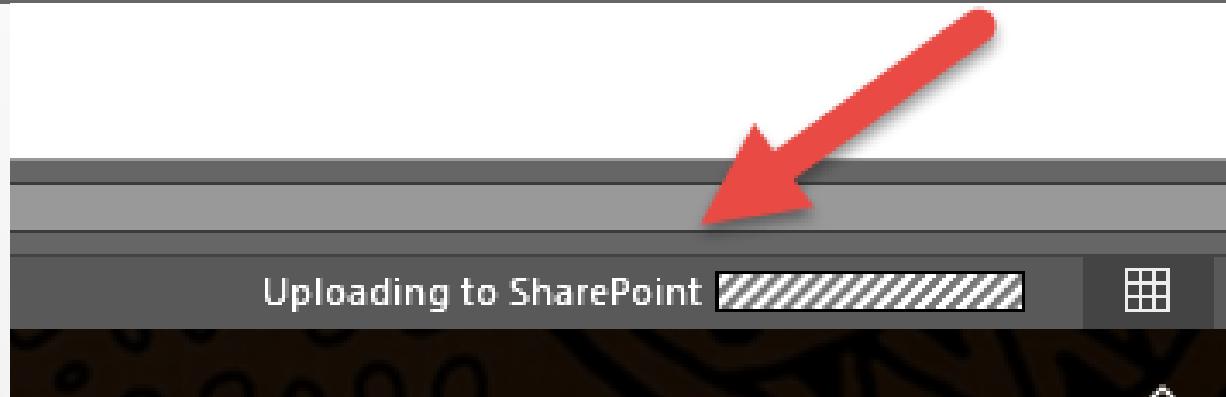


# Uploading to SharePoint

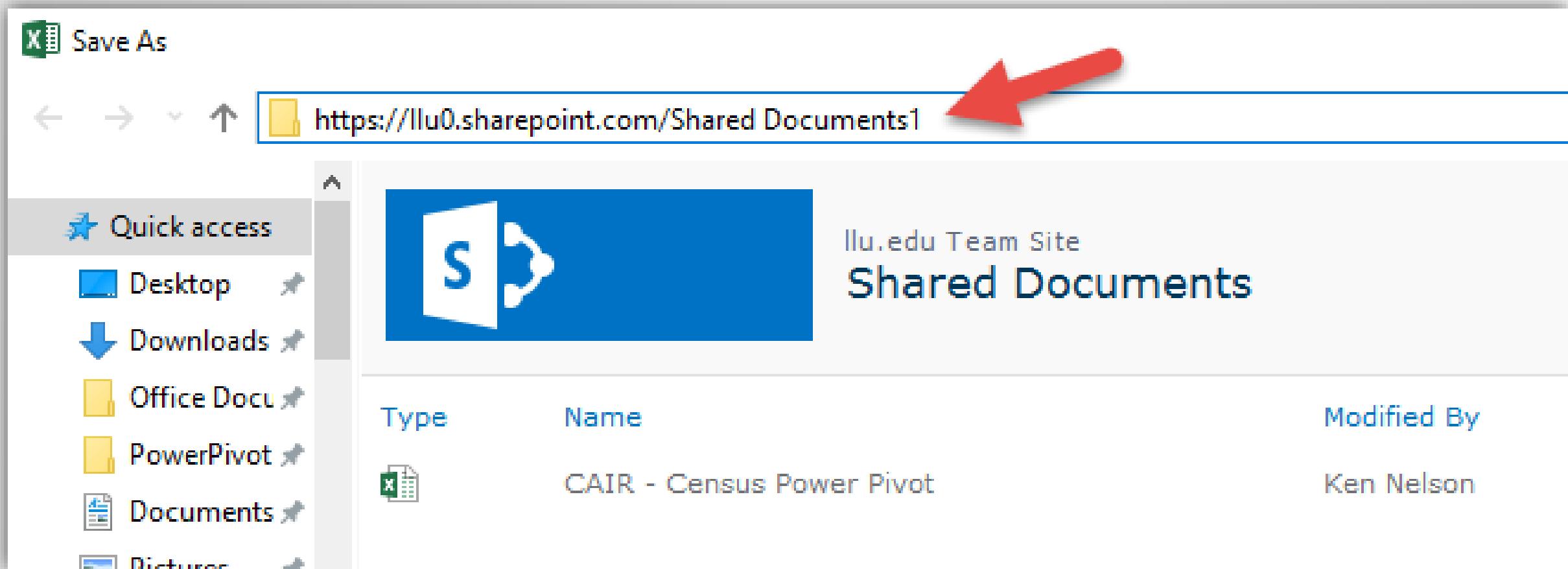
## Location depends on your Office 365 configuration



You can also save your file to a local folder.



Identifying the URL for your SharePoint file is easy  
Click on “Save As” and copy the address in the bar



# Excel Services Running in SharePoint

llu.edu Team Site      CAIR - Census Power Pivot

### Alphabet University Enrollment

#### Enrollment Trend

A line chart titled "Enrollment Trend" showing enrollment numbers from 2012 to 2016. The Y-axis ranges from 0 to 6000. The X-axis shows years 2012, 2013, 2014, 2015, and 2016. The enrollment starts at approximately 4500 in 2012, remains flat until 2013, then rises to about 4800 by 2014, and stays relatively flat around 4800 through 2016.

Year	Enrollment
2012	4500
2013	4500
2014	4800
2015	4800
2016	4800

#### School Enrollment by Selected Year

A bar chart titled "School Enrollment by Selected Year" for the year 2016. The Y-axis ranges from 0 to 1800. The X-axis shows schools A, B, C, D, and E. The enrollment is highest for school A (blue bar) at approximately 1600, followed by school D (yellow bar) at approximately 1100, school B (orange bar) at approximately 900, school C (grey bar) at approximately 700, and school E (blue bar) at approximately 400.

School	Enrollment
A	1600
B	900
C	700
D	1100
E	400

#### Race/Ethnicity

A bar chart titled "Race/Ethnicity" showing the distribution of students by race/ethnicity. The Y-axis ranges from 0 to 2000. The X-axis categories are: American Indian or Alaska Native (very low), Asian (approx. 1200), Black or African American (approx. 200), Hispanic (approx. 1000), Multiple Races (approx. 200), Native Hawaiian or Other Pacific Islander (very low), Unspecified (very low), and White (approx. 1800).

Race/Ethnicity	Count
American Indian or Alaska Native	~10
Asian	1200
Black or African American	200
Hispanic	1000
Multiple Races	200
Native Hawaiian or Other Pacific Islander	~10
Unspecified	~10
White	1800

#### Academic Level

A pie chart titled "Academic Level" showing the distribution of students by academic level. The chart is divided into two segments: Graduate (blue) and Professional (grey). The Graduate segment is labeled 1631 and the Professional segment is labeled 1608.

Academic Level	Count
Graduate	1631
Professional	1608

Academic Year: 2012, 2013, 2014, 2015, 2016  
Gender: Female, Male  
Citizenship: Argentina, Armenia, Austria, Bangladesh, Belarus, Bermuda, Brazil, Cameroon, Canada, Chile  
School: A, B, C, D, E  
Academic Level: Graduate, Professional, Undergraduate  
Degree: BS, MS

# Building a Dashboard in Power BI Desktop

The screenshot shows the Power BI website homepage with a yellow background. At the top, there's a navigation bar with links for Microsoft, Power BI, Products, Solutions, Partners, Learn, Sign in, and Sign up free. A large central text area says "Bring your data to life" in bold blue letters, followed by a subtitle: "Power BI transforms your company's data into rich visuals for you to collect and organize so you can focus on what matters to you." Below this is a "Get started free" button. In the bottom right corner, there's a preview of the Power BI desktop application showing various data visualizations like charts and tables. Two black arrows point from the bottom of the slide towards the "Get started free" button and the "Sign up free" link.

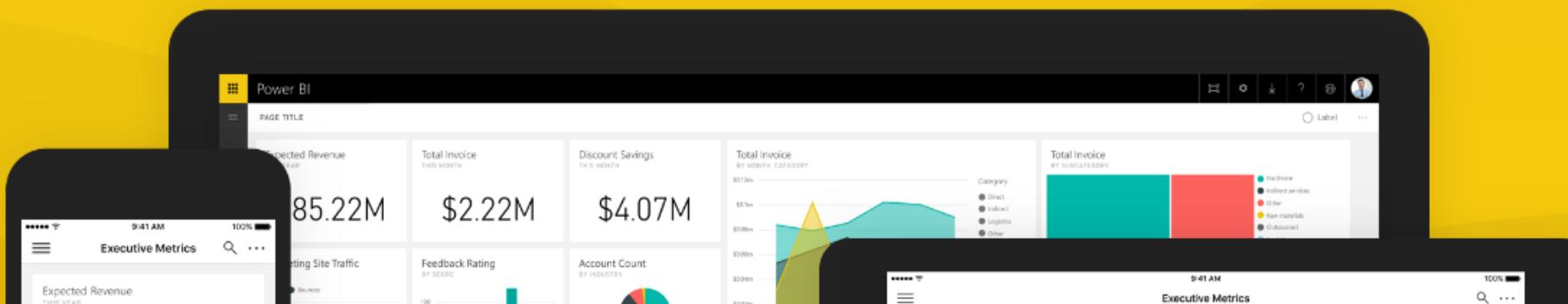
Microsoft | Power BI | Products | Solutions | Partners | Learn | Sign in | Sign up free

## Bring your data to life

Power BI transforms your company's data into rich visuals for you to collect and organize so you can focus on what matters to you.

Get started free

Sign up free



# Build in the desktop app – FREE – publish online - FREE

A screenshot of the Power BI Desktop application. The interface includes a ribbon bar at the top with tabs like File, Home, View, Modeling, and Share. A message in the ribbon indicates "Auto Recovery contains some recovered files that have not been opened". The main area shows the "Power BI Desktop" startup screen, which features a large yellow banner with the text "Ken Nelson" and a profile picture. Below the banner, there are sections for "WHAT'S NEW", "FORUMS", "POWER BI BLOG", and "TUTORIALS", each with links to further information. On the left, there's a sidebar with options like "Show Recovered Files", "Get Data", "Recent Sources", and a list of recent reports. On the right, there are "Visualizations" and "Fields" panes. A red arrow points from the bottom left towards the "Ken Nelson" profile picture.

Untitled - Power BI Desktop

File Home View Modeling

Cut Copy Format Painter Paste Get Data Recent Sources Enter Data Refresh New Page New Visual Insert Page View Manage Relationships New Measure Calculations Publish

Clipboard External Data

Auto Recovery contains some recovered files that have not been opened

View Auto Recovery

## Power BI Desktop

Power BI has recovered files that you might want to keep

- Show Recovered Files
- Get Data
- Recent Sources

AMS Report ID Rev.pbix  
C: > Office Documents > OEE > Po...

AMS Report.pbix  
C: > Office Documents > OEE > Po...

Open Other Reports

Getting started with Power BI Desktop

Building reports Query view concepts Uploading your reports

View all videos

✓ Show this page on startup

Ken Nelson

### WHAT'S NEW

Take a look at what's new and improved in Power BI in this month's update.

### FORUMS

Visit the Power BI Forum to ask questions or interact with other users in the Power BI community.

### POWER BI BLOG

Keep up to date with the latest news, resources, and updates from the Power BI team.

### TUTORIALS

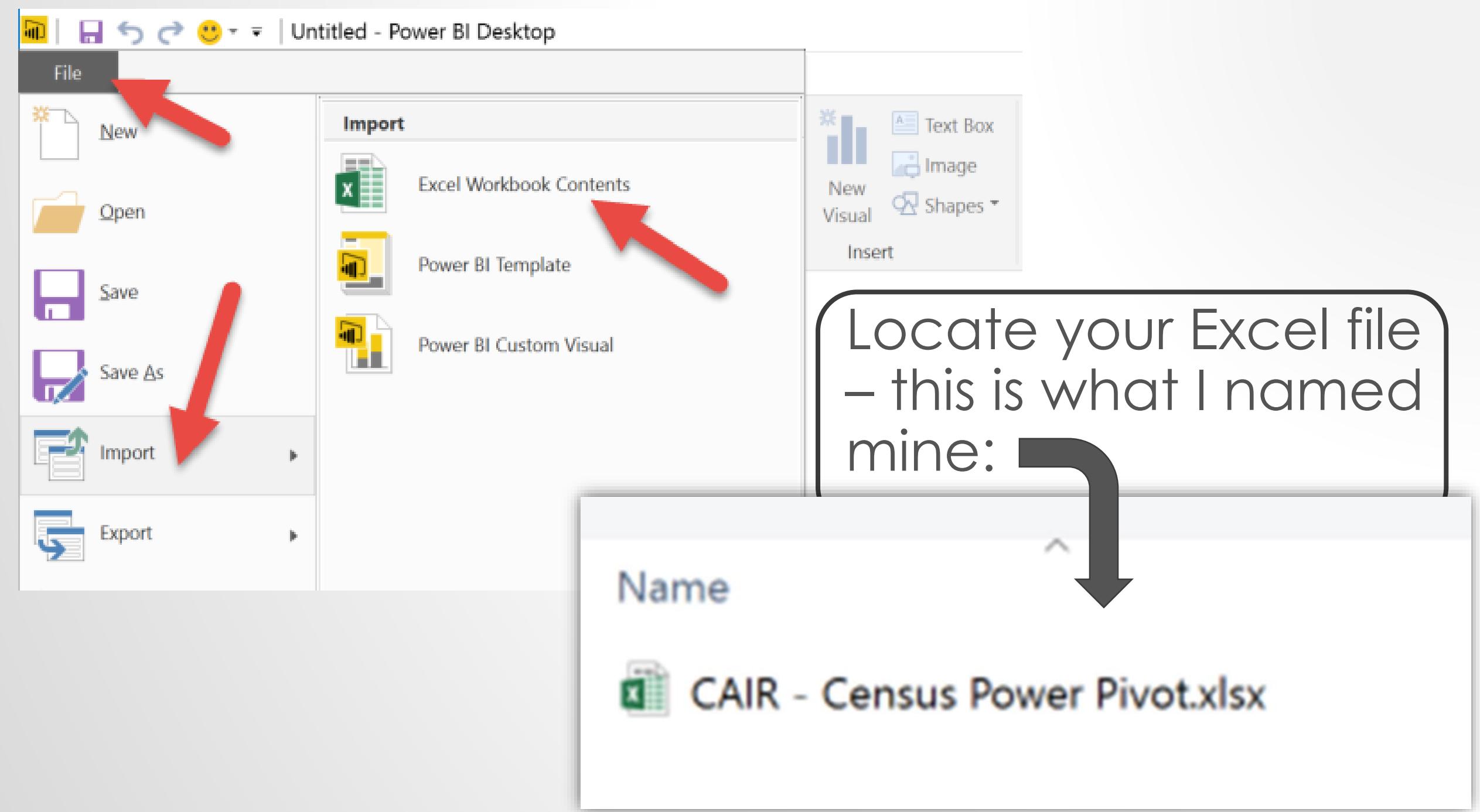
Watch our tutorials to learn about all the powerful features inside of Power BI.

Analyzing Sales Data  
Facebook Analytics  
Importing data from a Web page

Visualizations Fields

Search

Page 1 +



X

## Import Excel Workbook Contents

We don't work directly with Excel workbooks, but we know how to extract the useful content so you can work with it in Power BI Desktop.

A new Power BI file will be made for you. It will contain as much of your content as possible. This could take a few minutes.

[Learn More](#)



Start

Cancel

X

## Import Excel Workbook Contents

✓ Migration Completed

### Queries (2 items)

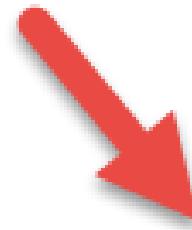
- ✓ Census
- ✓ Demographics

### Data Model Tables (2 items)

- ✓ Census
- ✓ Demographics

### KPIs and Measures (2 items)

-



Close

# Here's our data model from Excel

The screenshot shows the Power Pivot Data Model view. On the left is a grid of student data with columns: Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, Zip Code, and Race/Ethnicity. On the right is a 'Fields' pane containing a search bar and a list of fields categorized under 'Census', 'Demographics', and other academic-related categories.

Student ID	Academic Year	Quarter	County	State	Country	Status	School	Academic Level	Program	Degree	Zip Code	Race/Ethnicity
166959633072710	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
167812269210776	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
169749814917892	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
170298791620710	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
166174890255015	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
167432699716314	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
168265749969900	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
168437278001200	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
171996573474750	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
168677177127920	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
168435826798368	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
168940323967802	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
169948245442944	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
170353612104192	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
170846954914500	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
169036090380067	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
170386130628262	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White
170036919576615	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
170843842524044	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
171314844080162	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
171380064314546	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	White
166774263149075	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	Hispanic
168168665421064	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	Hispanic
168706385134848	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	Hispanic
170871480173149	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	Hispanic
171378647913000	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	Hispanic
171298874597093	2012	4	San Bernardino	CA	United States	FT	E	Graduate	E-Program	MS	92354	Hispanic
170924731770754	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	Asian

Remember the DAX formula we wrote in Power Pivot – it's here too!

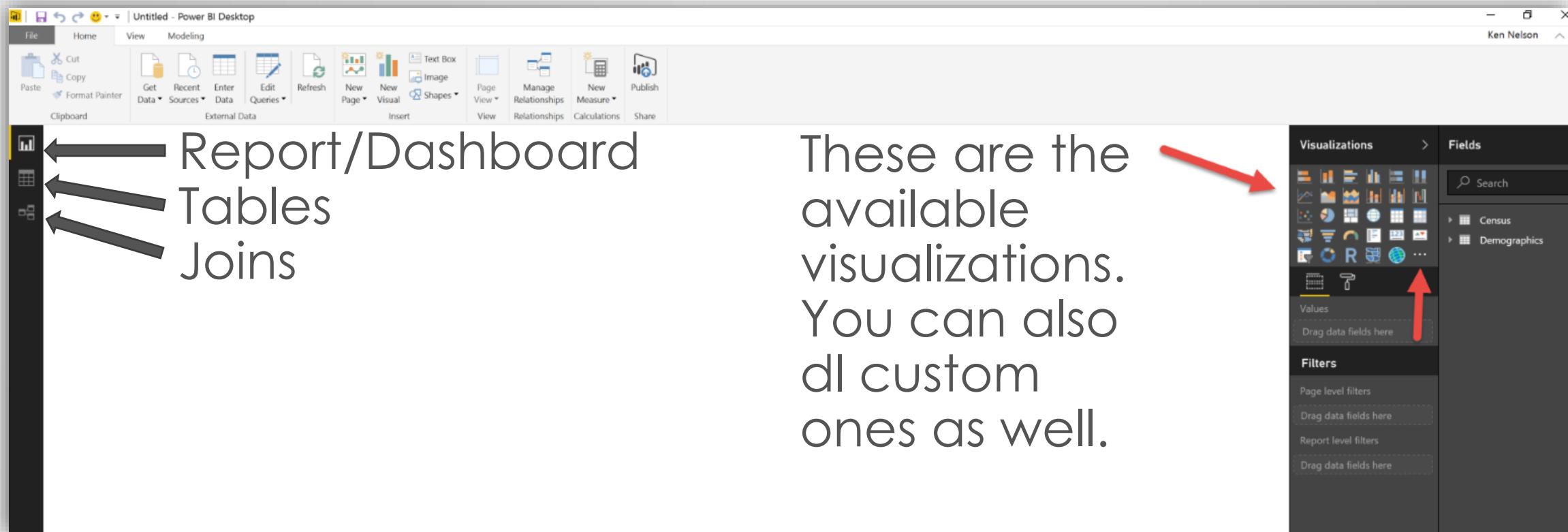
The screenshot shows the Power Pivot Data View. At the top, there is a formula bar with the text "Race/Ethnicity = RELATED(Demographics[Race\_Ethnicity])". Two red arrows point from the text in the formula bar down to the corresponding cells in the table below. The table has columns: Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, Zip Code, Race/Ethnicity, and Program Degree. The first two rows of data are visible.

Student ID	Academic Year	Quarter	County	State	Country	Status	School	Academic Level	Program	Degree	Zip Code	Race/Ethnicity	Program Degree
166959633072710	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS
167812269210776	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS

The screenshot shows the Power BI Desktop interface with the 'Data' view selected. On the left, there's a navigation bar with icons for Home, View, Modeling, and Insert. The main area displays two tables: 'Census' and 'Demographics'. The 'Census' table contains fields like Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, Zip Code, Race/Ethnicity, Program Degree, Sum of Student ID, and Distinct Count of Student ID. The 'Demographics' table contains fields like Student ID, Age Group, Birth Country, Citizenship, Race\_Ethnicity, and Gender. A red arrow points to the 'Census' table, and another red arrow points to the 'Demographics' table. A yellow box highlights the 'Demographics' table. A relationship line connects the 'Student ID' column in the 'Census' table to the 'Student ID' column in the 'Demographics' table, with a cardinality of 1.

The joins are still intact as well.  
Even the familiar indicator is present.

# Our canvas where we will start building our Power BI Dashboard



**WAIT! I liked my Power Pivot Dashboard – don't make me start over!**

# No problem! Export from Excel to Power BI

Publishing to Power BI  

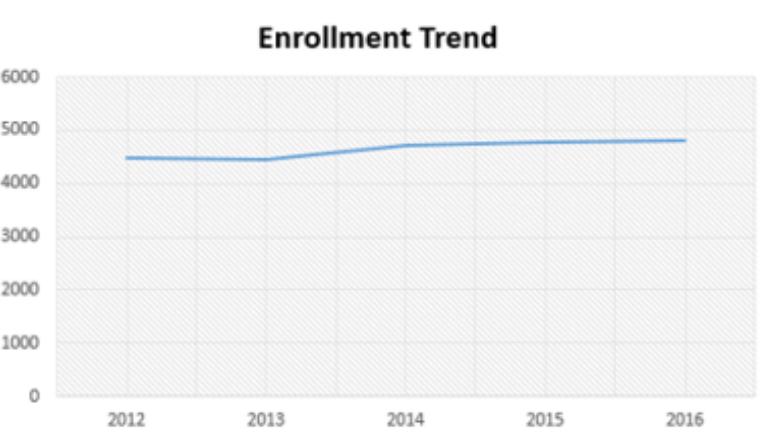
Power BI  My Workspace

Excel Online 

LAST DATA RE

### Alphabet University Enrollment

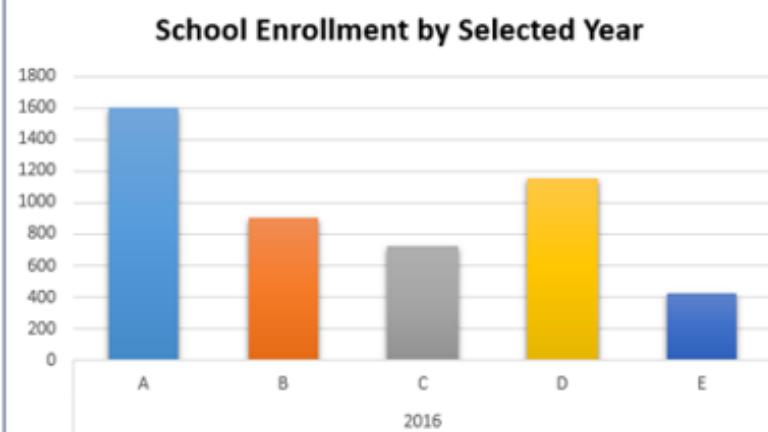
#### Enrollment Trend



A line chart titled "Enrollment Trend" showing a steady increase in enrollment from 2012 to 2016. The Y-axis ranges from 0 to 6000, and the X-axis shows years 2012, 2013, 2014, 2015, and 2016.

Year	Enrollment
2012	4500
2013	4600
2014	4700
2015	4800
2016	4900

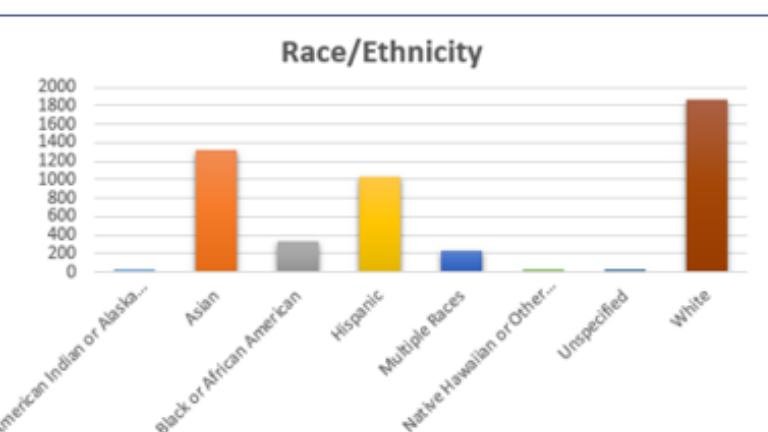
#### School Enrollment by Selected Year



A bar chart titled "School Enrollment by Selected Year" showing enrollment for five schools (A, B, C, D, E) in the year 2016. The Y-axis ranges from 0 to 1800.

School	Enrollment
A	1550
B	850
C	700
D	1150
E	400

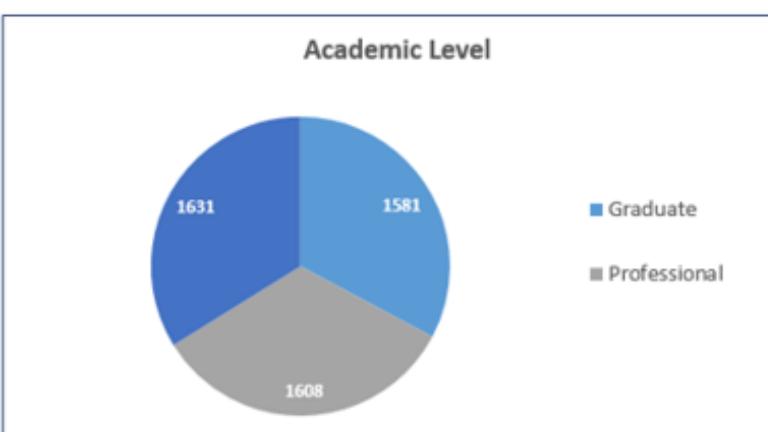
#### Race/Ethnicity



A bar chart titled "Race/Ethnicity" showing the distribution of students across various racial and ethnic groups. The Y-axis ranges from 0 to 2000.

Race/Ethnicity	Count
American Indian or Alaska Native	50
Asian	1300
Black or African American	300
Hispanic	1000
Multiple Races	150
Native Hawaiian or Other Pacific Islander	50
Unspecified	50
White	1800

#### Academic Level



A pie chart titled "Academic Level" showing the distribution of students across three levels: Graduate, Professional, and Undergraduate. The chart is divided into three segments with values 1631, 1581, and 1608 respectively.

Academic Level	Count
Graduate	1631
Professional	1581
Undergraduate	1608

Academic Year: 2012, 2013, 2014, 2015, 2016

Gender: Female, Male

Citizenship: Argentina, Armenia, Austria, Bangladesh, Belarus, Bermuda, Brazil, Cameroon, Canada, Chile

Quarter: 1, 2, 3, 4

School: A, B, C, D, E

Academic Level: Graduate, Professional, Undergraduate

Degree: BS, MS

Slicers still work!

# By using Power BI you will have access to a wide variety of interactive visualizations and more continue to be added

**Power BI**

Browse gallery How to use How to submit Docs

## Visuals library

Custom visuals R-powered visuals

Sort by Most Recent Search Visuals

There is an active developer community creating a wide variety of custom visual. Learn more about creating them by reading [Extend Power BI with custom visual](#). You can download custom visual and use them in your Power BI reports.

Infographic Designer Stock Chart Liquid Fill Gauge Sparkline by OKViz - v1.0.0 Stripet Browser

Cluster Map Facet Key Smart Filter by SQLBI BowtieChart Brick Chart

Bullet Chart by SQLBI Pulse Chart HierarchySlicer Circular Gauge Donut Chart

Visualizations > Fields

Search

Census Demographics

Axis

Drag data fields here

Legend

Drag data fields here

Values

Drag data fields here

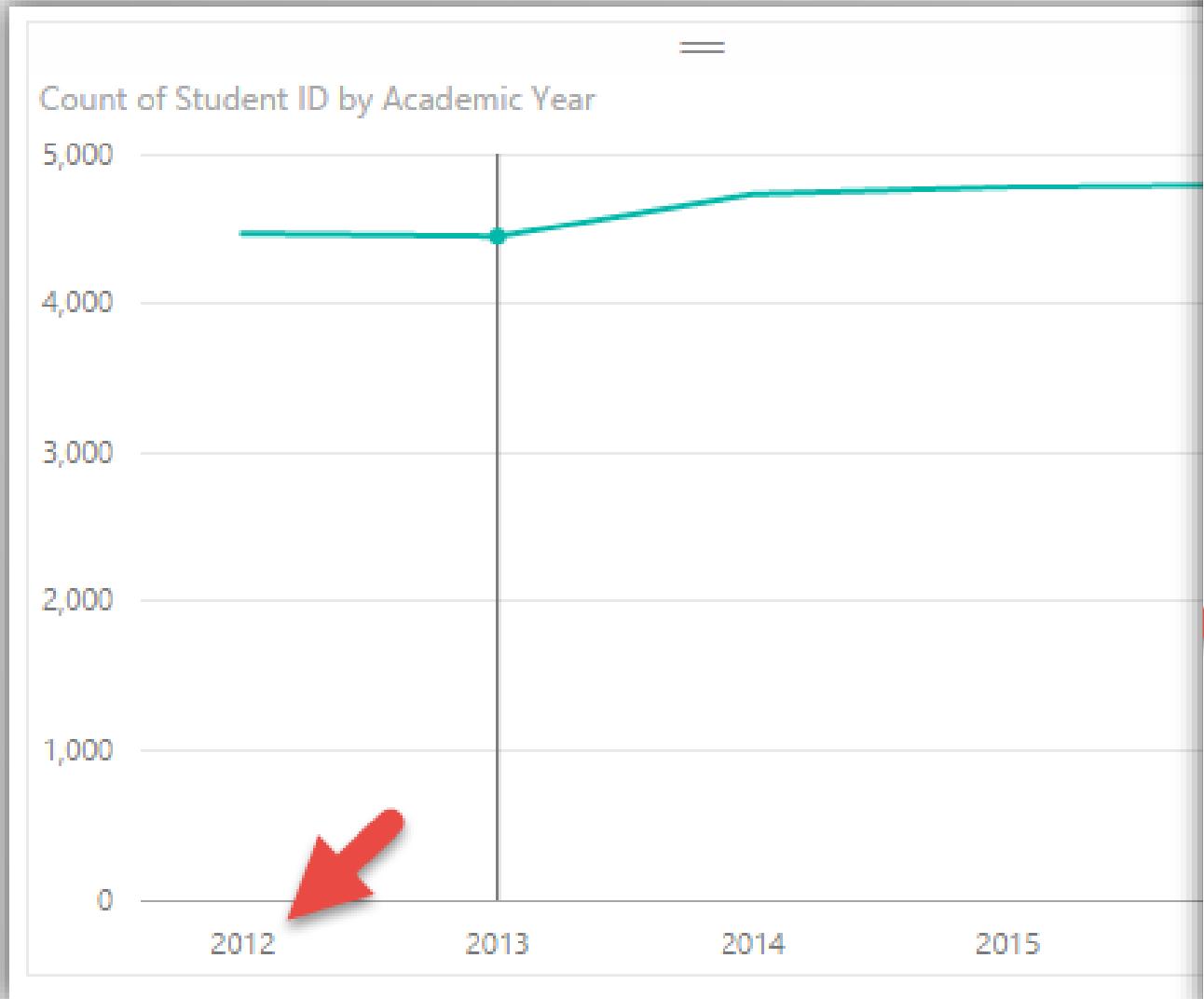
Tooltips

# Creating the Line Chart – select the *line chart icon*

The screenshot shows the Power BI visualization editor interface. On the left, there's a grid of chart icons. A large grey arrow points from the text above to this grid. Below the grid, the 'Visualizations' tab is selected. In the center, under 'Axis', 'Academic Year' is listed. Under 'Values', 'Student ID' is listed. A red arrow points to the 'Academic Year' dropdown. Another red arrow points to the 'Student ID' dropdown, which has a context menu open with 'Count (Distinct)' highlighted. On the right, the 'Fields' pane is open, showing a search bar and a list of fields under 'Census'. A third red arrow points to the 'Count (Distinct)' option in the context menu.

We will do just as we did in Excel – adding the Academic Year to the Axis and a distinct count of Student ID to the Values

# Setting Range on the Chart



The screenshot shows the Tableau interface with the following settings visible:

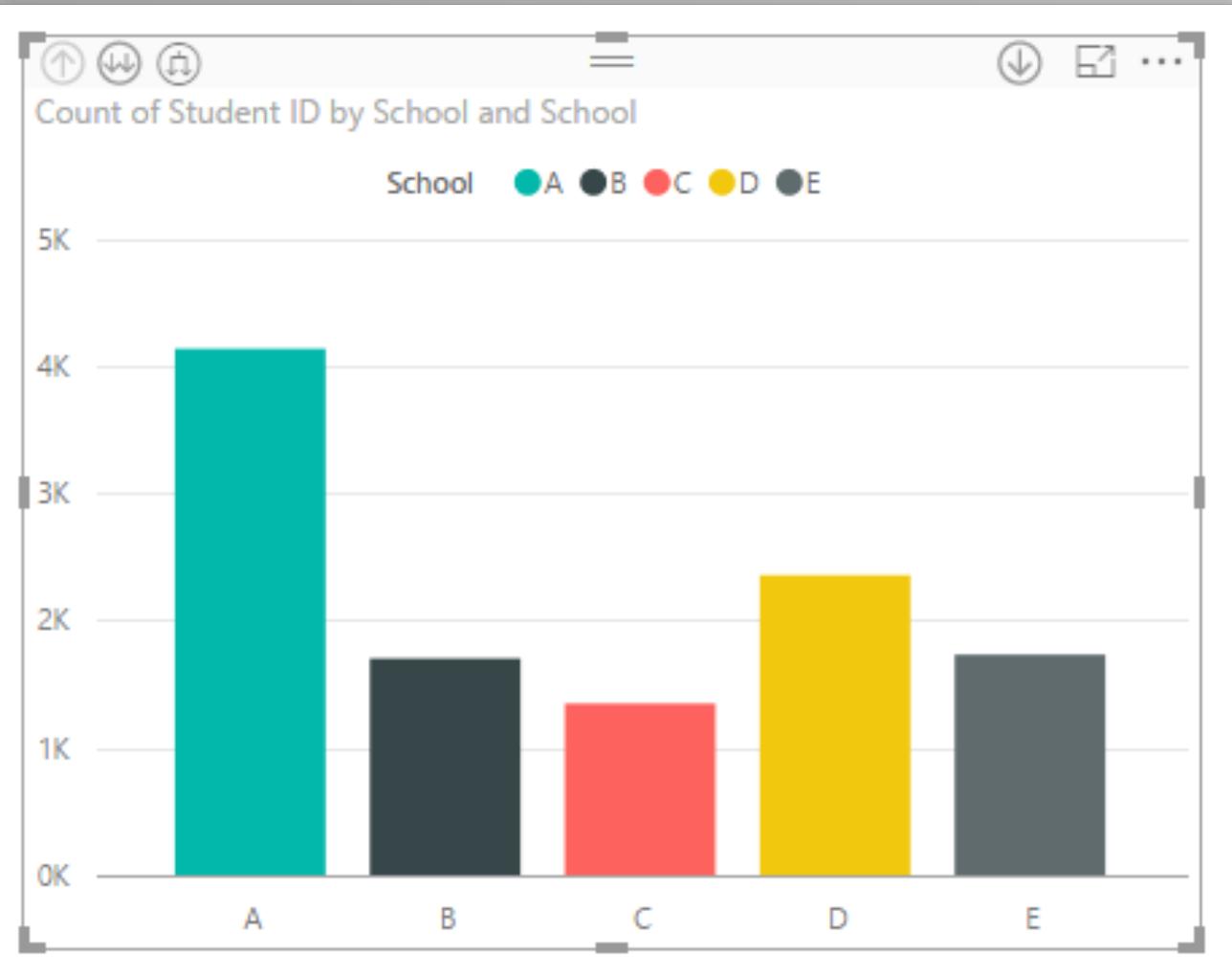
- Toolbars:** Top left icons for filters, refresh, and other data management.
- Search:** Top right search bar.
- Panel Headers:** "Census" at the top right.
- Legend:** On the far right, a legend for various dimensions and measures.
- Chart Settings:** On the right, a panel with:
  - Data colors:** Section with a yellow arrow pointing to it.
  - X-Axis:** On, with a slider.
  - Y-Axis:** On, with a slider.
  - Position:** Left.
  - Scale type:** Linear.
  - Start:** Set to 0.
  - End:** Set to Auto.
  - Title:** Off.
  - Style:** Show title.

Tip to get the visualization looking right

The screenshot shows the Power BI Desktop interface. The ribbon at the top has tabs: Home, View, and Modeling (which is currently selected). Below the ribbon, there are several icons: a folder, a calculator, a grid, and a sort arrow. To the right of these icons is a context menu titled "Data Type: Decimal Number". This menu lists several data types: Decimal Number, Fixed Decimal Number, Whole Number, Date/Time, Date, Time, Text, True/False, and Binary. The "Text" option is highlighted with a red arrow. The main area of the screen displays a table with columns: Student ID, Academic Year, and Qu. The "Academic Year" column is highlighted with a yellow background. The first few rows of the table show student IDs and their corresponding academic years.

Student ID	Academic Year	Qu
166959633072710	2012	
167812269210776	2012	
169749814917892	2012	
170298791620710	2012	
166174890255015	2012	
167432699716314	2012	
168265749969900	2012	
168437278001200	2012	

# Adding Enrollment Chart



Visualizations > Fields >

Search: Search

Census

- Academic Level
- Academic Year
- Country
- County
- Degree
- Distinct Count ...
- Program
- Program Degree
- Quarter
- Race/Ethnicity
- School

Axis: School (highlighted with a red arrow)

Legend: School (highlighted with a red arrow)

Value: Count of Student ID (highlighted with a red arrow)

'Census'[Count of Student ID]

- Count of Student ID
- Color saturation
- Drag data fields here
- Tooltips
- Drag data fields here
- Filters
- Visual level filters
- Count of Student ID(All)
- Program Degree(All)
- School(All)

Count of Student ID

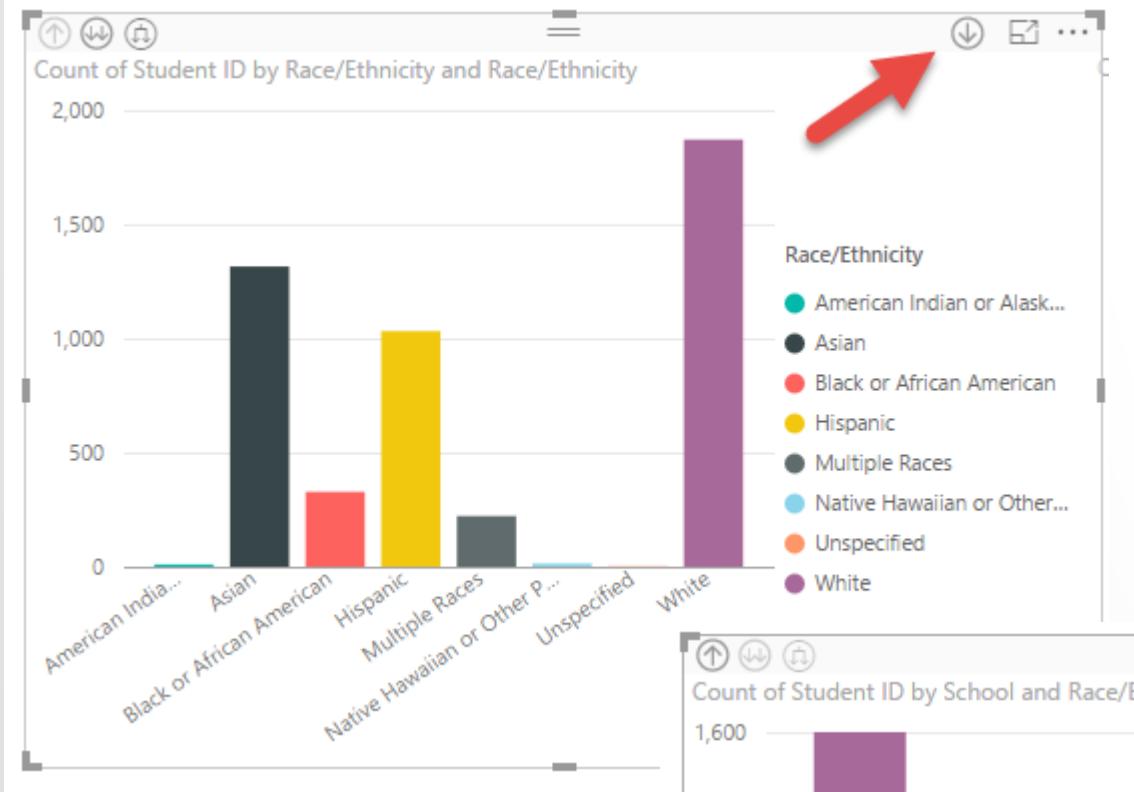
- Remove field
- Quick Calc
- Sum
- Average
- Minimum
- Maximum
- Count (Distinct)
- Count
- Standard deviation
- Variance
- Median

Program Degree

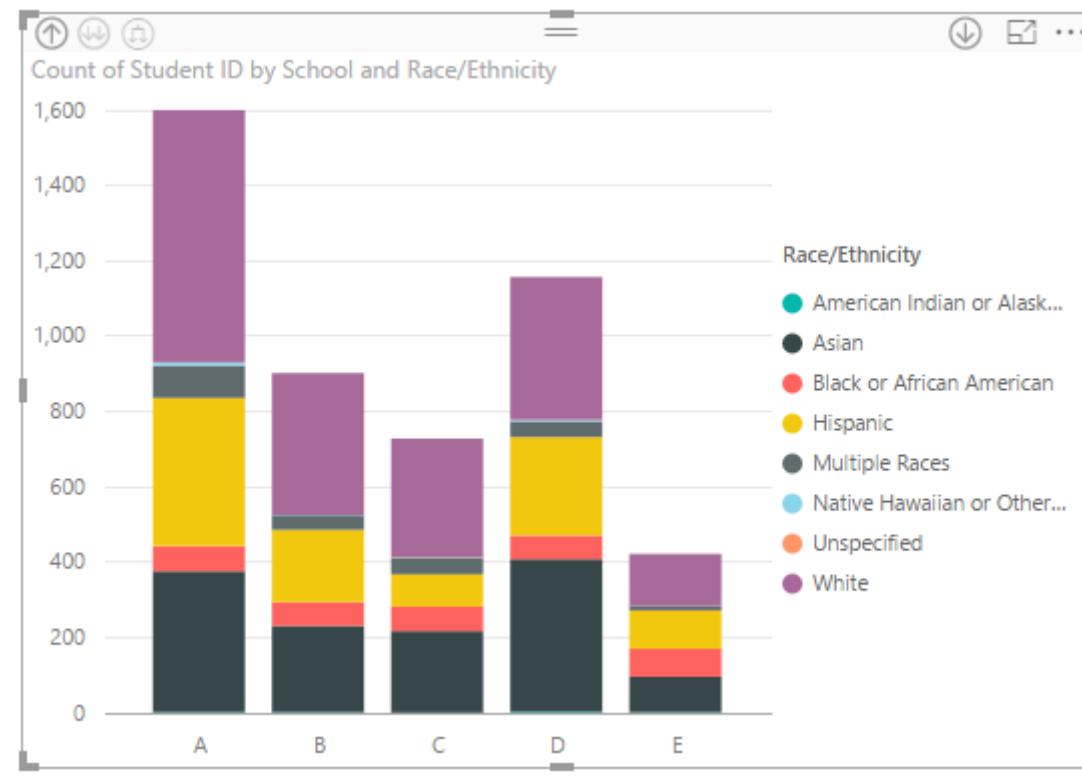
- Count of Student ID(All)
- Program Degree(All)

School

- State
- Status
- Student ID



Just drag columns to the axis to enable drill down



Overall values  
then drill down to  
each school. We  
could continue to  
do this for as deep  
as our dataset  
allows.

Visualizations >

Fields >

Search

Census

- Academic Level
- Academic Year
- Country
- County
- Degree
- Distinct Count ...
- Program
- Program Degree
- Quarter
- Race/Ethnicity
- School
- State
- Status
- Σ Student ID
- Sum of Studen...
- Σ Zip Code

Demographics

Axis

Race/Ethnicity

School

Legend

Race/Ethnicity

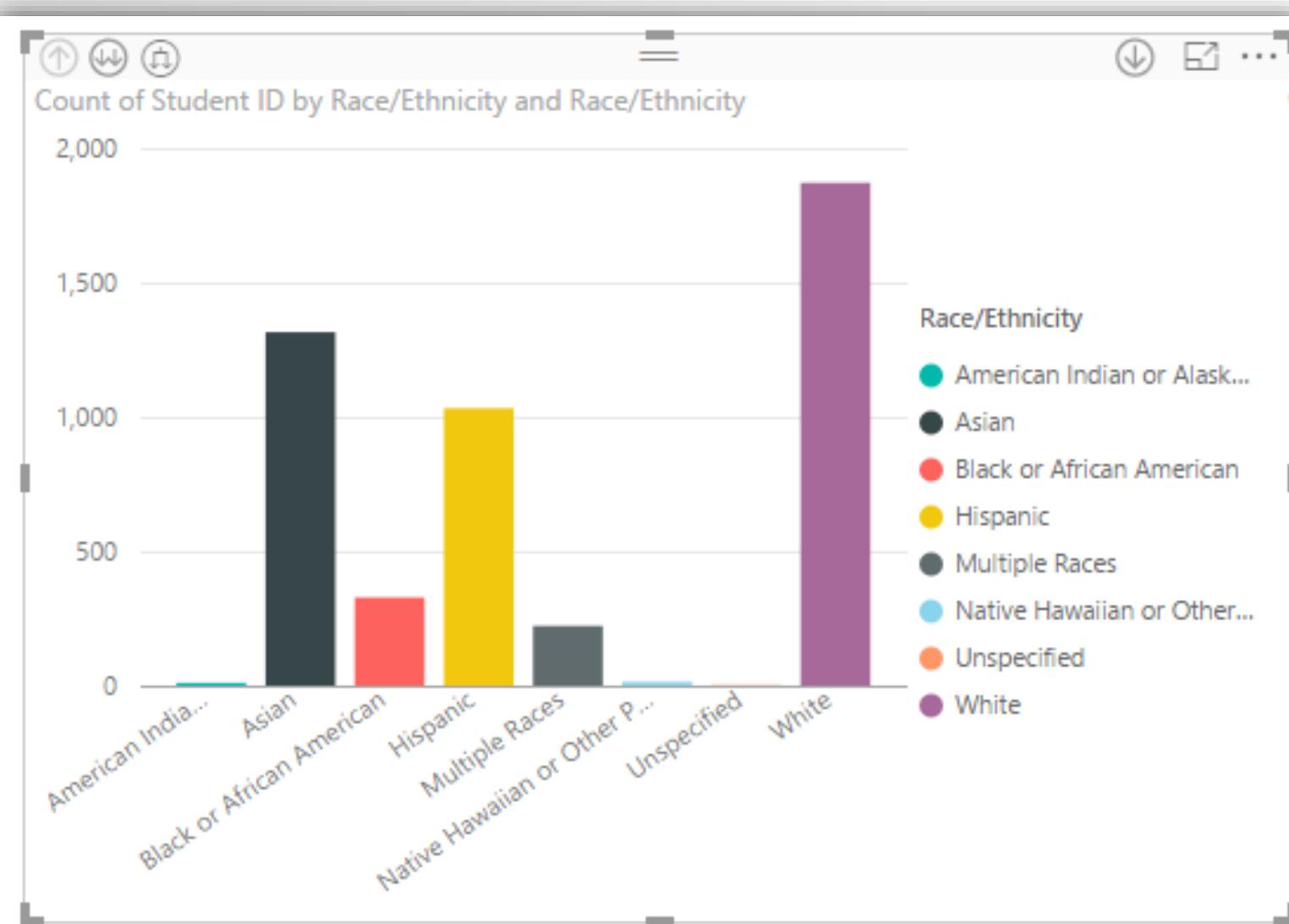
Value

Count of Student ID

Color saturation

Drag data fields here

# Adding Race/Ethnicity Chart



Visualizations > Fields >

Search

Census

- Academic Level
- Academic Year
- Country
- County
- Degree
- Distinct Count ...
- Program
- Program Degree
- Σ Quarter
- Race/Ethnicity
- School
- State
- Status

Axis

Race/Ethnicity

Legend

Race/Ethnicity

Value

Count of Student ID

Color saturation

Drag data fields here

Tooltips

Drag data fields here

Filters

Count (Distinct)

Count

Standard deviation

Variance

Median

Remove field

Quick Calc

Sum

Average

Minimum

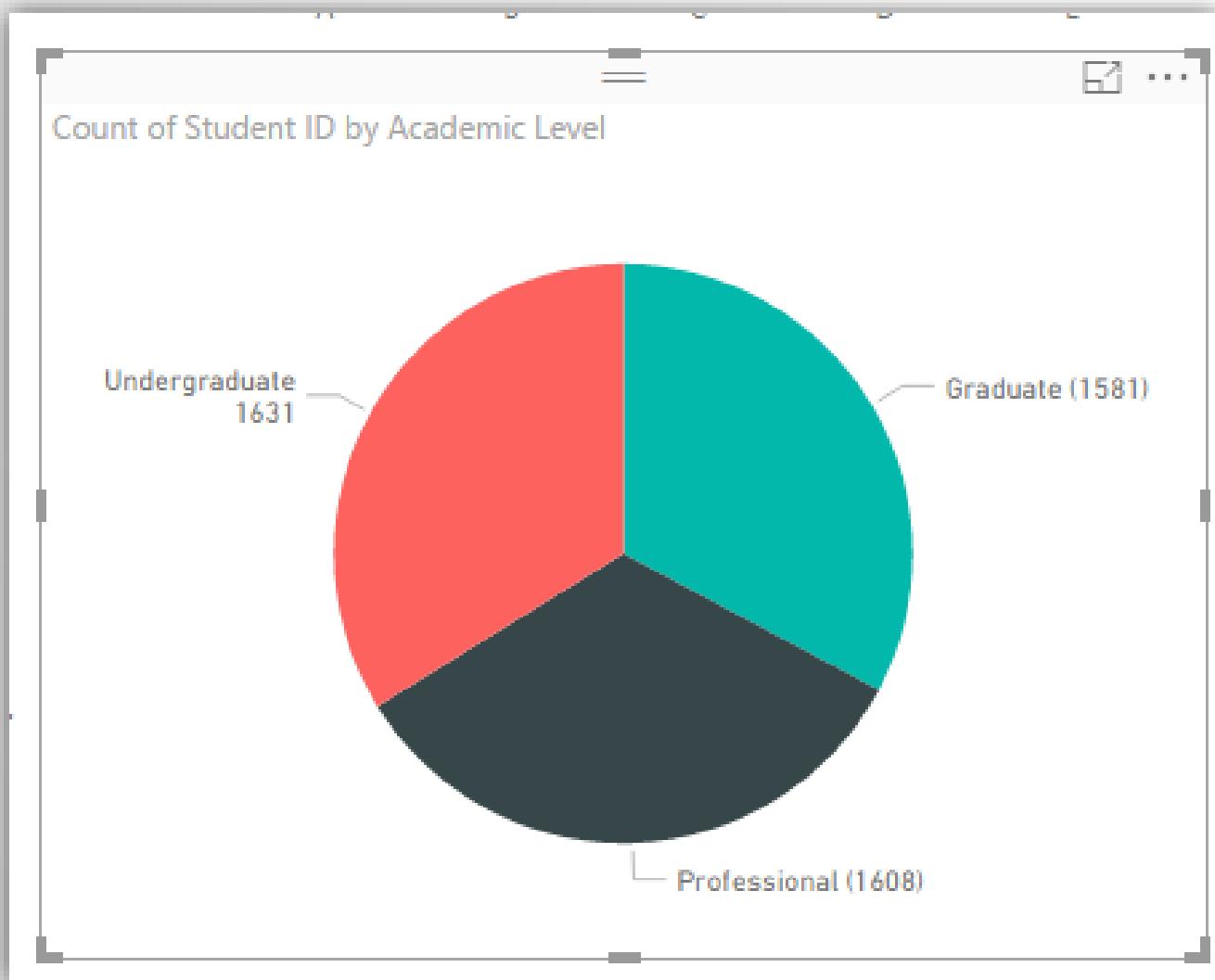
Maximum

Count Student ID(All)

Race/Ethnicity(All)

Red arrows point to the 'Value' dropdown menu and the 'Count (Distinct)' option in the context menu.

# Academic Level Pie Chart



Visualizations >

Fields >

Search

Census

- Academic Level
- Academic Year
- Country
- County
- Degree
- Distinct Count ...
- Program
- Program Degree
- Quarter
- Race/Ethnicity
- School
- State
- Status
- Student ID
- Sum of Studen...
- Zip Code

Demographics

Legend

Academic Level

Details

Drag data fields here

Values

Count of Student ID

Tooltips

Drag data fields here

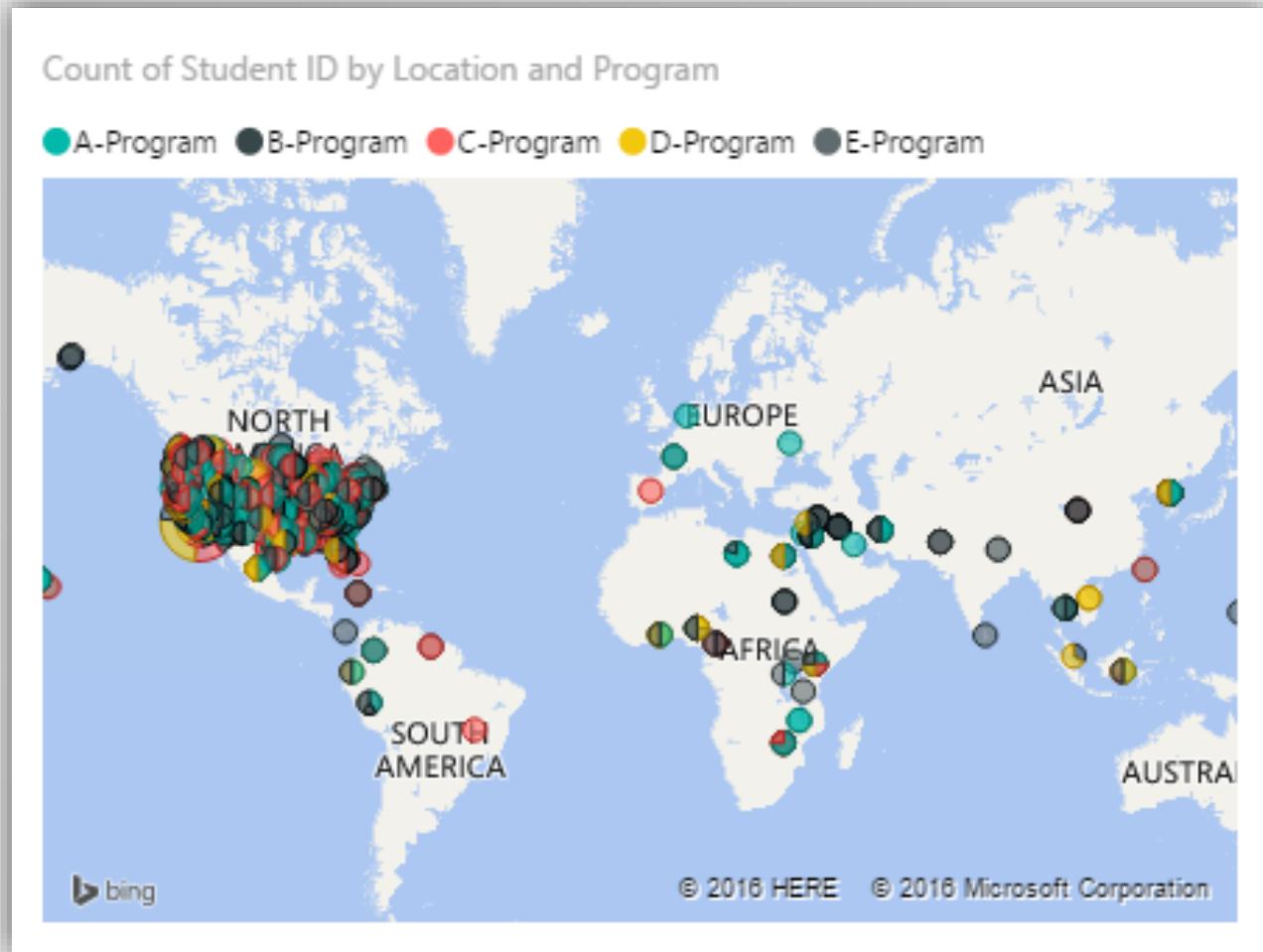
Filters

Visual level filters

Academic Level(All)

Count of Student ID(All)

# Adding a Citizenship Map



DAX to do this is:  
Location = [Zip Code] & "," & [Citizenship]

Visualizations >

Fields >

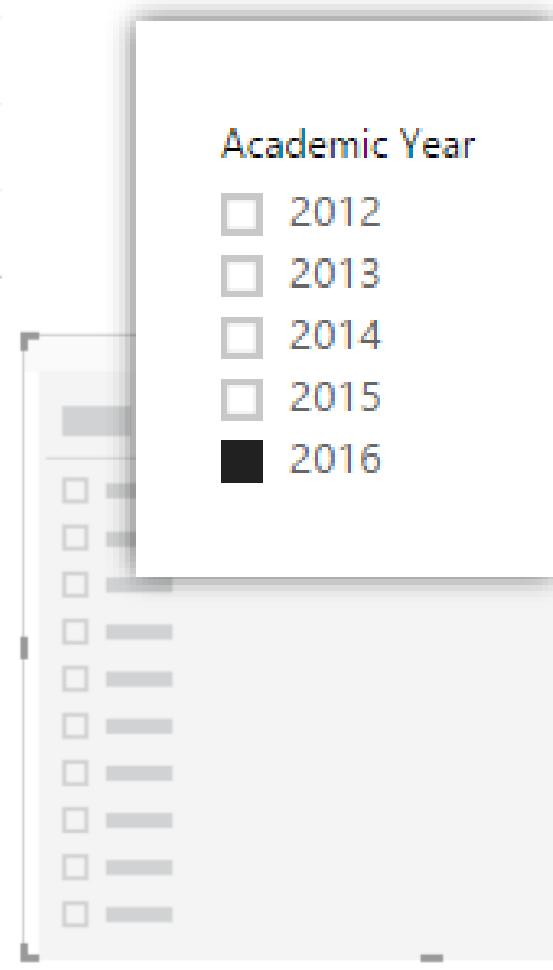
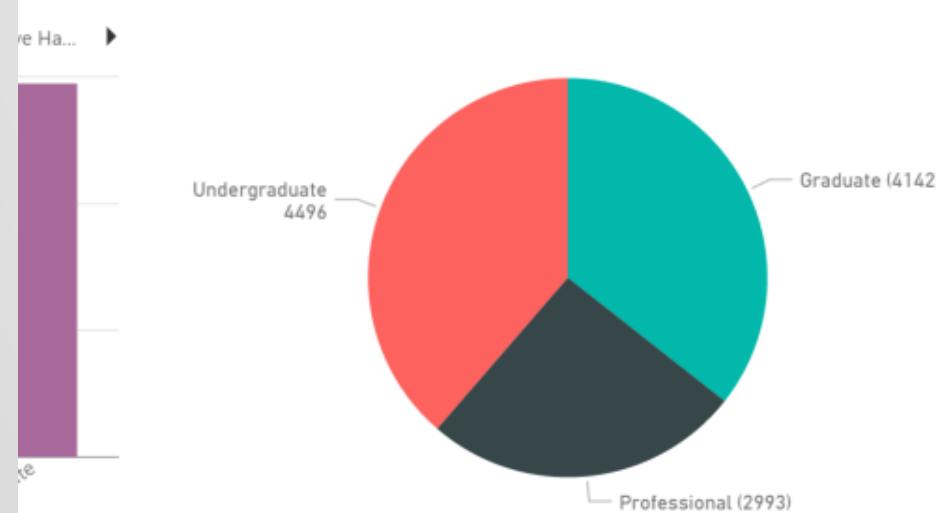
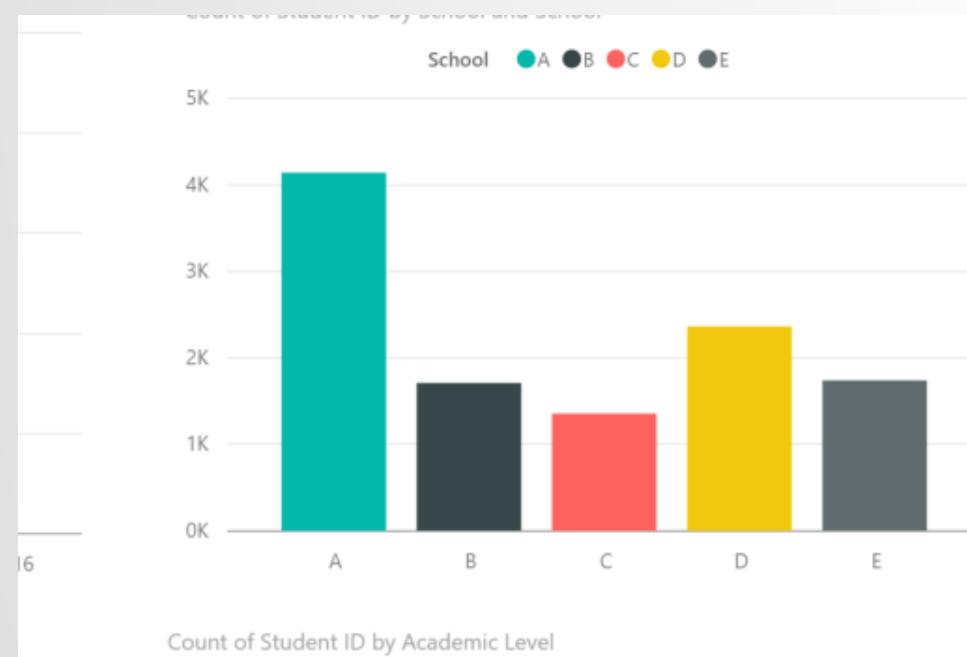
Search

Census

- Academic Level
- Academic Year
- Country
- County
- Degree
- Distinct Count ...
- Location
- Program
- Program Degree
- Quarter
- Race/Ethnicity
- School
- State
- Status
- Student ID
- Sum of Studen...
- Zip Code

Demographics

# Adding Filters



A screenshot of the Power BI Fields pane. The "Visualizations" section shows various chart icons. The "Fields" section has a search bar and a list of fields under "Census". A red arrow points to the "Academic Year" field, which is highlighted with a yellow border. Another red arrow points to the "Filters" section, specifically to the "Visual level filters" area where the "Academic Year" field is listed.

Visualizations >

Fields >

Search

Census

- Academic Level
- Academic Year**
- Country
- County
- Degree
- Distinct Count ...
- Location
- Program
- Program Degree
- Quarter
- Race/Ethnicity
- School
- State
- Status
- Student ID
- Sum of Studen...
- Zip Code

Demographics

Visualizations >

Fields >

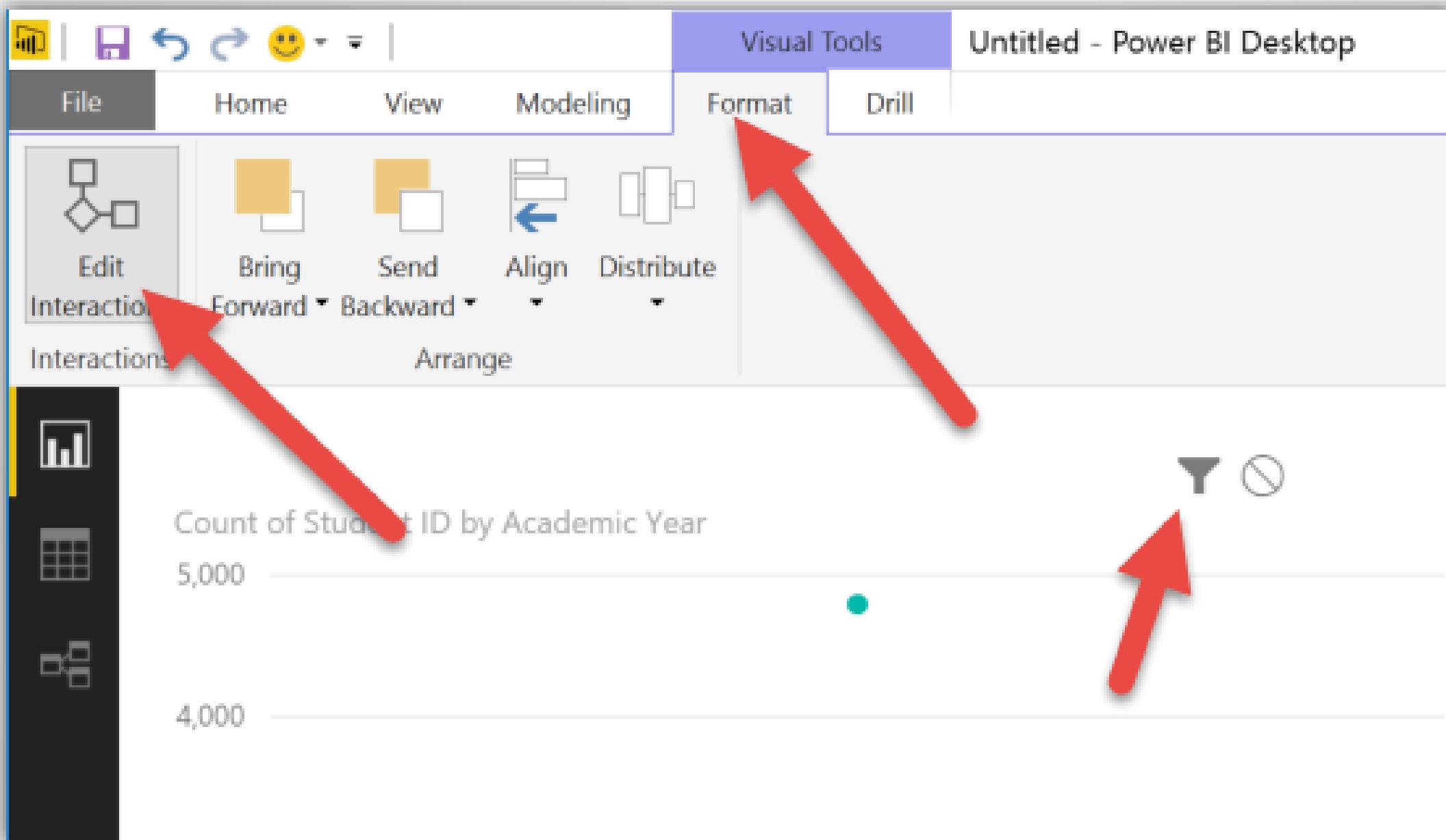
Search

Census

- Academic Level
- Academic Year**
- Country
- County
- Degree
- Distinct Count ...
- Location
- Program
- Program Degree
- Quarter
- Race/Ethnicity
- School
- State
- Status
- Student ID
- Sum of Studen...
- Zip Code

Demographics

# Configuring Filter Interactions



# Adding a New Column – Concatenate and Add Text if Desired

Program Degree = [Program]&" "&[Degree]

Student ID	Academic Year	Quarter	County	State	Country	Status	School	Academic Level	Program	Degree	Zip Code	Race/Ethnicity	Program Degree	
166959633072710	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
167812269210776	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
169749814917892	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
170298791620710	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
166174890255015	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
167432699716314	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
168265749969900	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
168437278001200	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
171996573474750	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
168677177127920	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:
168435826798368	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS	9:

Data Sources Data Queries Page Visual Insert

External Data

Program Degree = [Program]&" "&[Degree]



D	Academic Year	Quarter	County	State	Country
33072710	2012	4	San Bernardino	CA	United States
69210776	2012	4	San Bernardino	CA	United States
14917892	2012	4	San Bernardino	CA	United States
91620710	2012	4	San Bernardino	CA	United States
90255015	2012	4	San Bernardino	CA	United States

# DAX Statement to Concatenate – Easy as “&”

External Data

Insert

Program Degree = [Program]&" "&[Degree]

ID	Academic Year	Quarter	County	State	Country
33072710	2012	4	San Bernardino	CA	United States
69210776	2012	4	San Bernardino	CA	United States
14917892	2012	4	San Bernardino	CA	United States
91620710	2012	4	San Bernardino	CA	United States
90255015	2012	4	San Bernardino	CA	United States

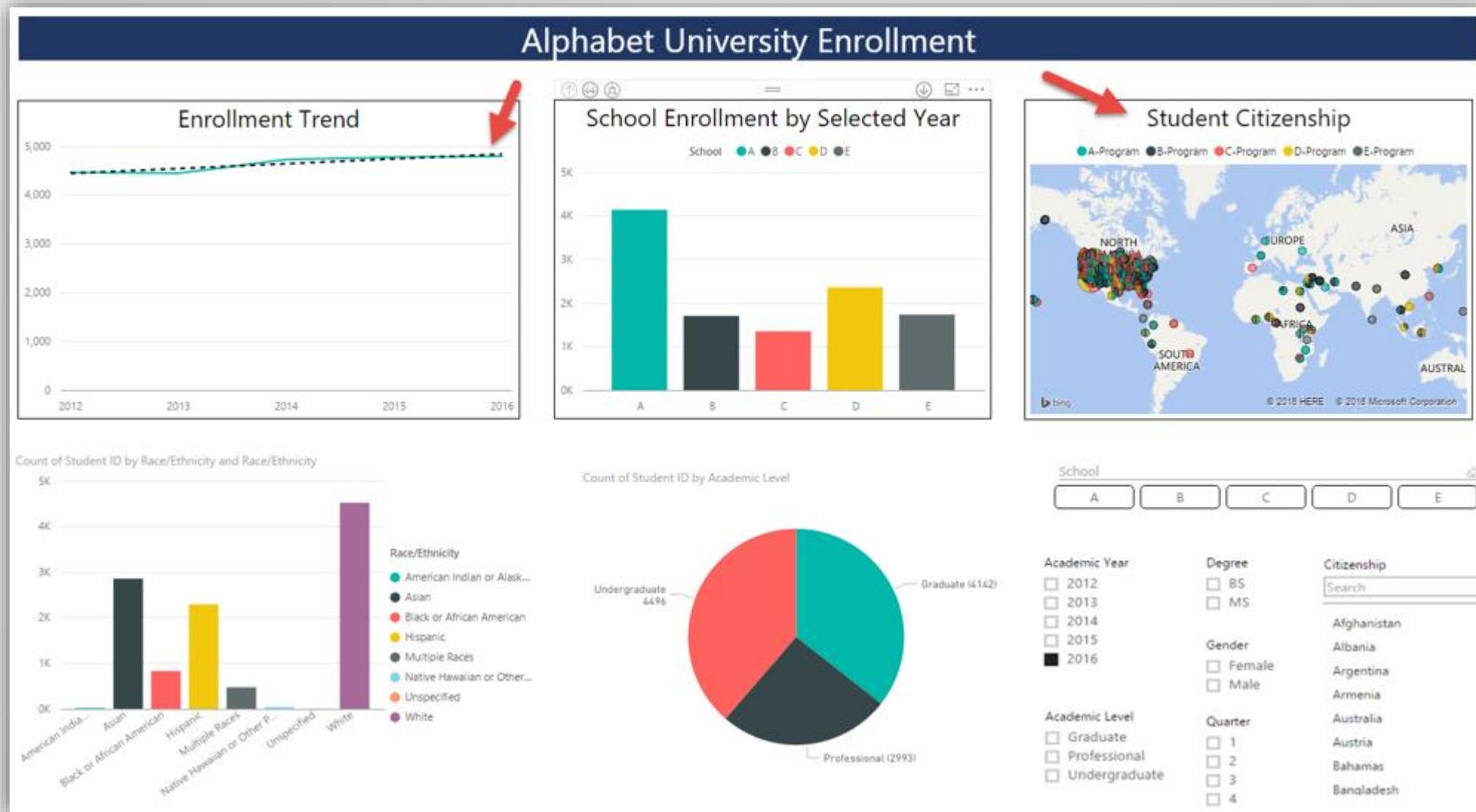
# Adding a Title

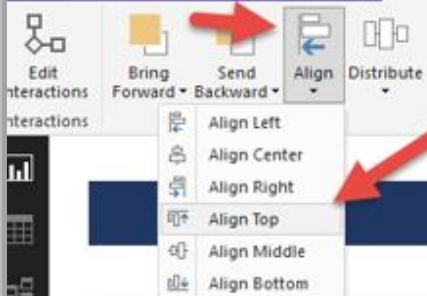
The screenshot shows the Power BI Desktop interface. The ribbon at the top has tabs: File, Home, View, and Modeling. The Home tab is selected. The Home tab's ribbon bar includes icons for Paste, Cut, Copy, Format Painter, Get Data, Recent Sources, Enter Data, Refresh, New Page, New Visual, Shapes, Text Box, Image, Page View, Manage Relationships, Relationships, and New Measure. A red arrow points from the 'Text Box' icon towards the title 'Alphabet University Enrollment'. To the right of the ribbon is the 'Visualizations' pane, which shows the title is turned 'On' and its text is 'Alphabet Uni...'. Below the ribbon is a dark blue header bar with the title 'Alphabet University Enrollment'. On the left side, a color picker dialog is open, showing a color palette and RGB sliders. A red arrow points to the 'RGB' button in the color model section. To the right of the color picker is a color palette with a hex code field containing '#203764'.

Color choice is in Hex – use color picker in Excel to see RGB and use an online converter to get Hex equivalent

# Bringing it All Together

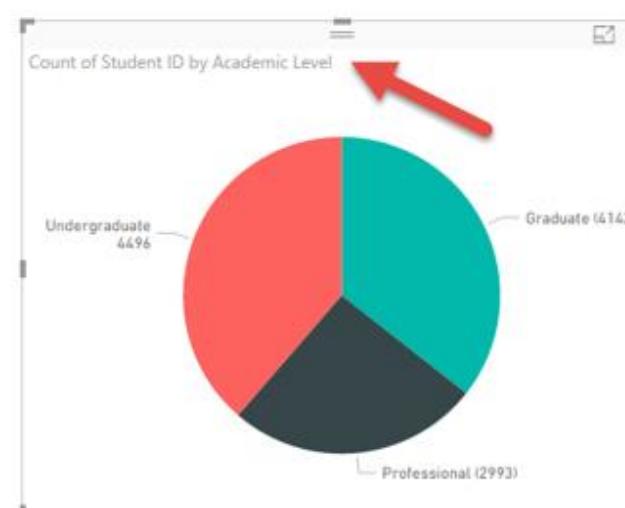
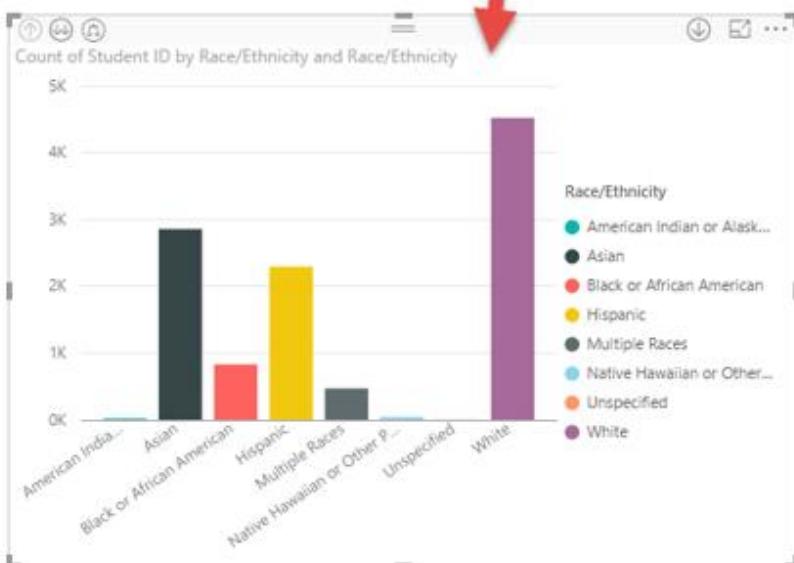
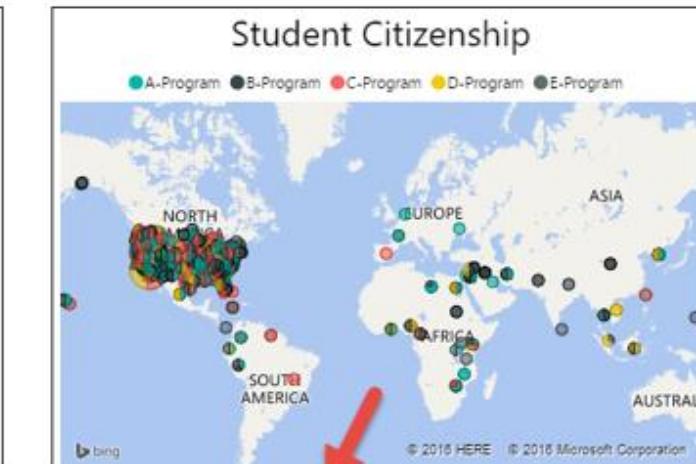
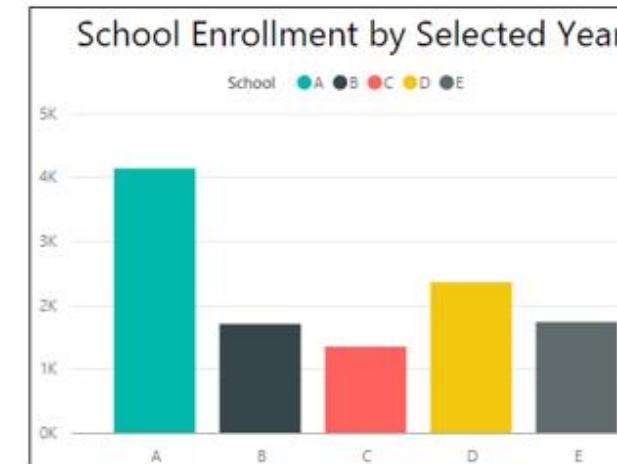
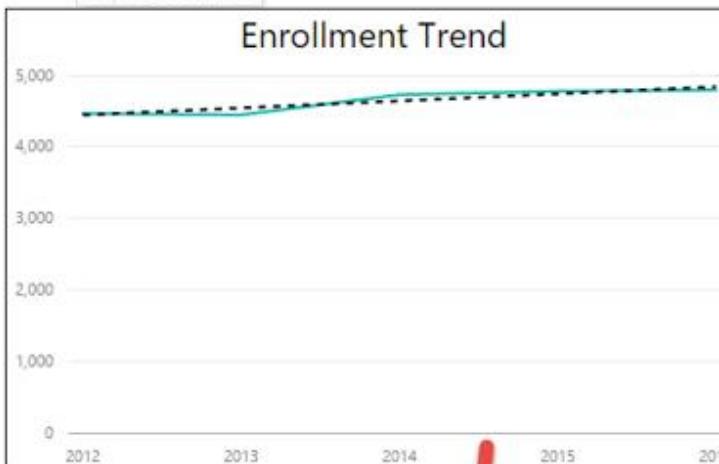
We've added some *titles* – still more to add below





# Formatting Alignment

## Alphabet University Enrollment



**School**

A	B	C	D	E
---	---	---	---	---

**Academic Year**

2012	2013	2014	2015	2016
------	------	------	------	------

**Degree**

BS	MS
----	----

**Citizenship**

Search
--------

**Gender**

Female	Male
--------	------

**Academic Level**

Graduate	Professional	Undergraduate
----------	--------------	---------------

**Quarter**

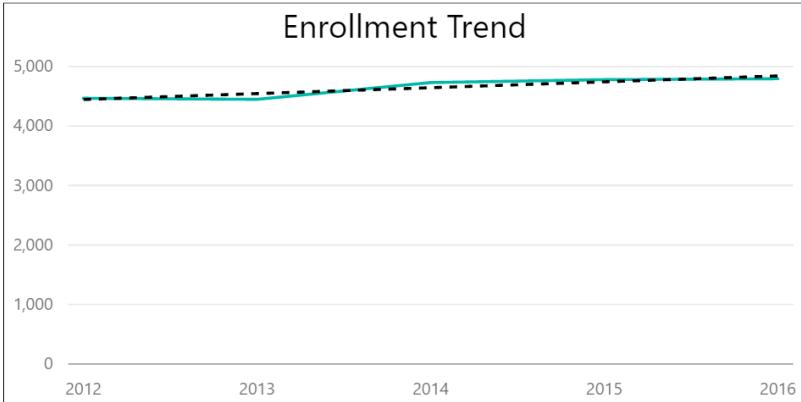
1	2	3	4
---	---	---	---

# Ready to Publish

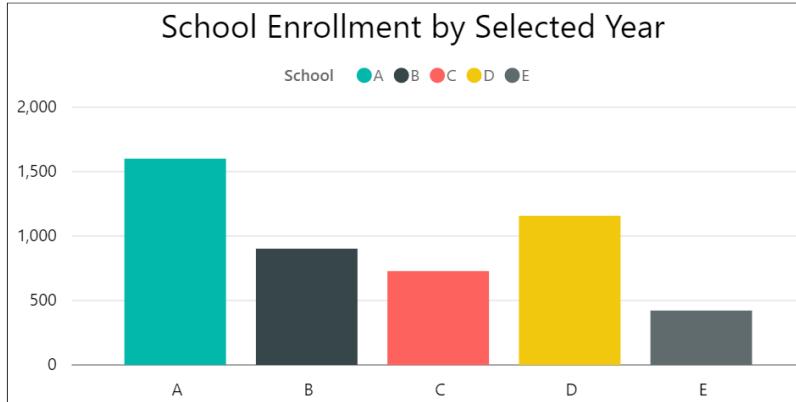
## Alphabet University Enrollment

Selected Students = 4794

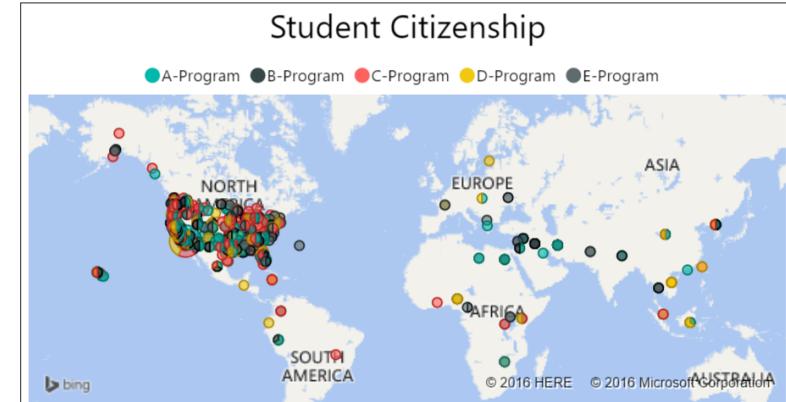
Enrollment Trend



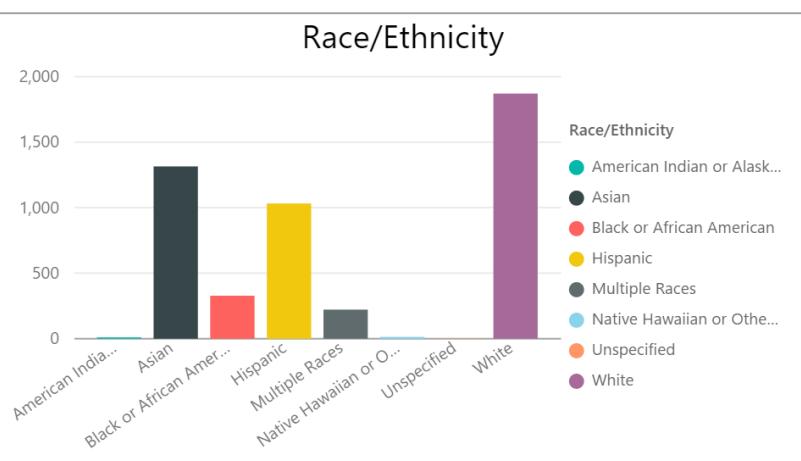
School Enrollment by Selected Year



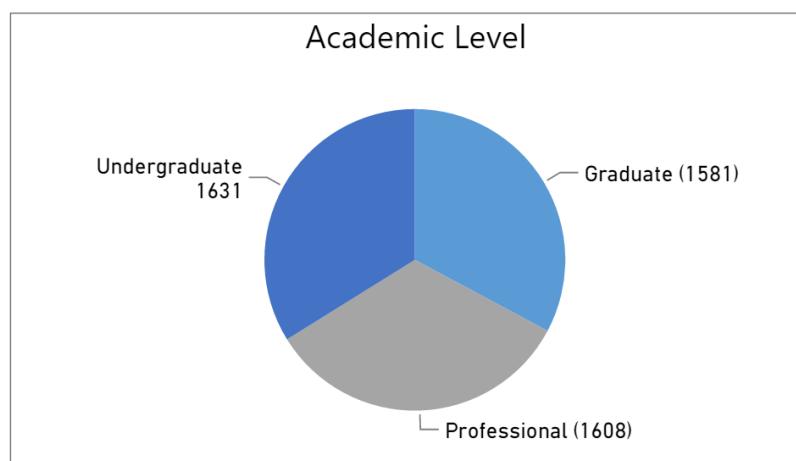
Student Citizenship



Race/Ethnicity



Academic Level



School

A

B

C

D

E

Academic Year

2012

2013

2014

2015

2016

Degree

BS

MS

Gender

Female

Male

Quarter

1

2

3

4

Citizenship

Search

Argentina

Armenia

Austria

Bangladesh

Belarus

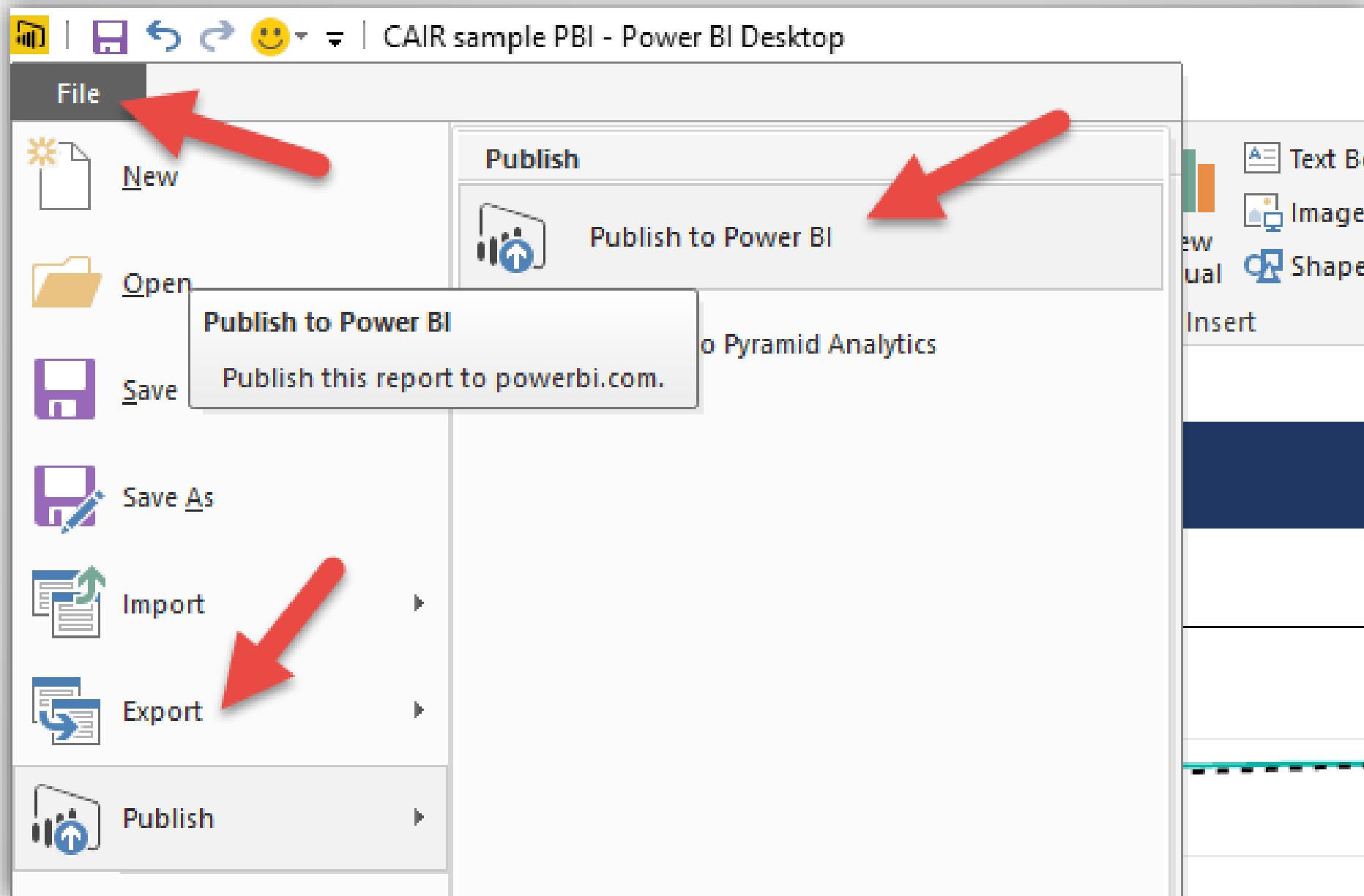
Bermuda

(UK)

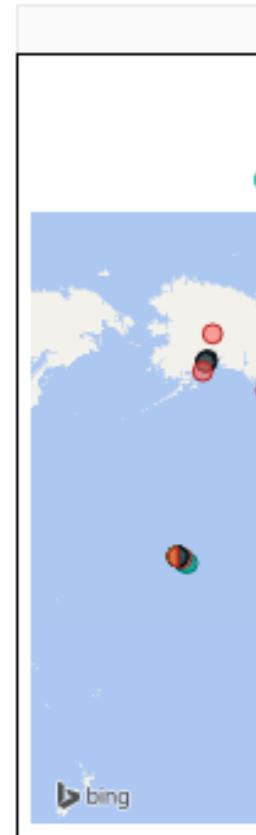
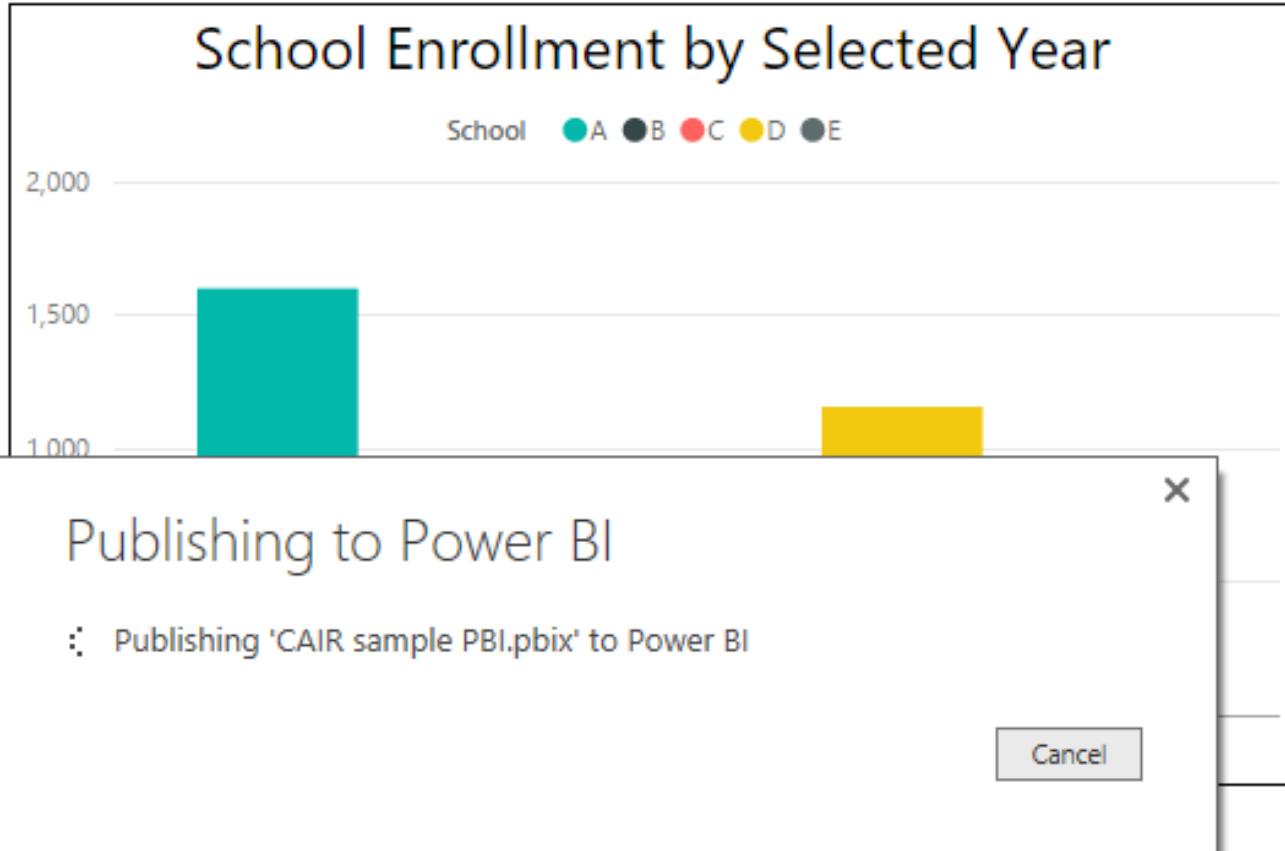
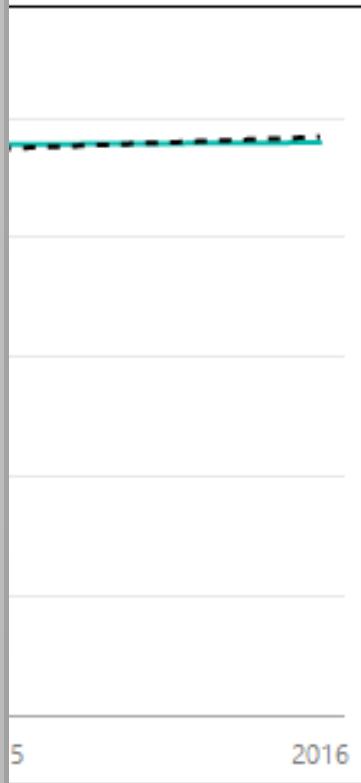
Brazil

Cameroon

# Select File, Export, Publish to Power BI



# Alphabet University Enrollment



School	Value
A	~1,600

# Alphabet University Enrollment

## School Enrollment by Selected Year

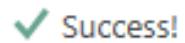
School ● A ● B ● C ● D ● E

2,000

1,500

1,000

Publishing to Power BI



Success!

[Open 'CAIR sample PBI.pbix' in Power BI](#)

[Get Quick Insights](#)

Got it

Schoo

# Success – Now We Need a URL

Power BI My Workspace > CAIR - Census Power BI

File View Edit report Explore Refresh Pin Live Page

## Alphabet University Enrollment

Selected Students = 4794

### Enrollment Trend

A line chart titled "Enrollment Trend" showing student counts over time. The Y-axis ranges from 0 to 5,000. The X-axis shows years from 2012 to 2016. The data shows a steady increase from approximately 4,500 in 2012 to nearly 5,000 in 2016.

Year	Students
2012	4,500
2013	4,600
2014	4,700
2015	4,800
2016	4,900

### School Enrollment by Selected Year

A bar chart titled "School Enrollment by Selected Year" comparing five schools (A-E). The Y-axis ranges from 0 to 2,000. School A has the highest enrollment at approximately 1,600, followed by D (~1,200), B (~900), C (~750), and E (~450).

School	Students
A	1,600
B	900
C	750
D	1,200
E	450

### Student Citizenship

A map titled "Student Citizenship" showing the global distribution of students across continents. Various colored dots represent students from different countries, with concentrations in North America, Europe, and Asia.

### Race/Ethnicity

A bar chart titled "Race/Ethnicity" showing student counts by ethnicity. The Y-axis ranges from 0 to 2,000. The "White" category is the largest at approximately 1,900, followed by "Asian" (~1,300), "Hispanic" (~1,050), "Black or African Amer..." (~350), and "Multiple Races" (~250).

Race/Ethnicity	Students
American Indian or Alaskan Native	10
Asian	1,300
Black or African American	350
Hispanic	1,050
Multiple Races	250
Native Hawaiian or Other Pacific Islander	10
Unspecified	10
White	1,900

### Academic Level

A pie chart titled "Academic Level" showing student counts by level. The chart is divided into three segments: "Undergraduate" (1,631), "Graduate" (1,581), and "Professional" (1,608).

Academic Level	Students
Undergraduate	1,631
Graduate	1,581
Professional	1,608

Filters

Selected Students = 4794

Student Citizenship

A-Personal B-Program C-Program D-Program E-Program

NORTH EUROPE ASIA SOUTH AMERICA AFRICA AUSTRALIA

bing © 2016 HERE © 2016 Microsoft Corporation

Race/Ethnicity

American Indian or Alaskan Native Asian Black or African American Hispanic Multiple Races Native Hawaiian or Other Pacific Islander Unspecified White

Academic Year 2012 2013 2014 2015 2016

Degree BS MS

Gender Female Male

Quarter 1 2 3 4

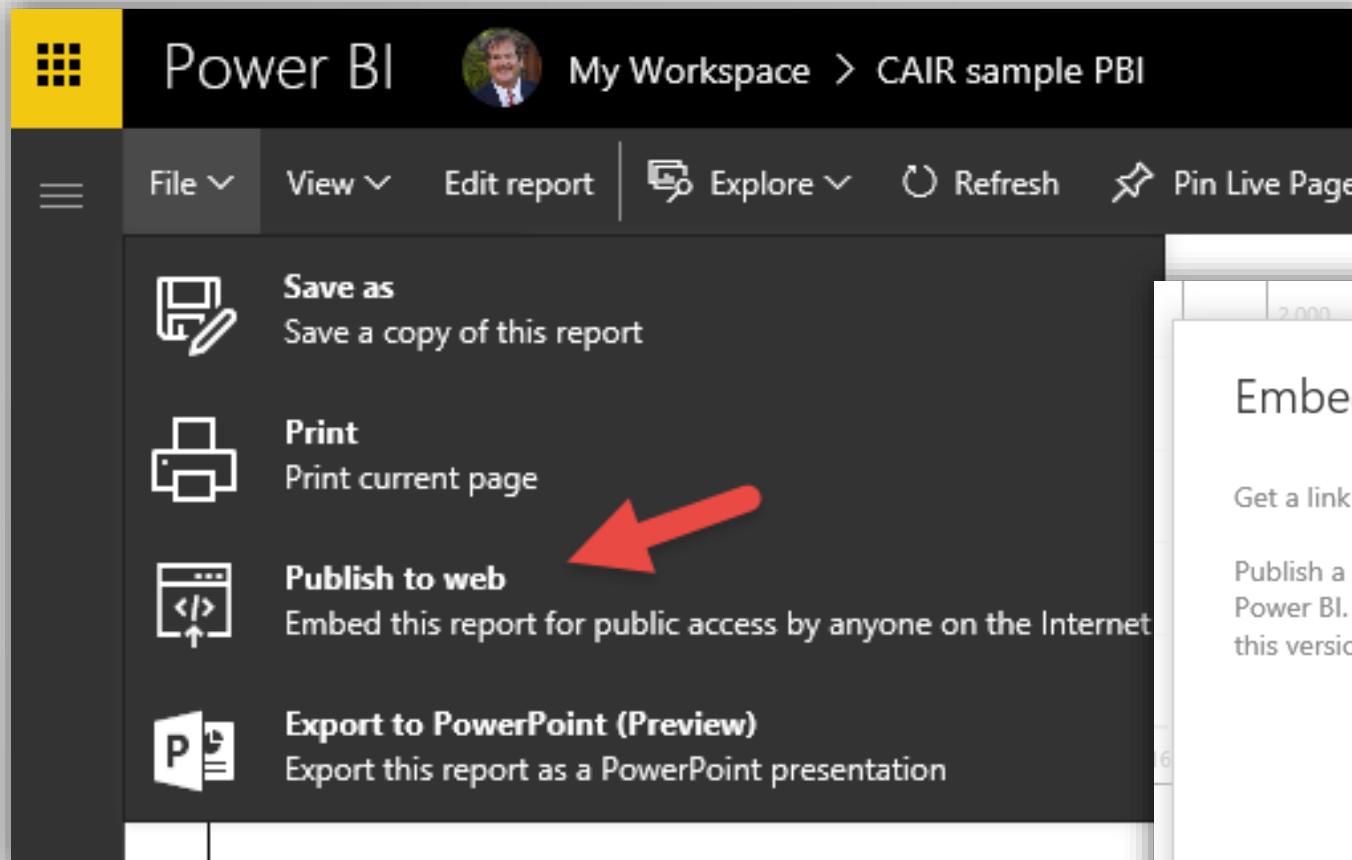
Academic Level Graduate Professional Undergraduate

Citizenship Search

Argentina Armenia Austria Bangladesh Belarus Bermuda Brazil Cameroon

Alphabet Calculate Example

# Publish to Web – URL or Embed Code

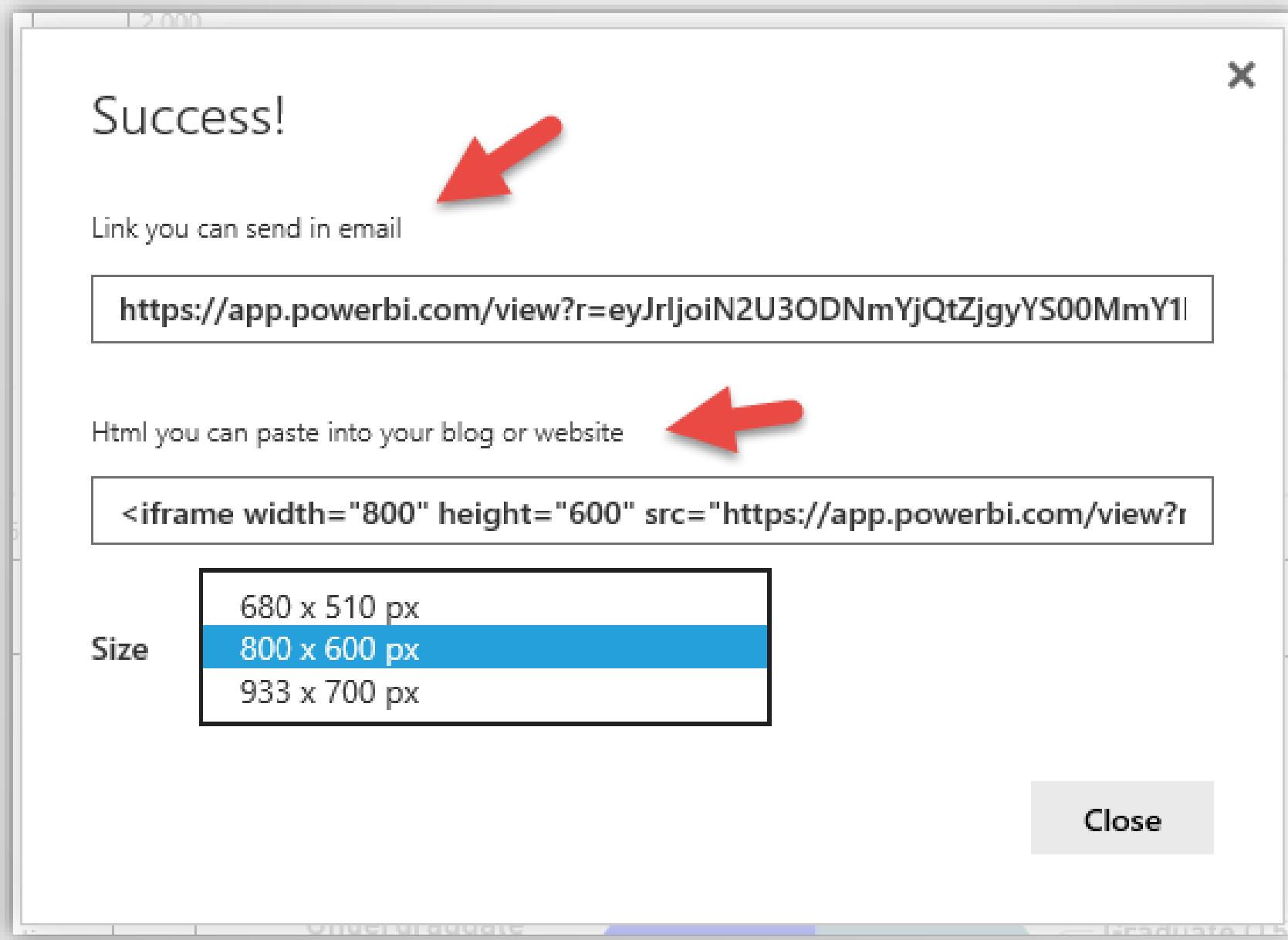


A screenshot of the Power BI desktop application. The window title is "Power BI" and the location is "My Workspace > CAIR sample PBI". The "File" menu is open, showing several options: "Save as", "Print", "Publish to web", and "Export to PowerPoint (Preview)". A large red arrow points to the "Publish to web" option. To the right of the menu, a modal dialog box titled "Embed in a public website" is displayed. The dialog contains instructions: "Get a link or embed code that you can include on a website, or send in email." and "Publish a live version that will remain synchronized with the source report in Power BI. Any changes you make to the report will immediately be reflected in this version." At the bottom right of the dialog are two buttons: "Create embed code" (in yellow) and "Close".

# MAJOR CAUTION



# URL and Embed Code



# URL for the Dashboard

<https://app.powerbi.com/view?r=eyJrIjoiN2U3ODNmYjQtZjgyYS00MmY1LWExMDgtNjg1MTU0MjM2NWQ2IiwidCI6ImYwNjdhMGY4LWIyNzQtNGE5Ni1hMTcwLTJIY2JhNmIxYml1YSIsImMiOjZ9>

# Tips:

- Filter controls
- Drill Down
- Titles – can be content sensitive
- Import Custom Visuals
- Experiment / Share / Join a user group
- Learn some Data Analysis Expressions (DAX)
- Use R? Power BI has built-in support

# DAX – CALCULATE

When we use CALCULATE in an expression it allows us to override a filter. In our example we will use it to create a percent of students in an age group.

Students filtered by Age Group in a given context, i.e., Year

Using CALCULATE to capture all students in the filtered context - Year

Age Group	Percent of Students	Students	Calculate Age Group
15-19	1 %	58	4794
20-24	41 %	1969	4794
25-29	31 %	1498	4794
30-34	14 %	661	4794
35-44	8 %	401	4794
45-54	3 %	156	4794
55+	1 %	51	4794
<b>Total</b>	<b>100 %</b>	<b>4794</b>	<b>4794</b>

**Calculate Age Group** = CALCULATE([Distinct Count of Student ID],ALL(Census[Age Group]))

# Matrix

Age Group	Percent of Students	Students	Calculate Age Group
15-19	1 %	58	4794
20-24	41 %	1969	4794
25-29	31 %	1498	4794
30-34	14 %	661	4794
35-44	8 %	401	4794
45-54	3 %	156	4794
55+	1 %	51	4794
<b>Total</b>	<b>100 %</b>	<b>4794</b>	<b>4794</b>

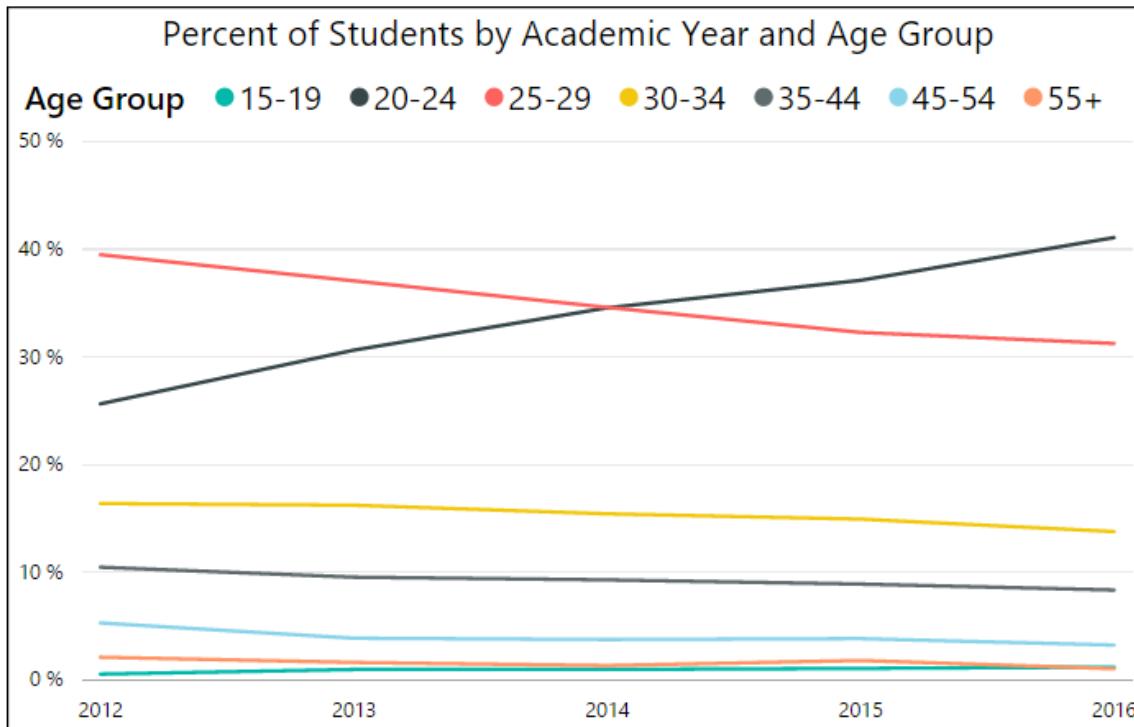
**Percent of Students** =

DIVIDE([Students],[Calculate Age Group])

**Students** = DISTINCTCOUNT(Census[Student ID])

**Calculate Age Group** = CALCULATE([Distinct Count of Student ID],ALL(Census[Age Group]))

# CALCULATE Function - Age Group as a Percentage of Enrollment Selected



4794  
Students

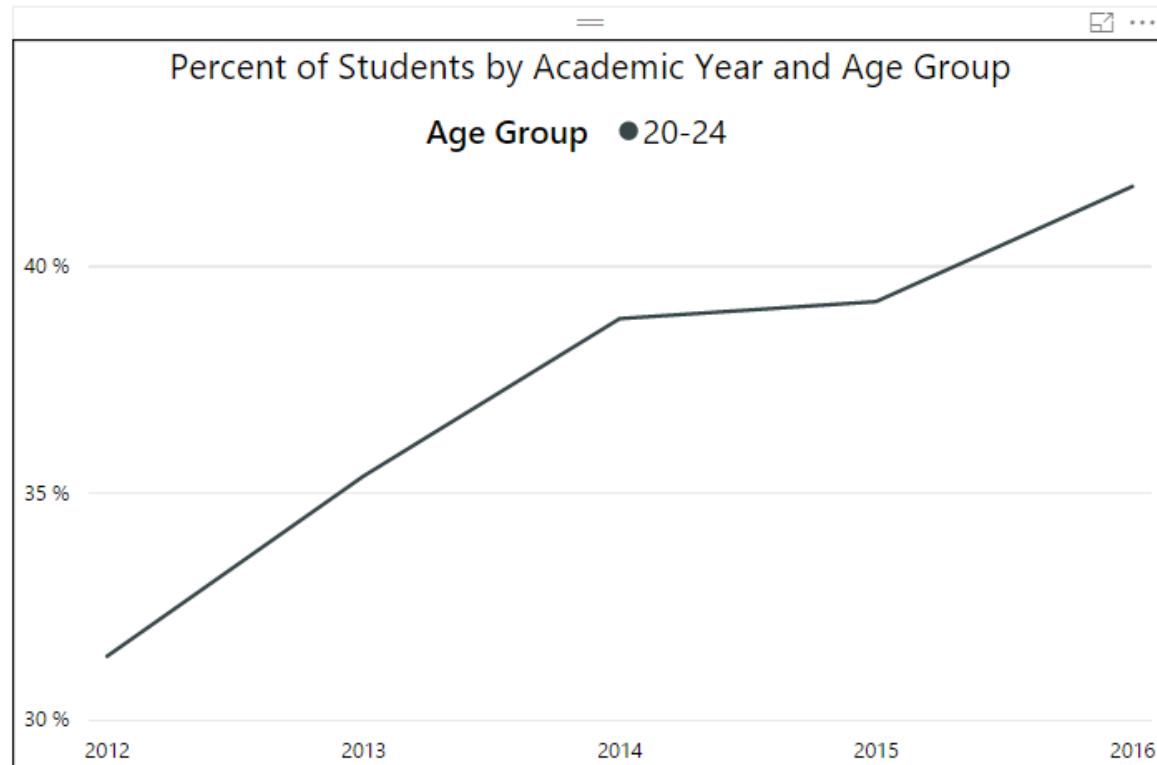
4794  
Calculate Age Group

100 %  
Percent of Students

Age Group	Race/Ethnicity	Academic Year
15-19	American Indian or Alaska Native	2012
20-24	Asian	2013
25-29	Black or African American	2014
30-34	Hispanic	2015
35-44	Multiple Races	2016
45-54	Native Hawaiian or Other Pacific Islander	
55+	Unspecified	
	White	

Age Group	Percent of Students	Students	Calculate Age Group
15-19	1 %	58	4794
20-24	41 %	1969	4794
25-29	31 %	1498	4794
30-34	14 %	661	4794
35-44	8 %	401	4794
45-54	3 %	156	4794
55+	1 %	51	4794
<b>Total</b>	<b>100 %</b>	<b>4794</b>	<b>4794</b>

# CALCULATE Function - Age Group as a Percentage of Enrollment Selected



Age Group	Percent of Students	Students	Calculate Age Group
20-24	42 %	431	1032
<b>Total</b>	<b>42 %</b>	<b>431</b>	<b>1032</b>

431  
Students

1032  
Calculate Age Group

42 %  
Percent of Students



# THANKS FOR ATTENDING!

Contact Info:

Ken Nelson

[wknelson@llu.edu](mailto:wknelson@llu.edu)