



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

CAIR 2016 Annual Conference - Workshop

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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 Office 365 Education plans and pricing page. The navigation bar includes Microsoft, Cloud, Mobility, and Productivity. The main heading is "Office 365 Education plans and pricing". Below the heading, there is a sub-heading "Get Office 365 for your entire school" and a paragraph describing the free trial and discount for qualified academic institutions. A green button labeled "Get started for free" is prominent. At the bottom, a table lists the "Office 365 Education" plan with two rows: "For students: FREE" and "For faculty and staff: FREE". A red arrow points to the "FREE" text in both rows. The table also shows "User maximum" as "Unlimited".

Plan	Price	User maximum
Office 365 Education (For students)	FREE	Unlimited
Office 365 Education (For faculty and staff)	FREE	Unlimited

The screenshot shows the Microsoft Power BI "Bring your data to life" page. The navigation bar includes Microsoft, Power BI, Products, Solutions, Partners, and Learn. The main heading is "Bring your data to life". Below the heading, there is a sub-heading "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." A yellow button labeled "Get started free" is prominent. Two red arrows point to the "Get started free" button. At the bottom, a tablet displays a Power BI dashboard with various charts and tables. The dashboard includes a table with the following data:

Category	Value
Requested Revenue	\$85.22M
Total Invoice	\$2.22M
Discount Savings	\$4.07M

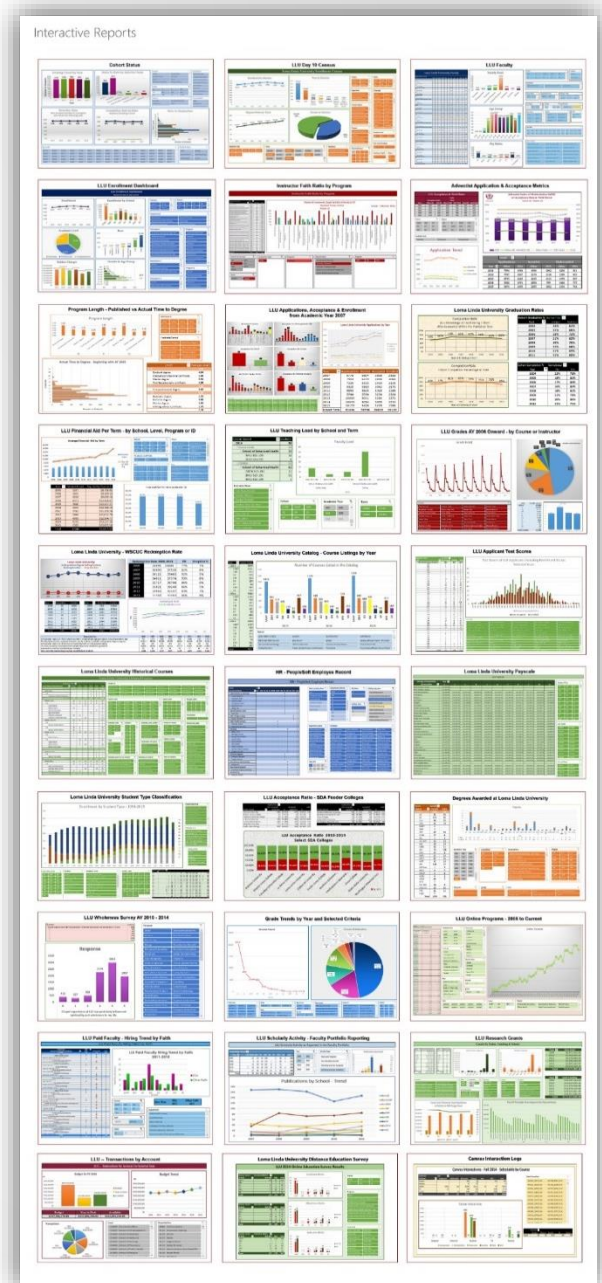
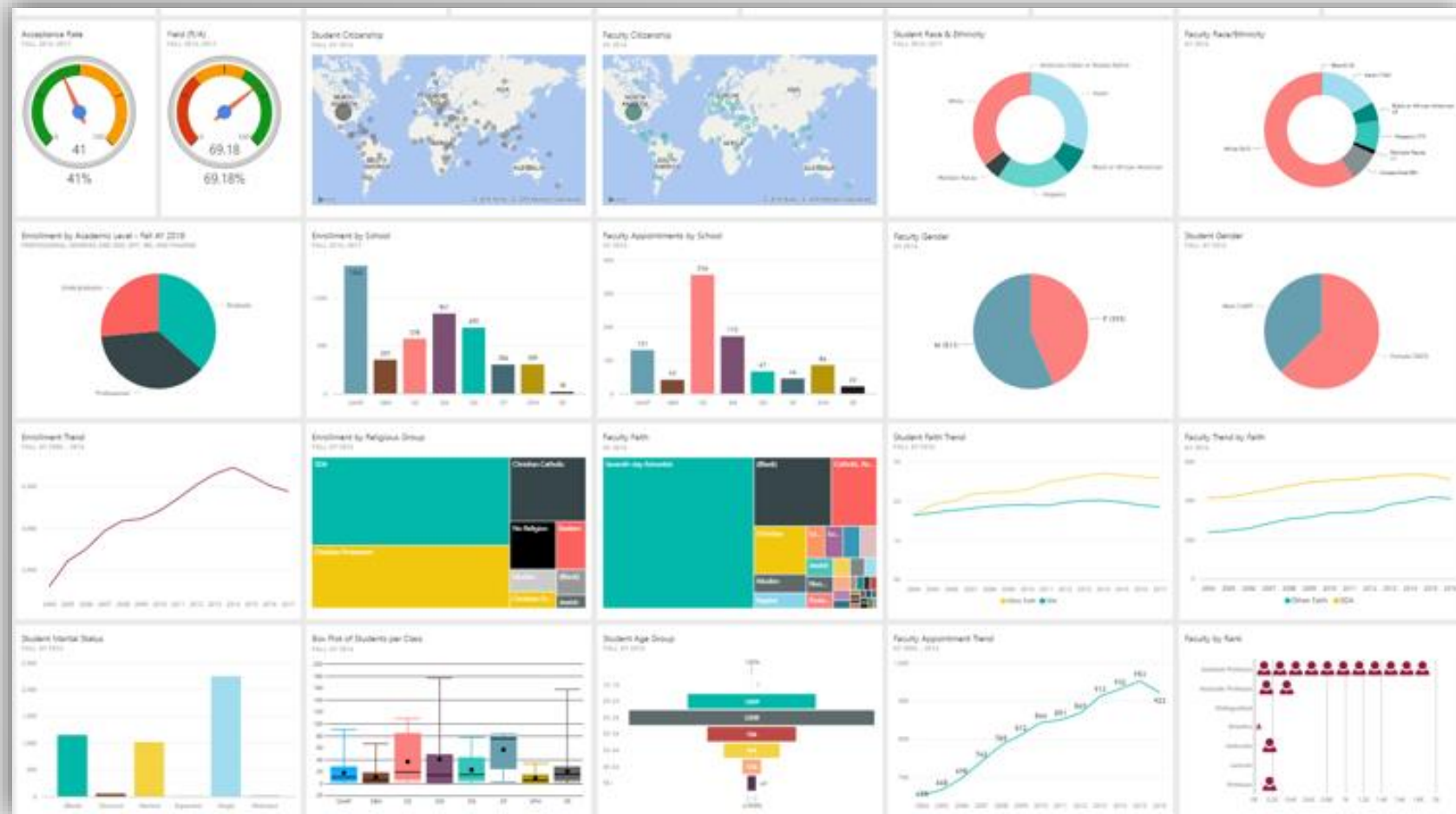
Content for this Workshop

- 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

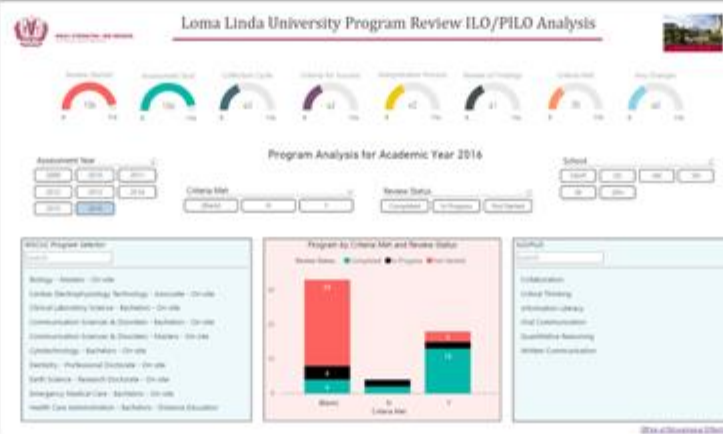


Sample - Program Review Dashboard

Click Here to View the LLU Assessment Guide



Click to View the ILO Reporting Summary



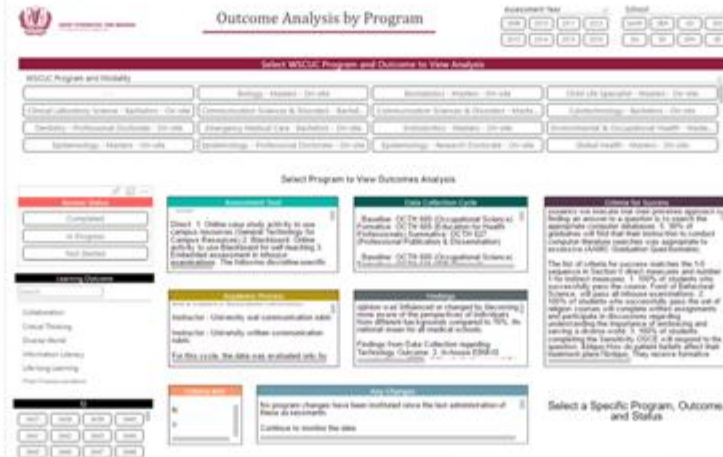
Click to View Detail Analysis



Click to View the Program Status Report



Click to View Outcome Analysis



Click to View the Action Plan Review





MANY STRENGTHS. ONE MISSION.
A Seventh-Day Adventist Organization

Loma Linda University - Program Action Plan Review

Programs Reporting

Action Plans

53

222



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) [More](#)

SD

- 10 DDS, Dentistry

SPH

- 8 MPH, Global Health
- 7 DrPH, Health Policy and Leadership
- 7 MPH, Biostatistics
- 6 DrPH, Preventive Care
- Other (20) [More](#)

SBH

- 7 MS, Counseling
- 6 PhD, Social Policy/Social Research
- 3 MS, Child Life Specialist
- 1 MS, Marital and Family Therapy

SAHP

- 6 BS, Clinical Laboratory Science
- 6 MOT, Occupational Therapy (Entry-Le...)
- 5 AS, Medical Radiography
- 4 BS, Radiation Sciences
- Other (10+) [More](#)

SR

- 2 MSChap, Chaplaincy

Issues, Goals, and Action Plans

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

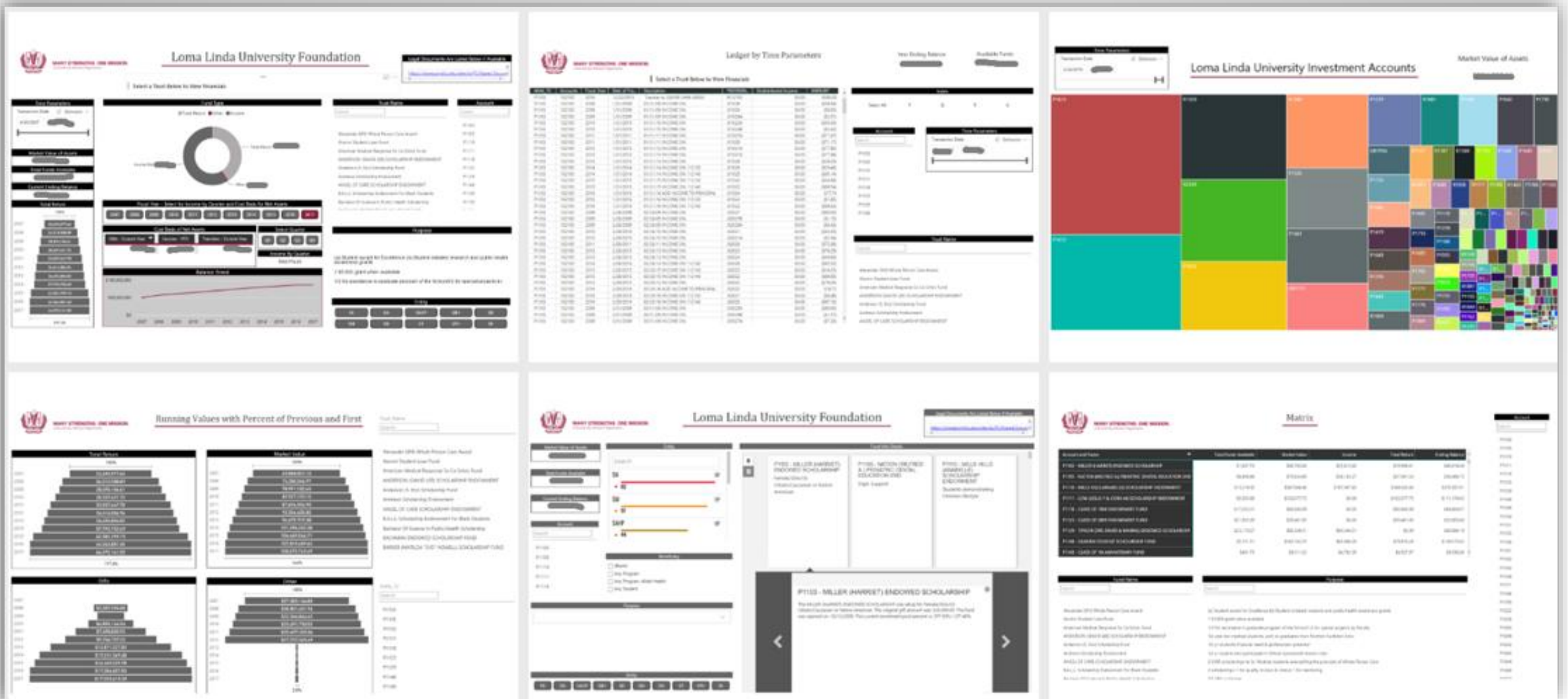
have revised the first PLO. Basic Knowledge has been separated from Technical Ability since the BOC exam is a better tool to assess basic knowledge and the bench records used by clinical faculty is a better tool to assess students' technical ability. A rubric has been developed to assess the second CLS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

BS, Clinical Laboratory Science B

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



Sample - Financial Aid – Funds are Purpose Searchable

The screenshot displays a financial aid management interface with several sections:

- Market Value of Assets:** A box containing a redacted value.
- Total Funds Available:** A box containing a redacted value.
- Current Ending Balance:** A box containing a redacted value.
- Account:** A search box and a list of account numbers: P1103, P1105, P1110, P1111, P1118.
- Entity:** A search box and three filter categories:
 - SN:** 62 (red bar)
 - SM:** 57 (orange bar)
 - SAHP:** 44 (yellow bar)
- Beneficiary:** A list of checkboxes:
 - (Blank)
 - Any Program
 - Any Program, Allied Health
 - Any Student
 - Any Student, Any School
- Purpose:** A dropdown menu with the following selected option:

3.0 GPA or Higher
3rd year student of the entry level Doctor of OT program showing compassion, le
40% for School operating & 30% added back to Principal
- Entity (Bottom):** A row of buttons for different fund types: FA, GA, SAHP, SBH, SD, SM, SN, SP, SPH, SR.
- Fund Info Sheets:** A grid of three fund cards:
 - 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
- Detail View:** A pop-up window for P1164 - CLASS OF 1969 SCHOLARSHIP SN, showing details: "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



LOMA LINDA UNIVERSITY

Loma Linda University Application Metrics

2017
Academic Year

Last Refreshed On: 10/21/2016

Academic Level

- Undergraduate
- Graduate
- Professional

Race/Ethnicity

- Select All
- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic
- Multiple Races
- Native Hawaiian or Other Pacific...
- Unspecified
- White

Program

- AS.Cardiac Electrophysiolog...
- AS.Dental Hygiene
- AS.Medical Radiography
- AS.Physical Therapist Assista...

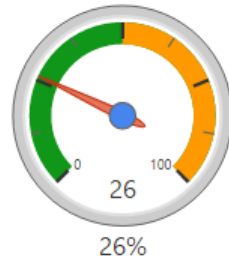
Department

- (Blank)
- Allied Health Studies
- Basic Sciences
- Cardiopulmonary Sciences
- Clinical Laboratory Science
- Communication Sciences and Dis...
- Counseling and Family Science
- Dental Anesthesiology

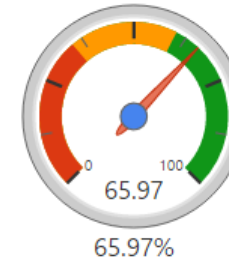
(Blank)

Applications	Accepted	Registered
9,519	2,454	1,619

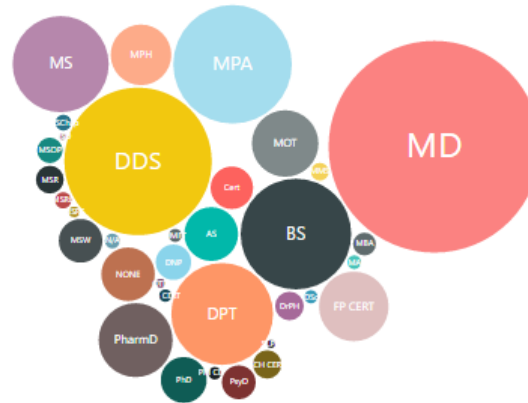
Acceptance Rate



Yield (R/A)



Applications by Degree



Term/Quarter

- 1-Summer
- 2-Autumn
- 3-Winter
- 4-Spring

School Year

- 10-11
- 11-12
- 12-13
- 13-14
- 14-15
- 15-16
- 16-17
- 17-18

School

- SAHP
- SBH
- SD
- SM
- SN
- SP
- SPH
- SR

Degree Abbreviation

- AS
- MSChap
- BS
- MSD
- Cert
- MSOP
- DDS
- MSR
- DMFT
- MSRC

Gender

- F
- M
- N

Faith

- Other Faith
- SDA

Campus

- (Blank)
- Off-Palm ...
- LL
- Off-Puert...

Application Trend



Acceptance Rate Trend



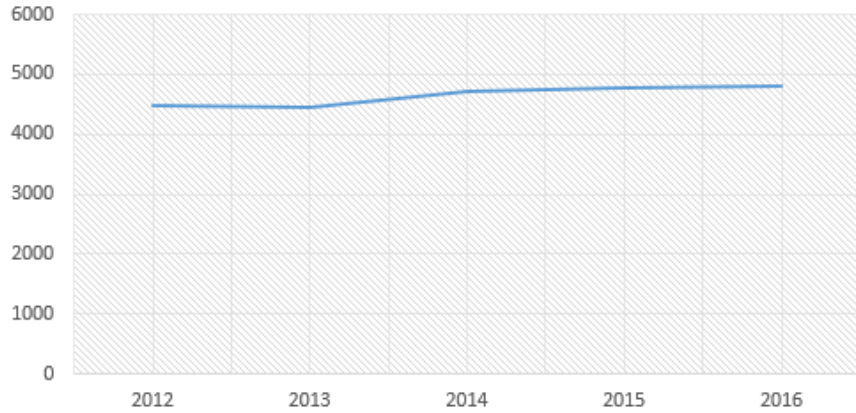
Yield Trend



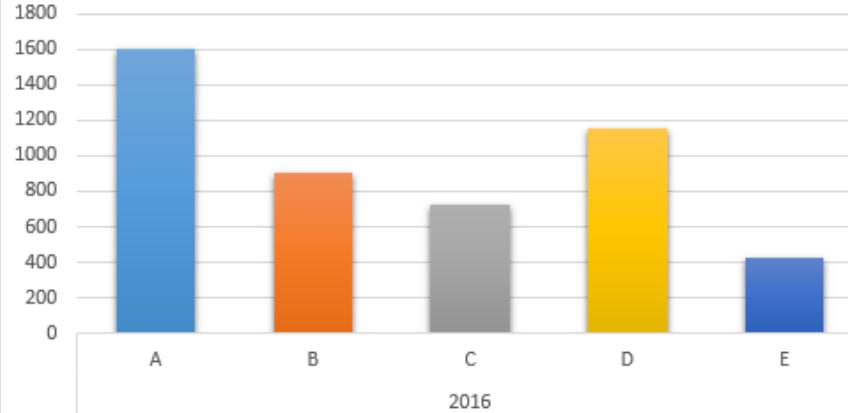
Today's Dashboard - Excel Power Pivot Example

Alphabet University Enrollment

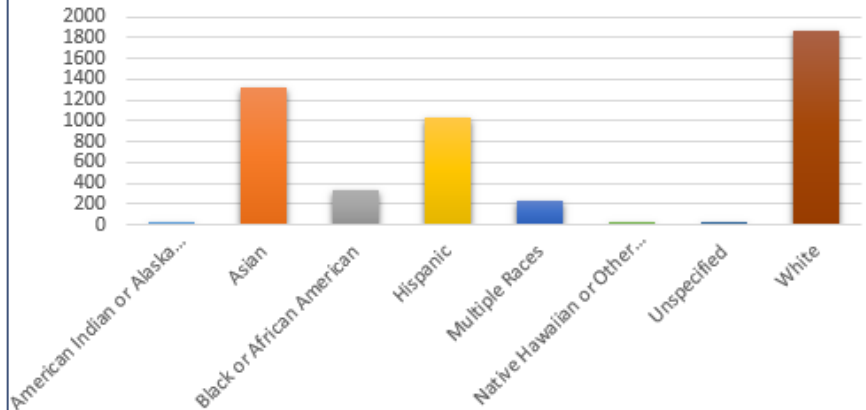
Enrollment Trend



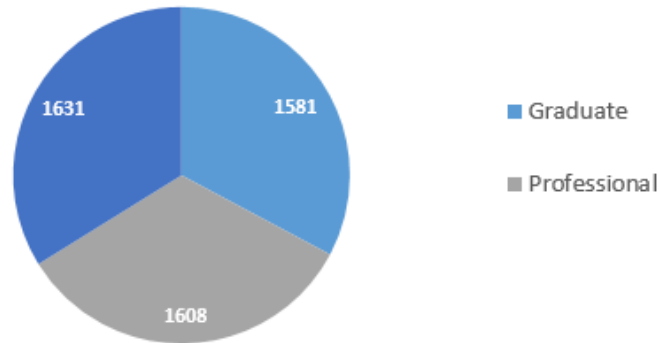
School Enrollment by Selected Year



Race/Ethnicity



Academic Level



Academic Year



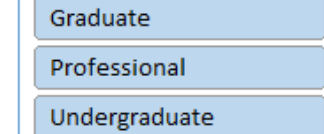
Quarter



School



Academic Level



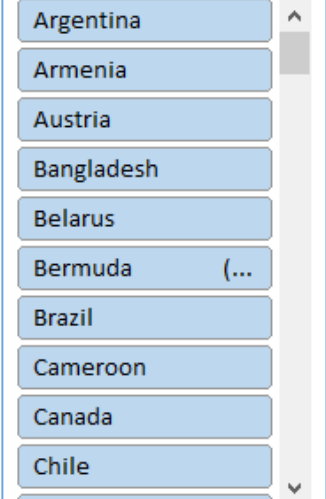
Degree



Gender



Citizenship

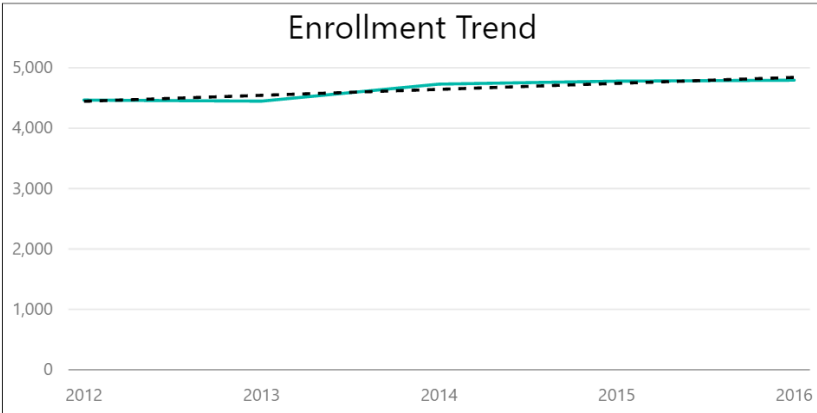


Today's Dashboard - Power BI Example

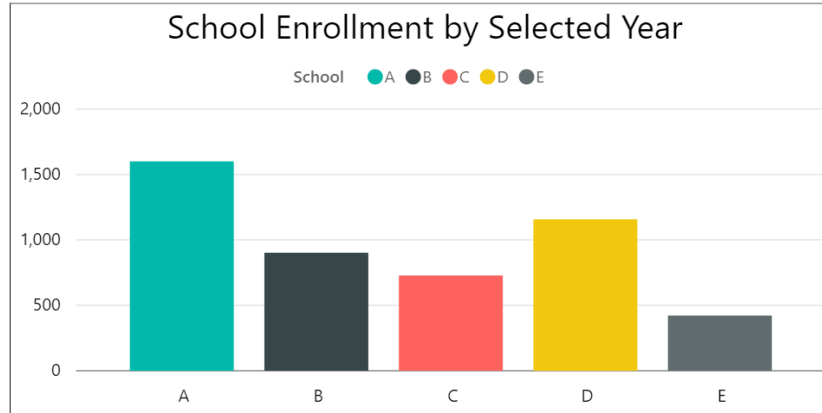
Alphabet University Enrollment

Selected Students = 4794

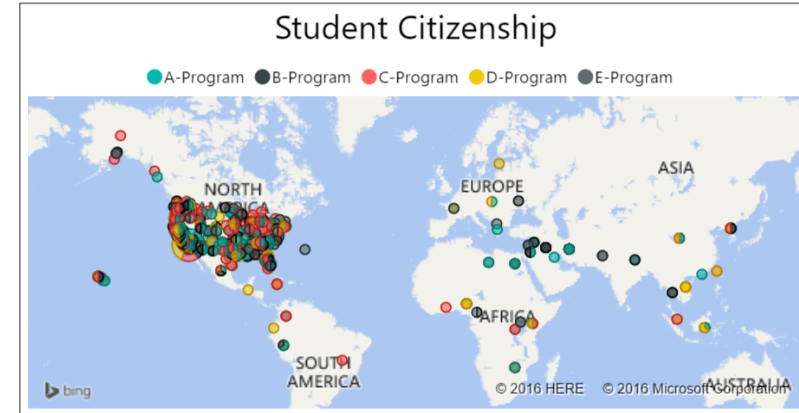
Enrollment Trend



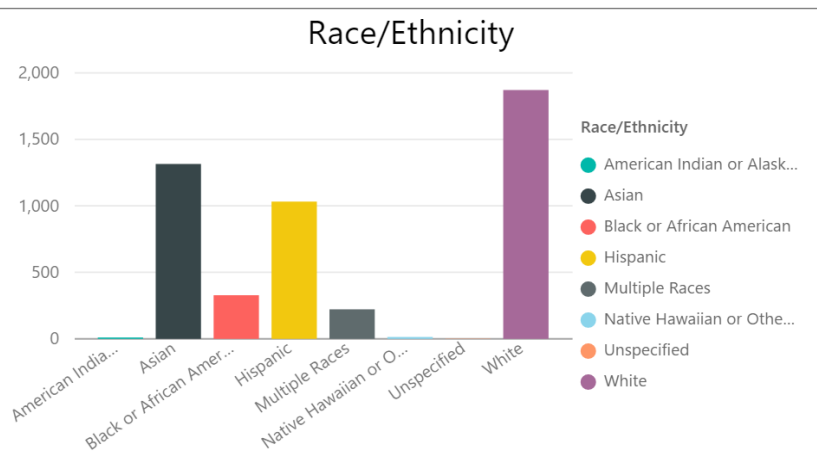
School Enrollment by Selected Year



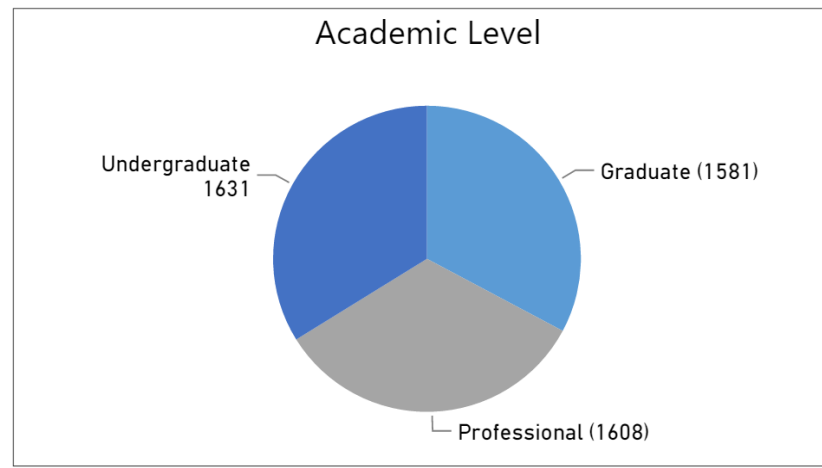
Student Citizenship



Race/Ethnicity



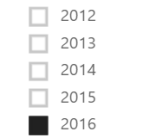
Academic Level



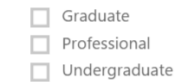
School



Academic Year



Academic Level



Degree



Gender



Quarter



Citizenship

- Argentina
- Armenia
- Austria
- Bangladesh
- Belarus
- Bermuda (UK)
- Brazil
- Cameroon

Based on an Underlying Data Model

The image shows the Microsoft Excel interface with the Power Pivot ribbon selected. The ribbon includes tabs for File, Home, Design, and Advanced. The Advanced tab is active, showing options for Data Type, Format, Sort and Filter, Find, Calculations, and View. Below the ribbon, a data table is displayed with the following columns: Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, and Program (partially visible). The table contains 24 rows of data, all from San Bernardino, CA, United States, with various status and school information.

	Student ID	Academic Year	Quarter	County	State	Country	Status	School	Academic Level	Prog
1	166959633072710	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
2	167812269210776	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
3	169749814917892	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
4	170298791620710	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
5	166174890255015	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
6	167432699716314	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
7	168265749969900	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
8	168437278001200	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
9	171996573474750	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
10	168677177127920	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
11	168435826798368	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
12	168940323967802	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
13	169948245442944	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
14	170353612104192	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
15	170846954914500	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
16	169036090380067	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
17	170386130628262	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
18	170036919576615	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
19	170843842524044	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
20	171314844080162	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
21	171380064314546	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
22	166774263149075	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr
23	168168665421064	2012		San Bernardino	CA	United States	FT	E	Graduate	E-Pr
24	168706205124010	2012		San Bernardino	CA	United States	PT	E	Graduate	E-Pr

Let's Start by Opening Excel

The image shows a screenshot of the Microsoft Excel interface. The ribbon is set to the 'Power Pivot' tab. A callout box labeled 'Select Manage' points to the 'Manage' button in the ribbon. Another callout box labeled 'Select Power Pivot' points to the 'Power Pivot' tab itself. In the bottom right corner, the 'COM Add-ins' dialog box is open, with 'Microsoft Power Pivot for Excel' selected and checked. A callout box labeled 'Make sure Power Pivot has been enabled!' points to this selection. The dialog box also shows other add-ins like 'Acrobat PDFMaker Office COM Addin', 'Inquire', 'Microsoft Power BI Publisher for Excel', 'Microsoft Power Map for Excel', 'PDF Converter 8 ExcelAddin', 'Power View', and 'TableauPowerPivotConnector'. The 'Location' is 'C:\Program Files\Microsoft Office\Root\Office16\ADDINS\PowerPivot Excel Add-in\PowerPivotExc...' and the 'Load Behavior' is 'Load at Startup'.

Select Manage

Select Power Pivot

Make sure Power Pivot has been enabled!

COM Add-ins

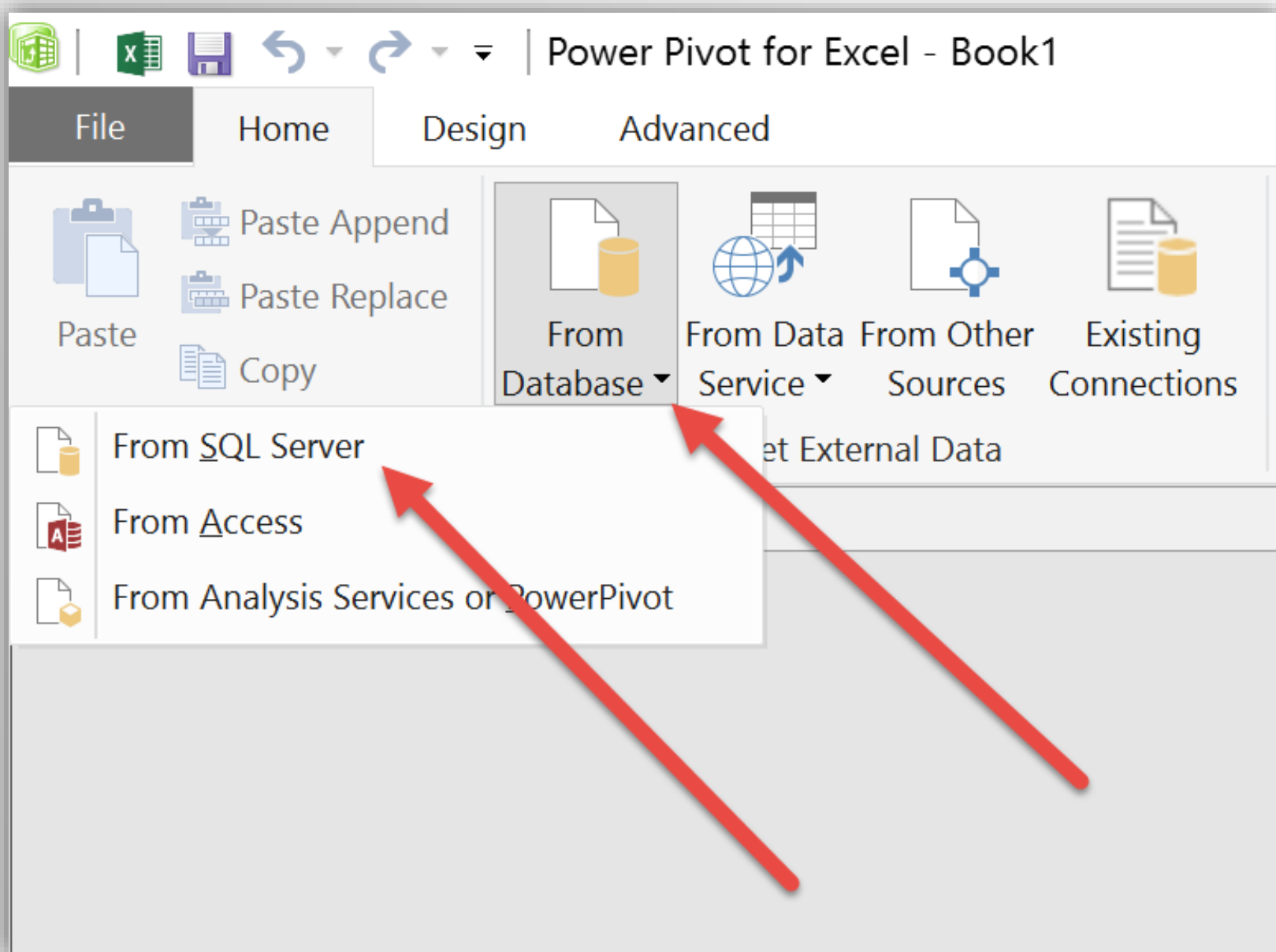
Add-ins available:

- 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

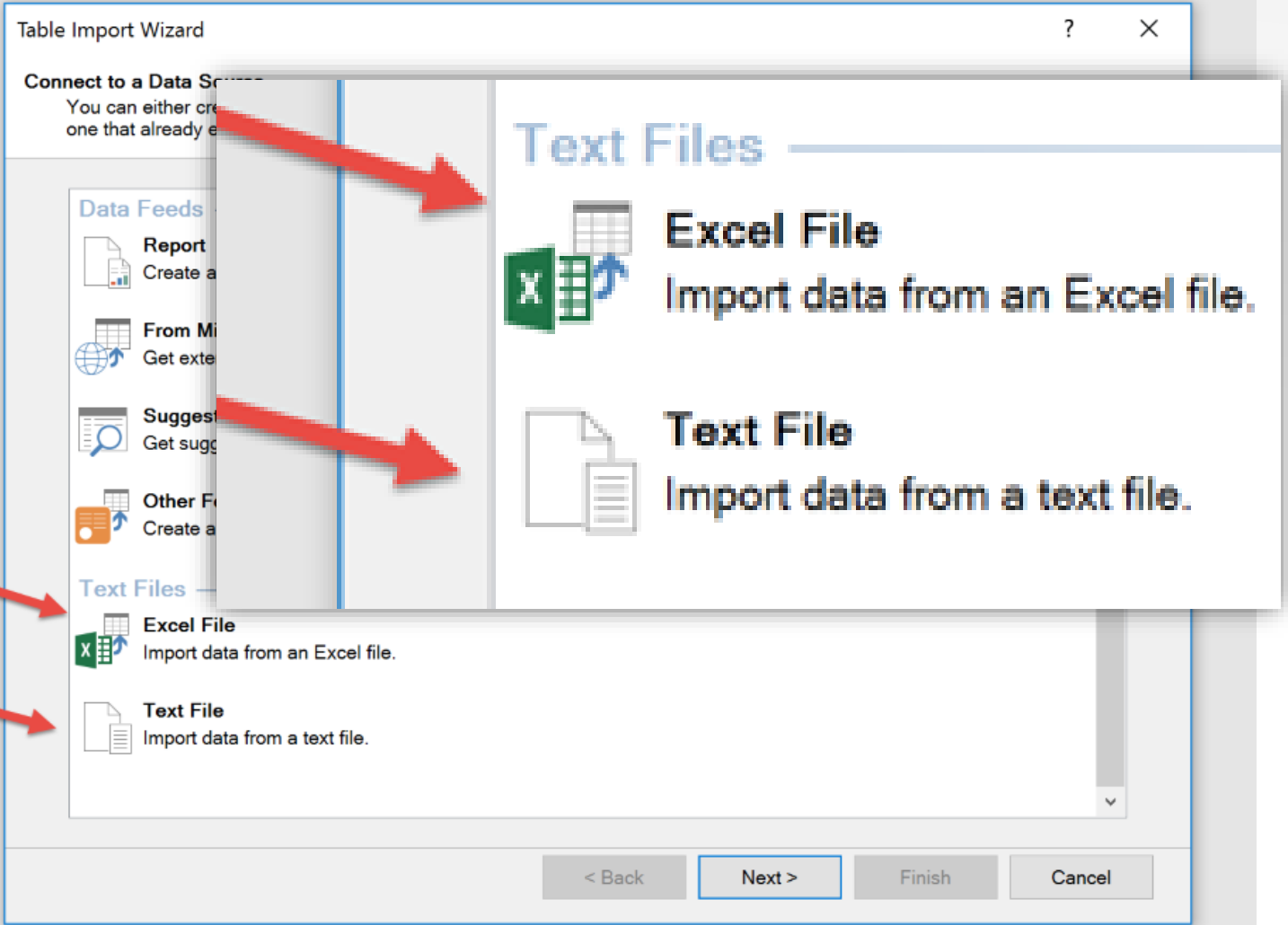
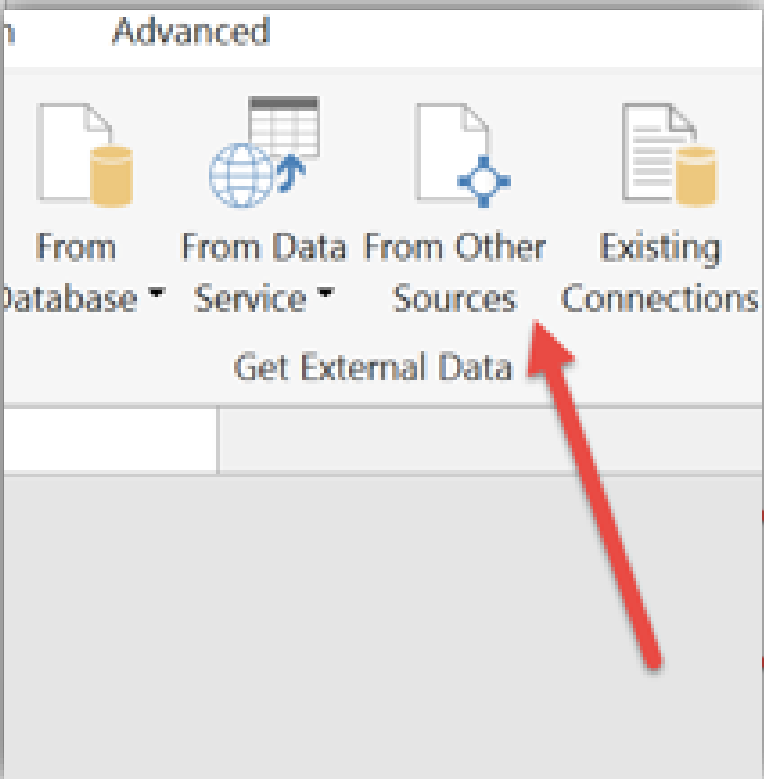
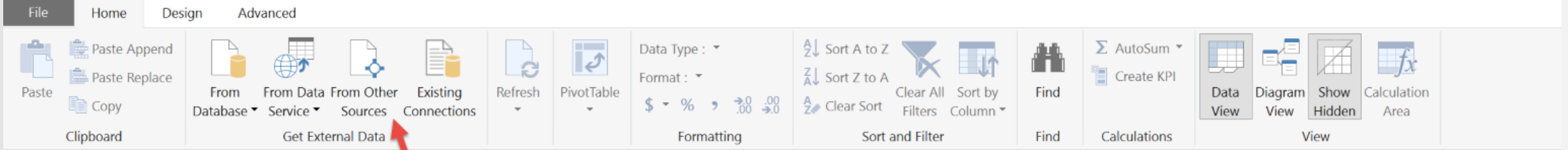


Table Import Wizard

Connect to a Microsoft Excel File

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

Friendly connection name:

Excel File Path:

Browse...

Use first row as column headers.

Open



« PowerPivot » CAIR presentation

Search CAIR pres

New folder

Name

Date modified

Dataset Census.xlsx

10/18/2016 10:11

Dataset Demographics.xlsx

10/18/2016 10:04

(C:)

File name:

Microsoft Office

Open

Name



Dataset Census.xlsx



Dataset Demographics.xlsx

< Back

Next >

Finish

Cancel

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:

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



Select Related Tables

Preview & Filter

< Back

Next >

Finish

Cancel

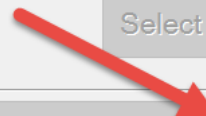


Table Import Wizard



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
✓ Census	Success. 70,608 rows transferred.	



We have successfully imported the data file



Stop Import

Close

Repeat Steps to Import the 2nd Data File

The screenshot displays the Microsoft Excel interface with the 'Table Import Wizard' dialog box open. The background shows a data table with the following columns: Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, and Zip Code. The 'Table Import Wizard' dialog box is titled 'Table Import Wizard' and has a close button (X) in the top right corner. It contains the following sections:

- 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**: Create a connection to a Microsoft Reporting Services Report. Import data from the feed.
 - From Microsoft Azure Marketplace**: Get external data from Microsoft Azure Marketplace.
 - Suggest Related Data**: Get suggestions of external data.
 - Other Feeds**: Create a connection to a data feed. Import data from the feed.
- Text Files**:
 - Excel File**: Import data from an Excel file. (This option is selected and highlighted in blue.)
 - Text File**: Import data from a text file.

At the bottom of the dialog box, there are four buttons: '< Back', 'Next >', 'Finish', and 'Cancel'. The 'Next >' button is highlighted with a red arrow. Another red arrow points to the 'From Other Sources' button in the 'Get External Data' group of the Excel ribbon. A third red arrow points to the 'Excel File' option in the 'Text Files' section. A fourth red arrow points to the 'Census' cell in the bottom-left corner of the spreadsheet.

	Student ID	Academic Year	Quarter	County	State	Country	Status	School	Academic Level	Program	Degree	Zip Code	Add Column
1	1669596330...	2012	4	San Bern...	CA	United St							
2	1678122692...	2012	4	San Bern...	CA	United St							
3	1697498149...	2012	4	San Bern...	CA	United St							
4	1702987916...	2012	4	San Bern...	CA	United St							
5	1661748902...	2012	4	San Bern...	CA	United St							
6	1674326997...	2012	4	San Bern...	CA	United St							
7	1682657499...	2012	4	San Bern...	CA	United St							
8	1684372780...	2012	4	San Bern...	CA	United St							
9	1719965734...	2012	4	San Bern...	CA	United St							
10	1686771771...	2012	4	San Bern...	CA	United St							
11	1684358267...	2012	4	San Bern...	CA	United St							
12	1689403239...	2012	4	San Bern...	CA	United St							
13	1699482454...	2012	4	San Bern...	CA	United St							
14	1703536121...	2012	4	San Bern...	CA	United St							
15	1708469549...	2012	4	San Bern...	CA	United St							
16	1690360903...	2012	4	San Bern...	CA	United St							
17	1703861306...	2012	4	San Bern...	CA	United St							
18	1700369195...	2012	4	San Bern...	CA	United St							
19	1708438425...	2012	4	San Bern...	CA	United St							
20	1713148440...	2012	4	San Bern...	CA	United St							
21	1713800643...	2012	4	San Bern...	CA	United St							
22	1667742631	2012	4	San Bern...	CA	United St							

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.

Open

« PowerPivot » CAIR presentation

Organize New folder

Name	Date modified
Dataset Census.xlsx	10/18/2016 10:11
Dataset Demographics.xlsx	10/18/2016 10:04

File name: Microsoft Office E

Name

Dataset Census.xlsx
Dataset Demographics.xlsx

Student ID	Age Group	Birth Country	Citizenship	Race_Ethnicity	Gender
1	20-24	United States	United States	White	Female
2	20-24	United States	United States	White	Female
3	20-24	United States	United States	White	Female
4	20-24	United States	United States	White	Female
5	20-24	United States	United States	White	Female
6	20-24	United States	United States	White	Female
7	20-24	United States	United States	White	Female
8	20-24	United States	United States	White	Female
9	20-24	United States	United States	White	Female
10	20-24	United States	United States	White	Female
11	20-24	United States	United States	White	Female
12	20-24	United States	United States	White	Female
13	20-24	United States	United States	White	Female
14	20-24	United States	United States	White	Female
15	20-24	United States	United States	White	Female
16	20-24	United States	United States	White	Female
17	20-24	United States	United States	White	Female
18	20-24	United States	United States	White	Female
19	20-24	United States	United States	White	Female
20	20-24	United States	United States	White	Female
21	20-24	United States	United States	White	Female
22	20-24	United States	United States	White	Female

We have now imported two datasets:

- Census
- Demographics

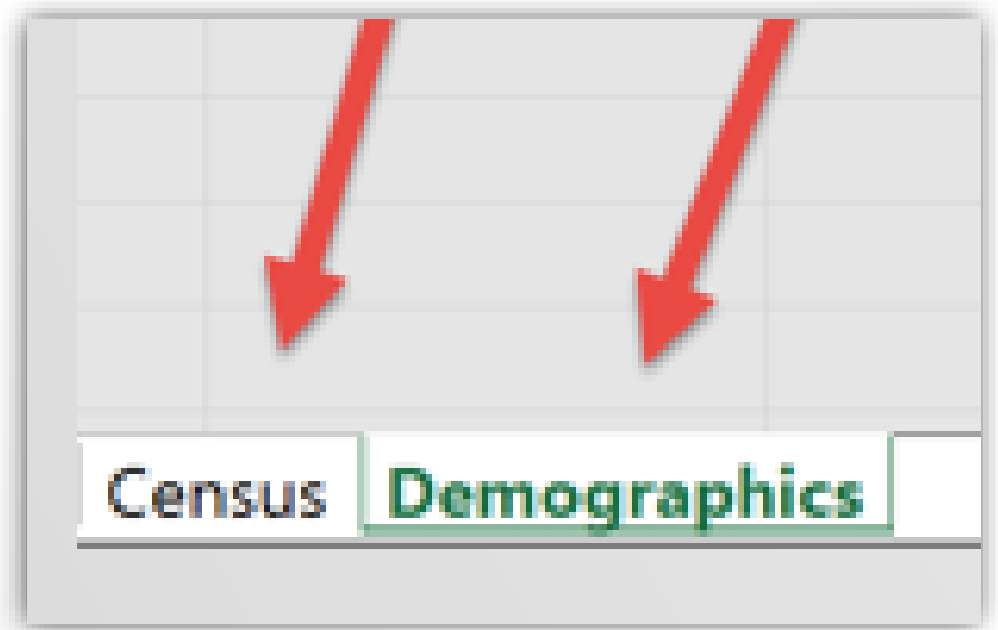


Table Joins

Power Pivot for Excel - Book1

File Home Design Advanced

Paste Append Paste Replace Copy Clipboard

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

Get External Data

Data Type: Format: \$ % , .00 .00

Sort A to Z Sort Z to A Clear Sort Clear All Filters Sort by Column Find Find AutoSum Create KPI

Calculations

Data View Diagram View Show Hidden

View

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

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

Census
Student ID 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

Census

Student ID

Academic Year

Quarter

County

State

Country

Status

School

Academic Level

Program

Degree

Zip Code

Demographics

Student ID

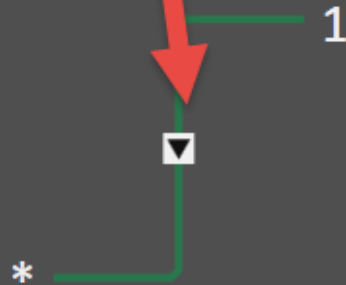
Age Group

Birth Country

Citizenship

Race_Ethnicity

Gender



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

Adding a New Column

am	Degree	Zip Code	<i>Race/Ethnicity</i>
am	MS	92354	
am	MS	92354	
am	MS	92354	
am	MS	92354	

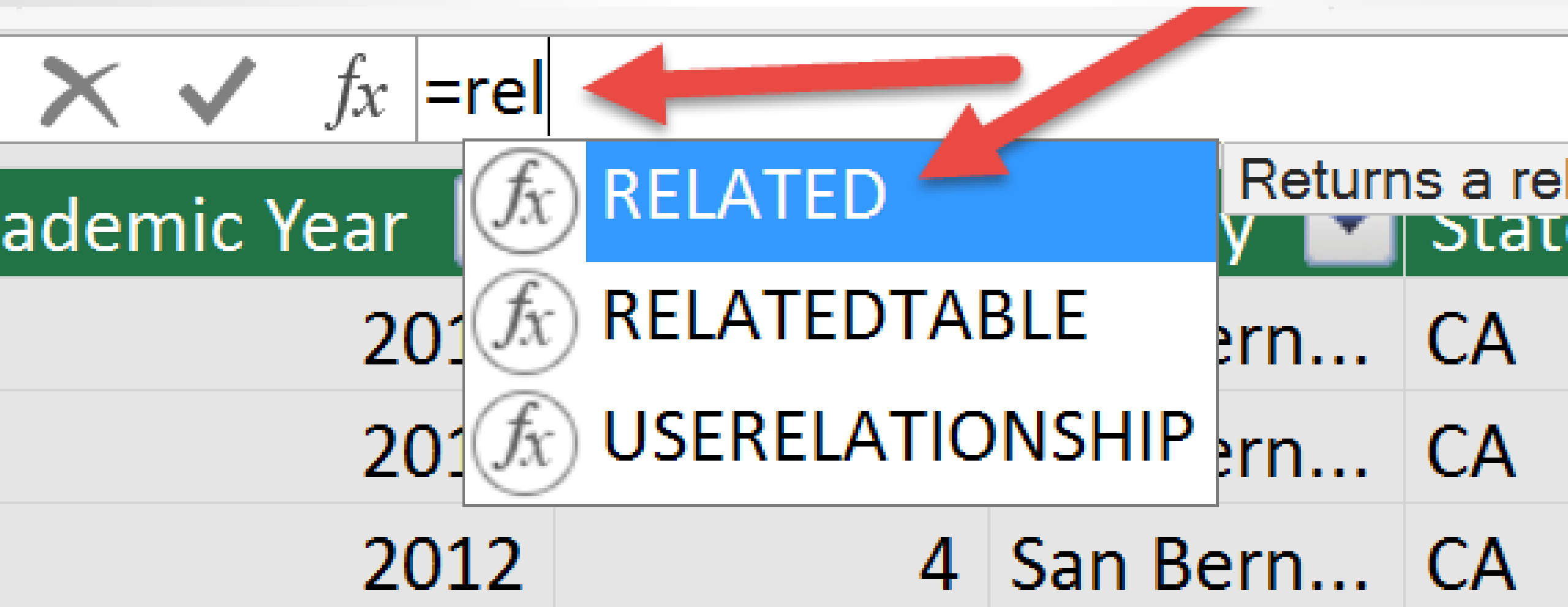


Let's add a column to our census table based on a column from the demographics table

Introducing Data Analysis Expressions – DAX

Powerful language for Power Pivot and Power BI

When we start to type suggestions are displayed



The image shows a close-up of the Excel formula bar. The formula bar contains the text '=rel'. A dropdown menu is open, displaying three function suggestions: 'RELATED', 'RELATEDTABLE', and 'USERELATIONSHIP'. The 'RELATED' function is highlighted in blue. A red arrow points from the text 'When we start to type suggestions are displayed' to the dropdown menu. Another red arrow points from the top right towards the 'RELATED' function in the dropdown.

academic Year	Stat
201	ern... CA
201	ern... CA
2012	4 San Bern... CA



=RELATED(



RELATED(ColumnName)

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

- Demographics[Age Group]
- Demographics[Birth Country]
- Demographics[Citizenship]
- Demographics[Gender]
- Demographics[Race_Ethnicity]
- Demographics[Student ID]



Complete DAX Formula

=RELATED(Demographics[Race_Ethnicity])

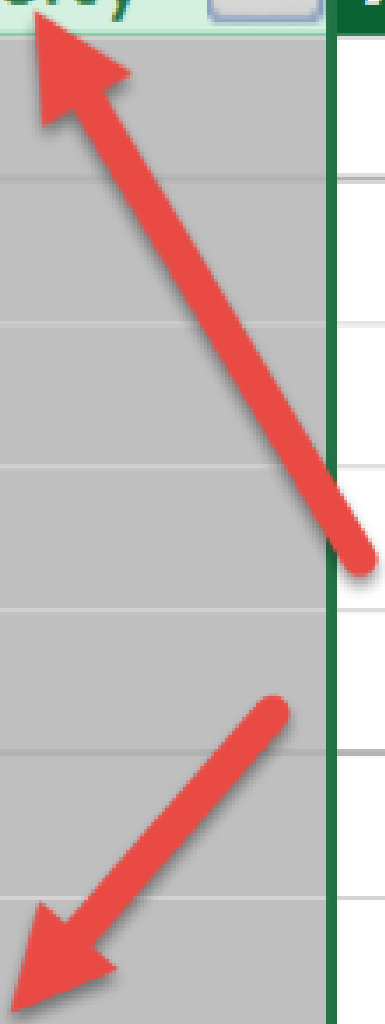
Get External Data

fx =RELATED(Demographics[Race_Ethnicity])

demomic Year	Quarter	County	State	Country	Stat
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	Ac
MS	92373	White	
MS	92373	White	
MS	92373	White	
MS	92373	Hispanic	
MS	92373	Hispanic	
MS	92373	Hispanic	
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 displays an Excel PivotTable with a slicer for the 'County' field. The PivotTable is structured as follows:

Row Labels	County
95928	(blank)
95938	Alameda
95954	Amador
95965	Butte
95966	Calaveras
95967	Contra Costa
95969	Del Norte
95973	El Dorado
Grand Total	

The PivotTable Fields task pane on the right shows the following configuration:

- Active | All
- Choose fields to add to report:
- Search
- Demographics
 - County
 - State
 - Country
 - Status
 - School
 - Academic Level
 - Program
 - Degree
 - Zip Code
 - Race/Ethnicity
- Drag fields between areas below:
- Filters
- Rows
 - Zip Code

Building the Dashboard

File Home Design Advanced

Paste Append
Paste Replace
Copy

Clipboard

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

Get External Data

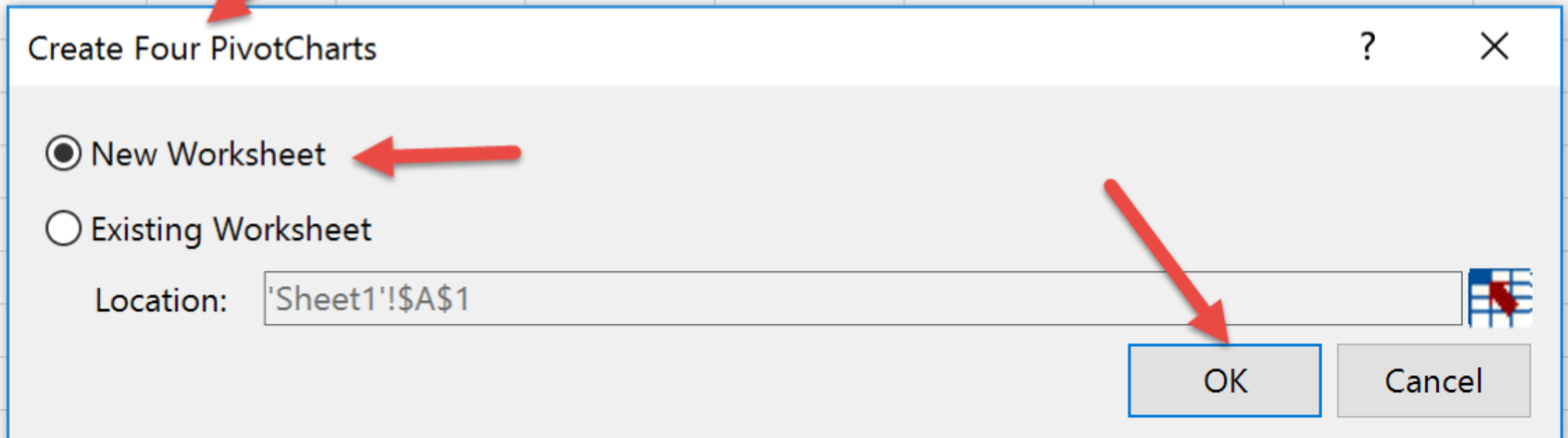
Data Type :
Format :
\$ % , .00 .00

Formatting

	[Student ID]						
	Student ID	Age Group	Birth Country			nicity	Gender
1	7856461041...	20-24	United States				Female
2	7929833041...	20-24	United States				Female
3	1685401477...	20-24	United States				Female
4	1700807900...	20-24	United States				Female
5	1701443053...	20-24	United States				Female
6	1701836563...	20-24	United States				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

- PivotTable
- PivotChart
- Chart and Table (Horizontal)
- Chart and Table (Vertical)
- Two Charts (Horizontal)
- Two Charts (Vertical)
- Four Charts
- Flattened PivotTable

Selecting the Location for Charts



Selecting Content for Chart

The image illustrates the process of selecting content for a chart in Microsoft Excel. It shows the PivotChart Field List task pane on the right and the PivotChart interface in the center. Red arrows indicate the flow of data selection from the field list to the chart's legend and values areas.

PivotChart Field List (Right):

- Active: All
- Choose fields to add to report:
- Search: [Search]
- Fields: Census, Demographics

PivotChart Interface (Center):

Drag fields between areas below:

- Filters
- Legend (Ser...)
- Axis (Categ...)
- Σ Values

Field List (Bottom Left):

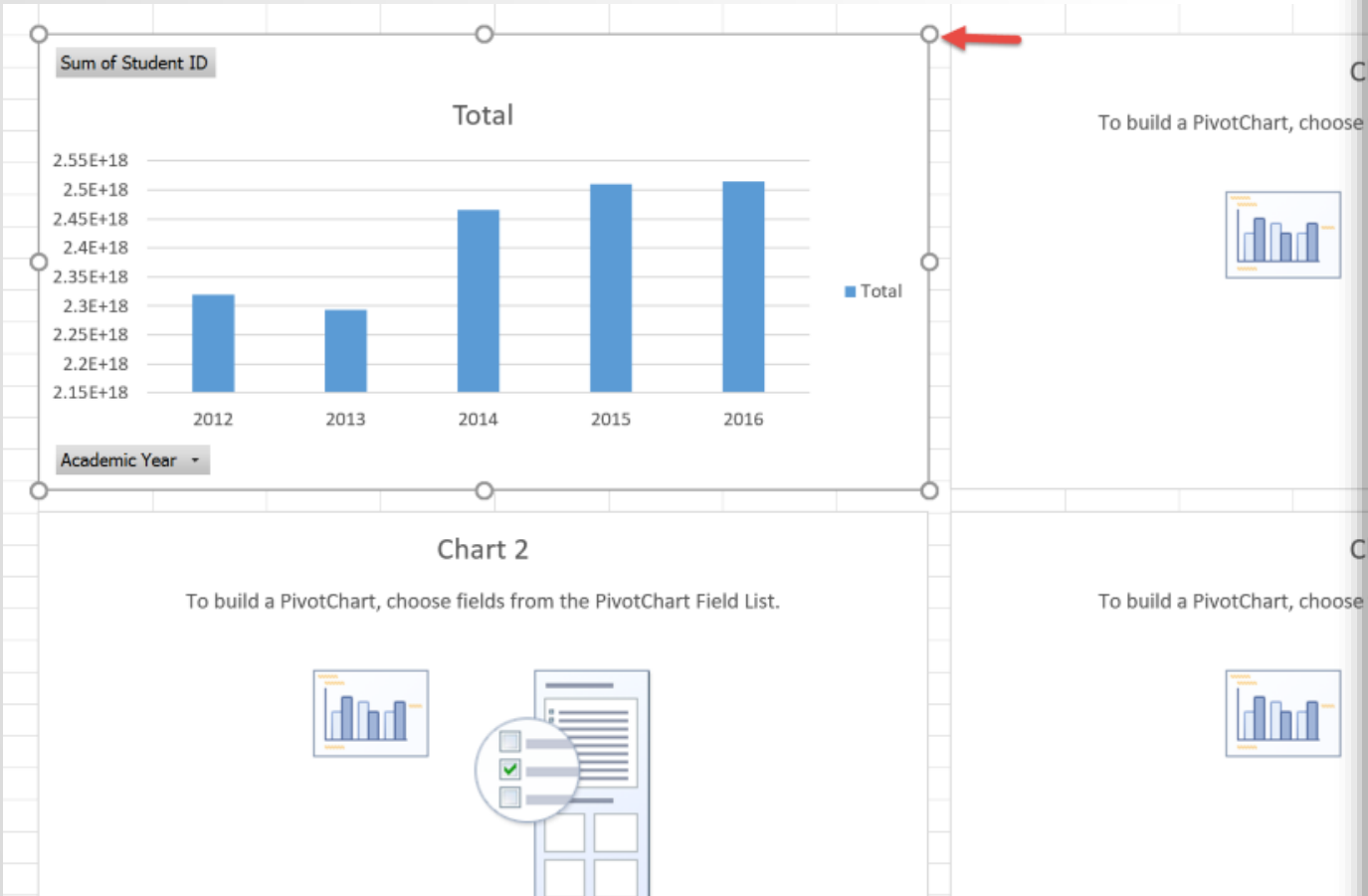
- Census
- Demographics

Chart Area (Top Left):

Chart 1

To build a PivotChart, choose fields from the PivotChart Field List.

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



The screenshot shows the PivotTable Field List task pane. The fields 'Student ID' and 'Academic Year' are checked and selected. The 'Values' area contains 'Sum of Student ID' and the 'Axis (Columns)' area contains 'Academic Year'. Red arrows point to the 'Student ID' and 'Academic Year' checkboxes, and to the 'Axis (Columns)' and 'Values' areas.

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

Drag fields between areas below:

Filters	Legend (Series)
Axis (Columns)	Σ Values
Academic...	Sum of St...

This is another view of the PivotTable Field List task pane, showing the same configuration as the previous one. Red arrows point to the 'Student ID' and 'Academic Year' checkboxes, and to the 'Axis (Columns)' and 'Values' areas.

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

Drag fields between areas below:

Filters	Legend (Series)
Axis (Columns)	Σ Values
Academic...	Sum of St...

Y Move to Report Filter

≡ Move to Axis Fields (Categories)

▮ Move to Legend Fields (Series)

Σ Move to Values

Hide Value Field Buttons on Chart

Hide All Field Buttons on Chart

X Remove Field

Value Field Settings...

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...)

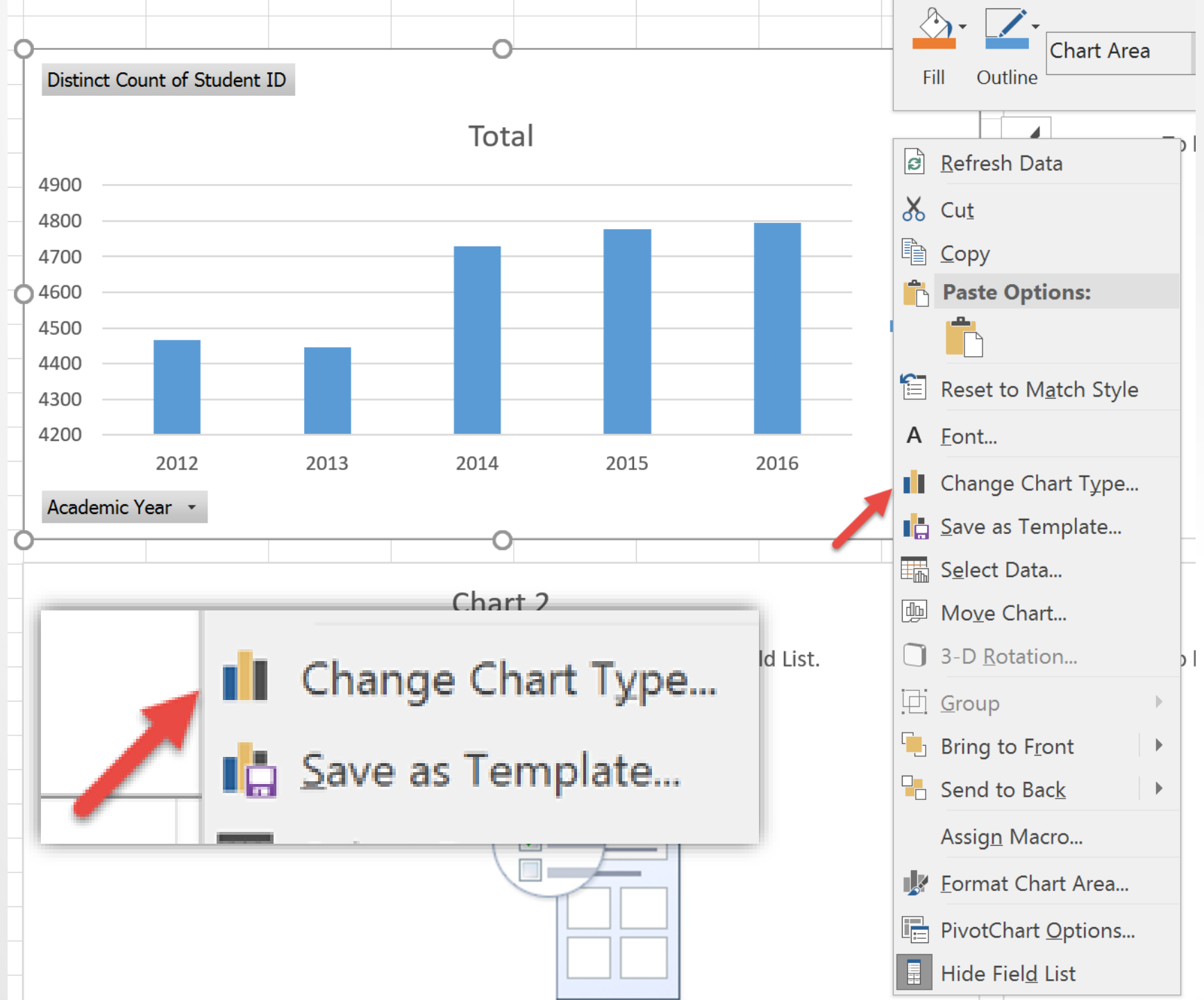
Axis (Categ...)

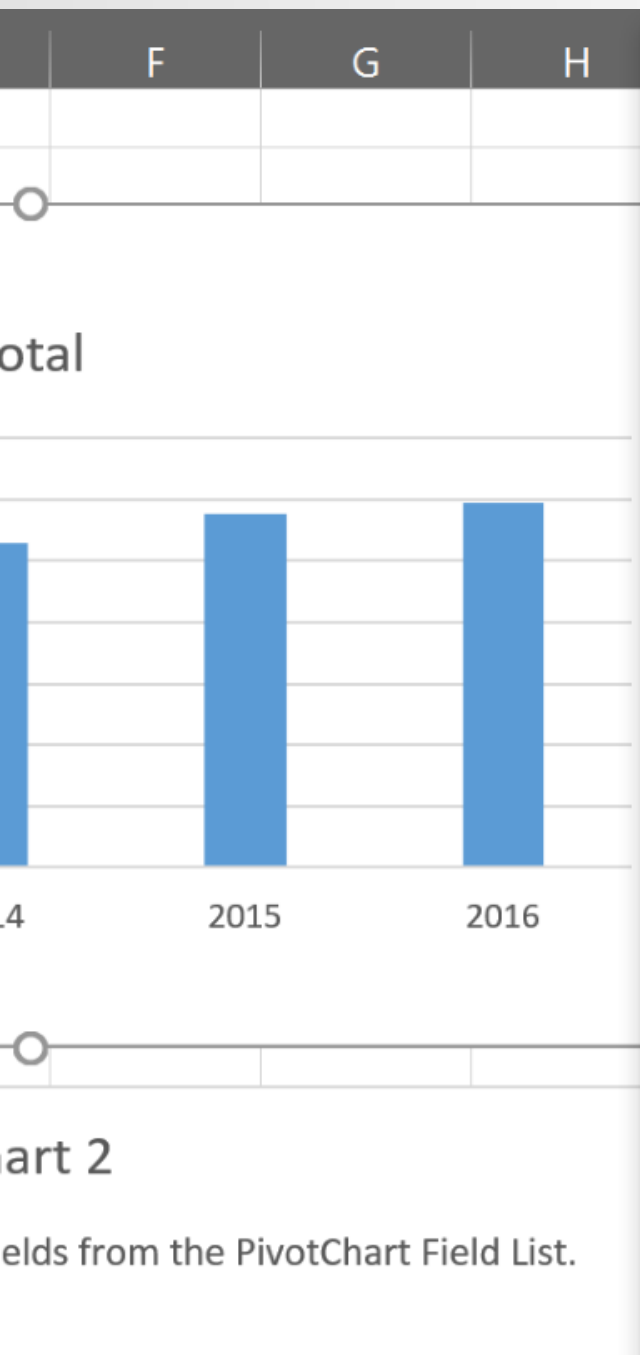
Values

Academic... ▾

Sum of St... ▾

For this display it would be nice to use a line chart instead of a bar chart





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

Year	Total
2012	~4450
2013	~4450
2014	~4750

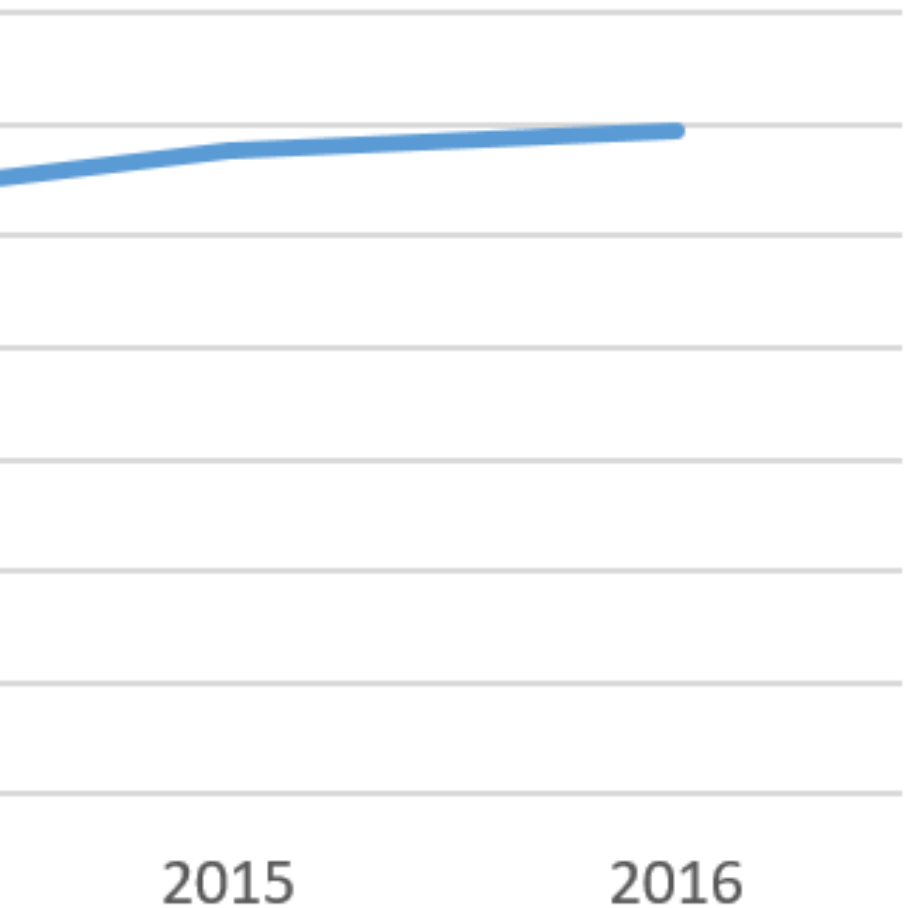
Column

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 ▾

Series "Total" 1 ▾

Fill Outline

Delete

Reset to Match Style

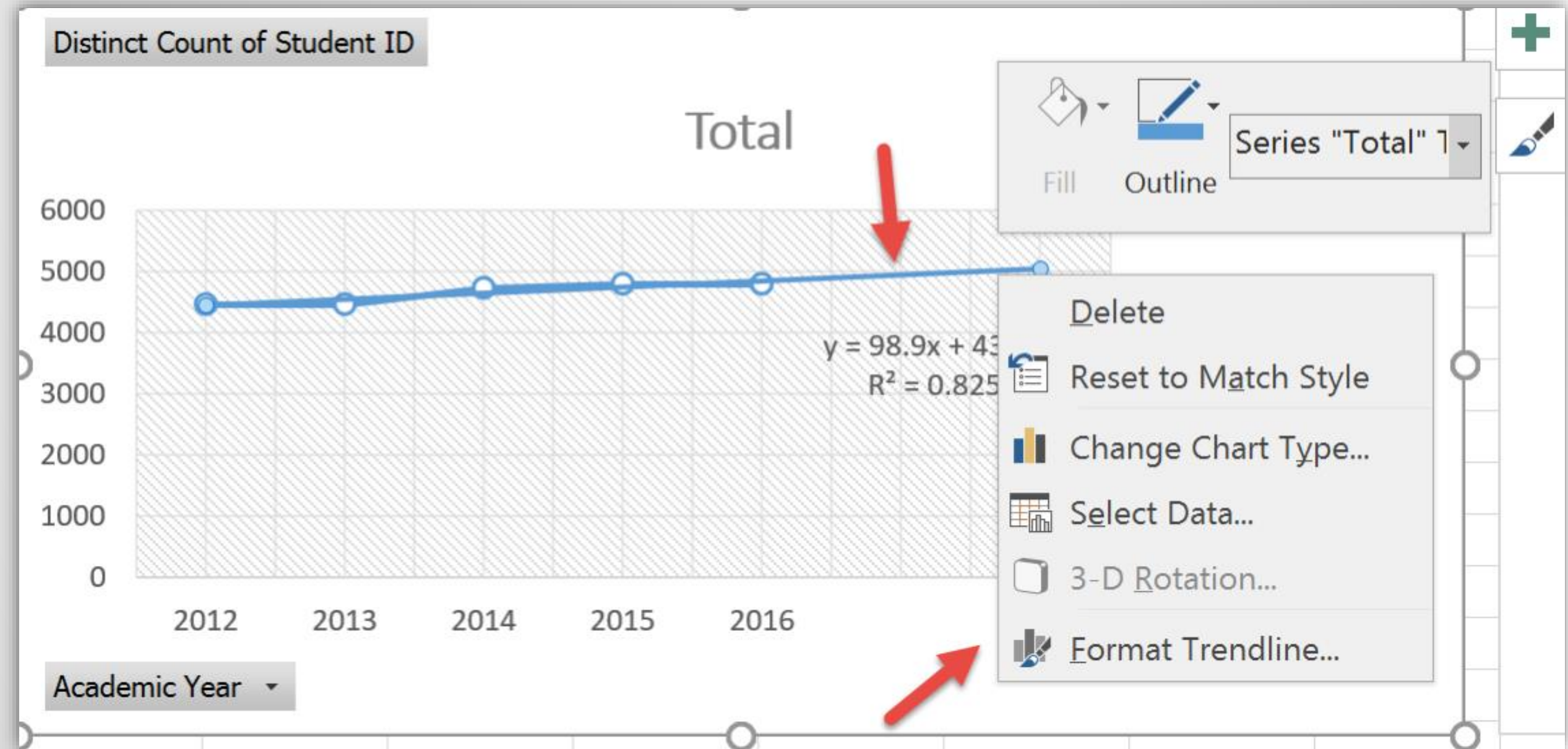
Change Chart Type...

Select Data...

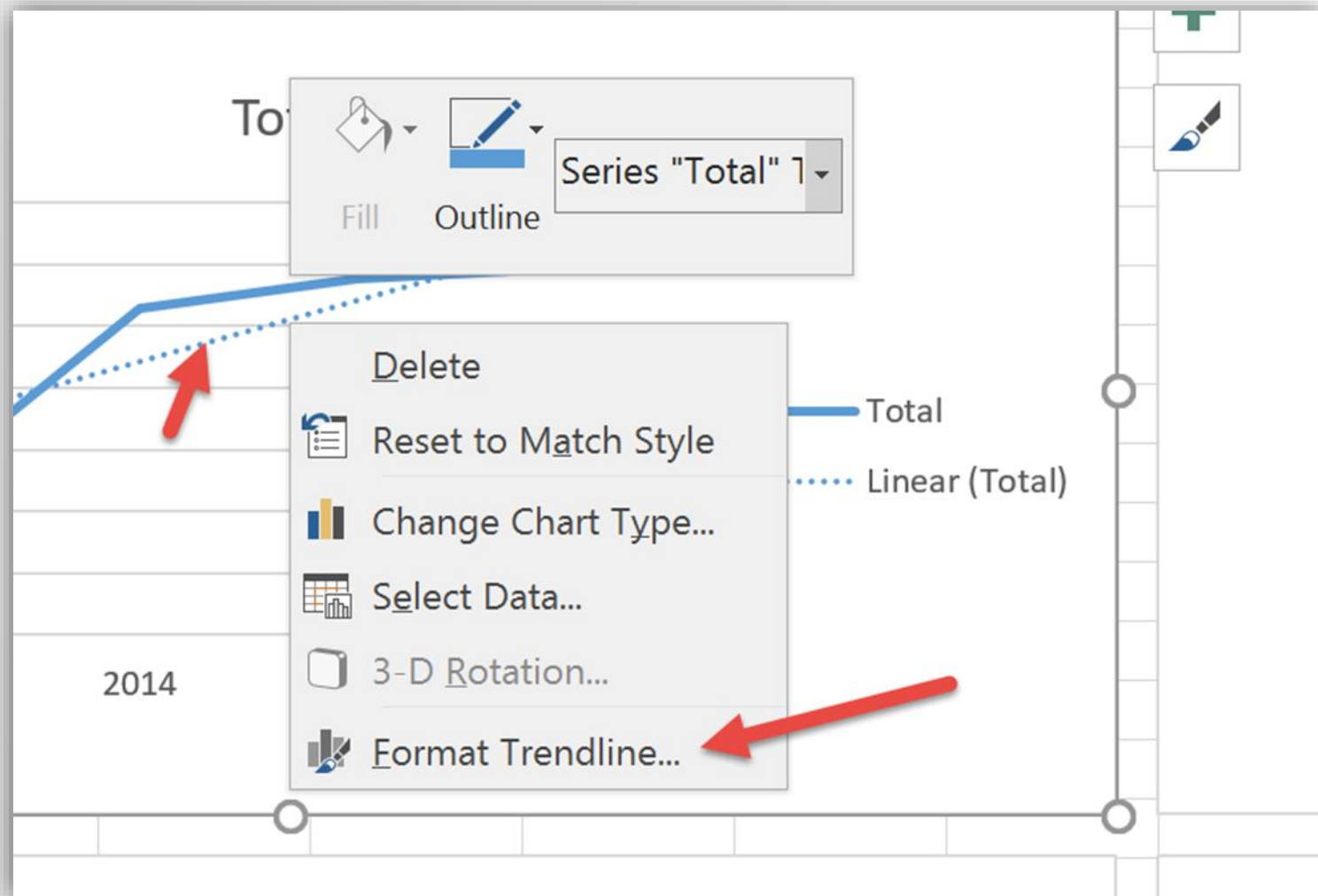
3-D Rotation...

Format Trendline...

$$y = 98.9x + 43$$
$$R^2 = 0.825$$



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



The "Format Trendline..." task pane is shown with the following settings:

- Trendline Options:**
 - No line
 - Solid line
 - Gradient line
 - Automatic
- Line:**
 - Color: [Color Picker]
 - Transparency: 0%
 - Width: 1.5 pt
 - Compound type: [Solid Line]
 - Dash type: [None]
 - Cap type: Round
 - Join type: Round
 - Begin Arrow type: [None]
 - Begin Arrow size: [None]
 - End Arrow type: [None]
 - End Arrow size: [None]

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

PivotChart F.. x

Active | All

Choose fields to add to report: [gear icon]

Search [magnifying glass icon]

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

Drag fields between areas below:

Filters Legend (Ser...)

Axis (Categ... Σ Values

Academic... Distinct C...

Format Trendli... x

Trendline Options [chart icons]

▲ Trendline Options

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

Trendline Name

- Automatic Linear (T
- Custom []

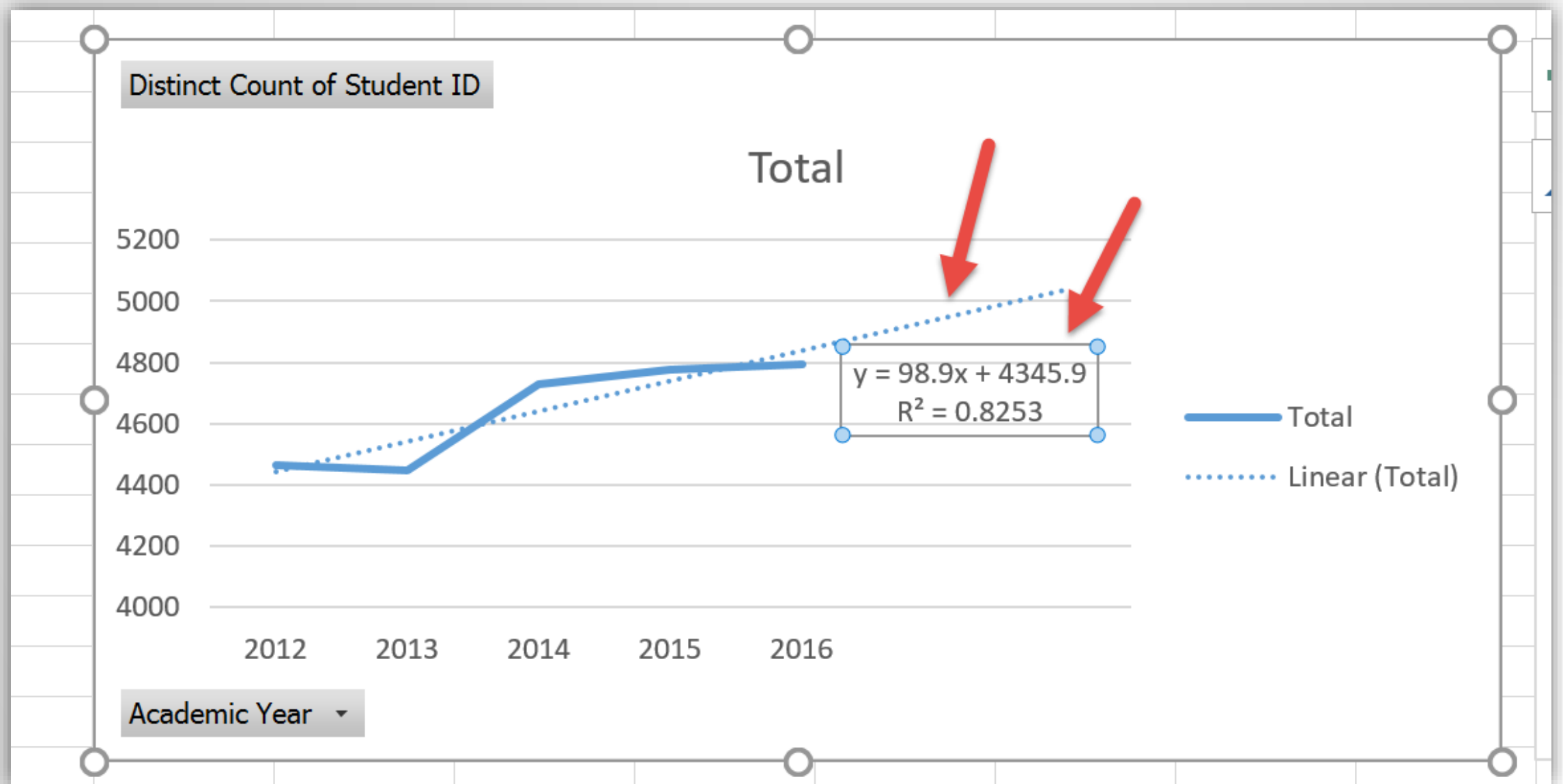
Forecast

Forward 0.0 p

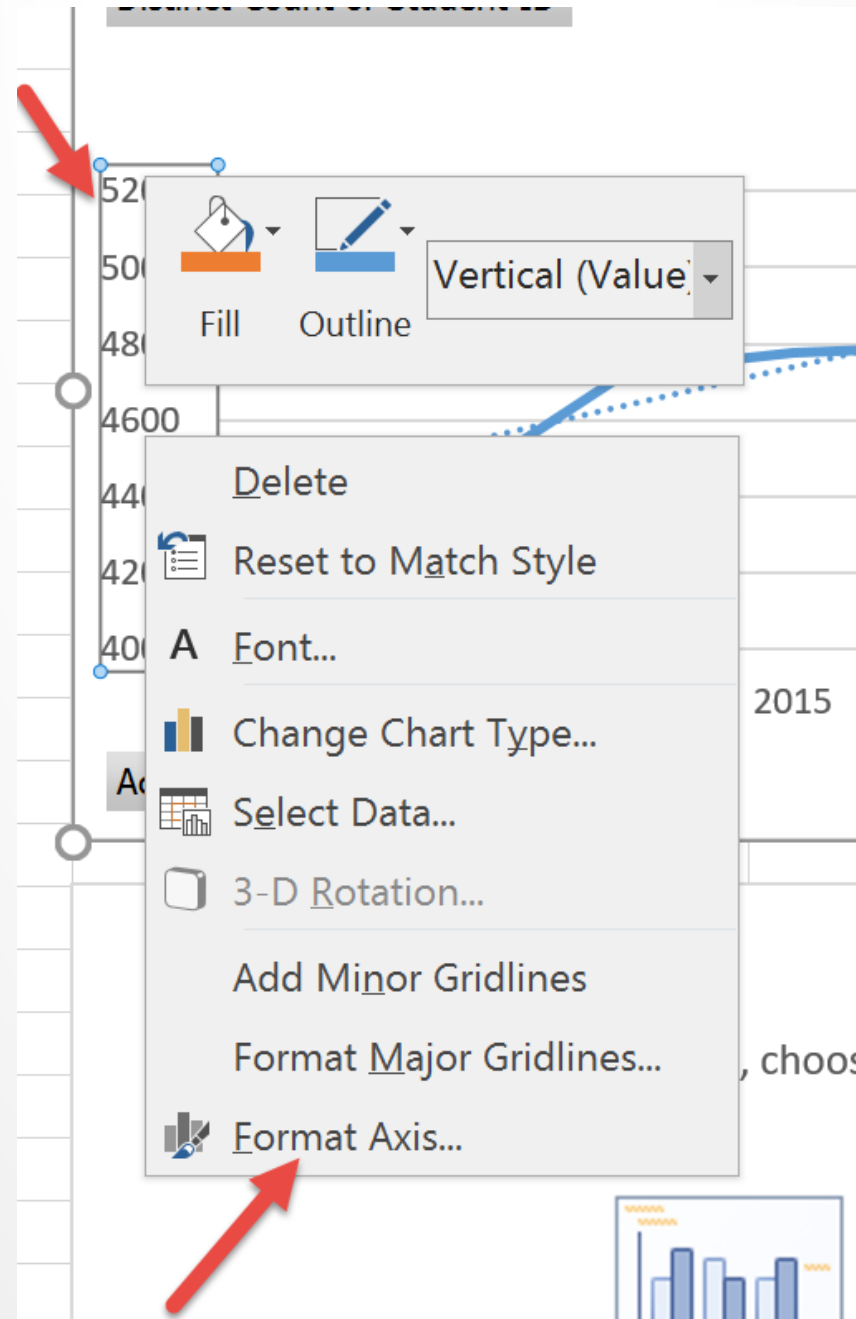
Backward 0.0 p

- 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



Format Axis

Axis Options | Text Options

Axis Options

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

The image shows the Microsoft Excel interface with the **Design** tab selected in the ribbon. The Design menu is open, displaying a grid of 14 different PivotChart styles. A red arrow points to the top-right corner of the Design menu. Below the ribbon, the worksheet grid is visible, with column headers B through M. A PivotChart is displayed on the worksheet, titled "Distinct Count of Student ID". The chart shows a blue line representing the "Total" data and a dotted blue line representing a linear trendline. The trendline equation is $y = 98.9x + 4345.9$ and the coefficient of determination is $R^2 = 0.8253$. The chart has a white background and a light gray border. To the right of the chart, there is a text box that says "To build a PivotChart, choose f" and a small icon of a bar chart.

Home Insert Draw Page Layout Formulas Data Review View Developer Power Pivot Analyze Design

Quick Start Change Colors

Style 13

Distinct Count of Student ID

Total

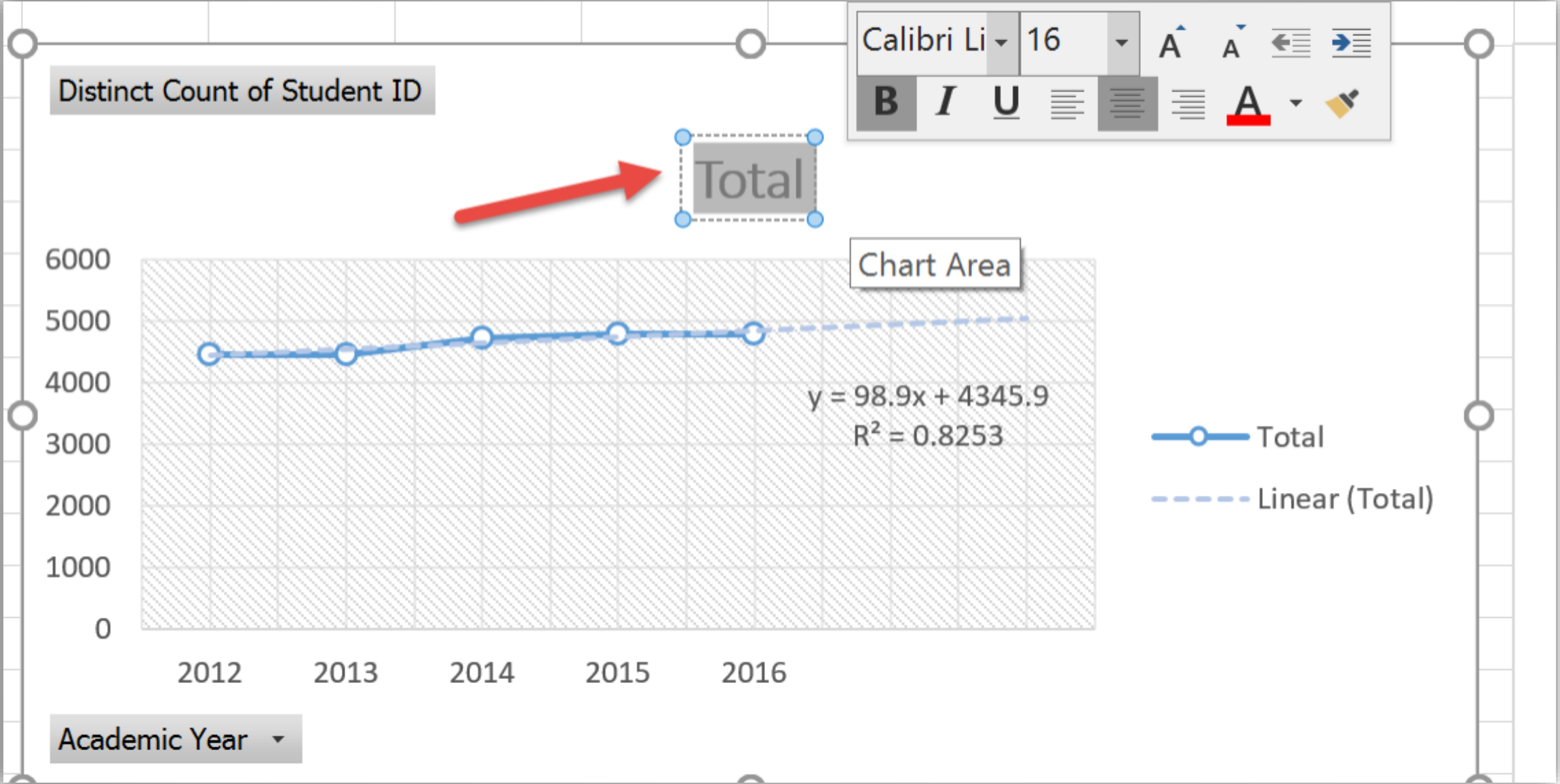
$y = 98.9x + 4345.9$
 $R^2 = 0.8253$

Total

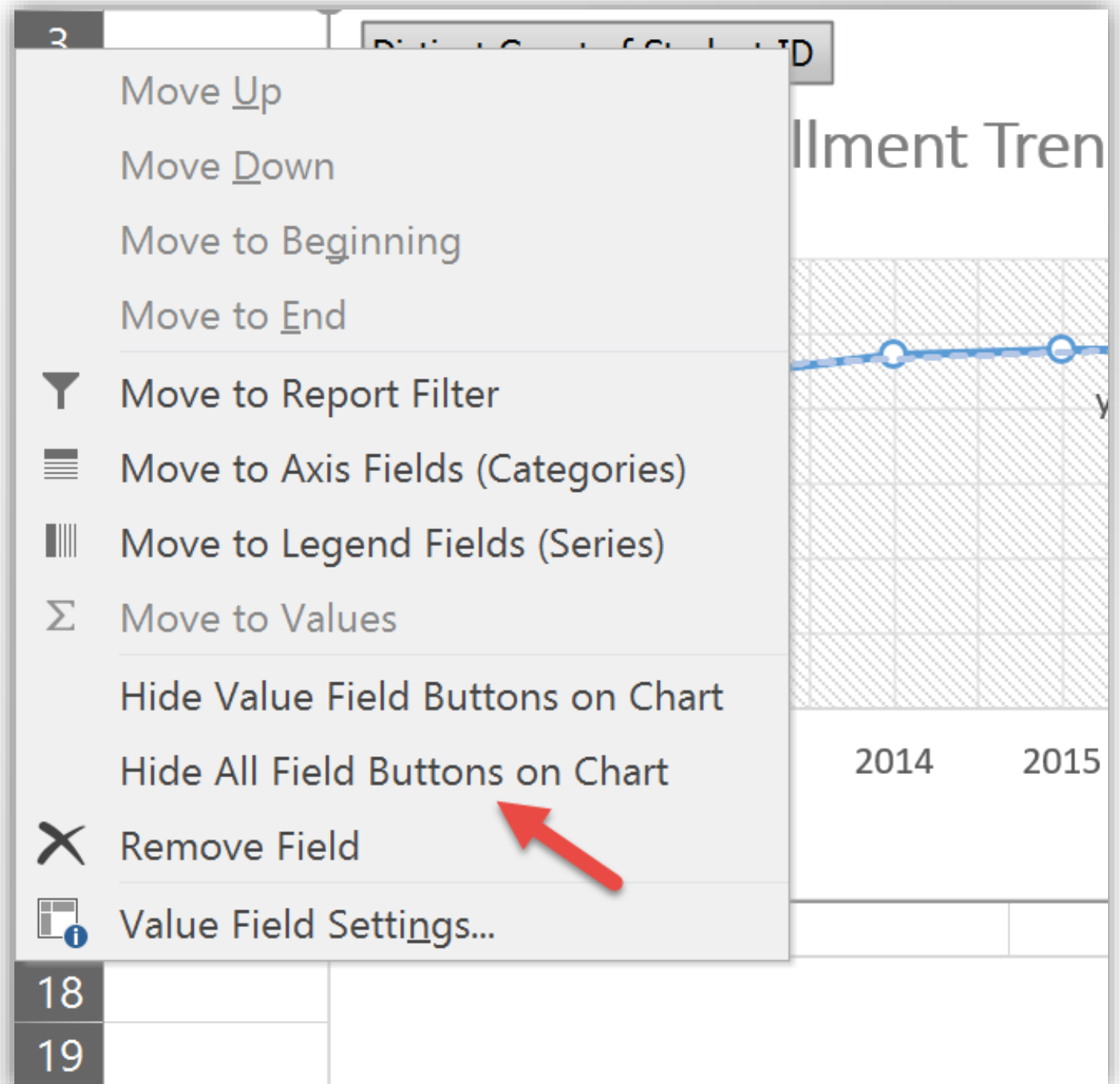
Linear (Total)

To build a PivotChart, choose f

By Highlighting the Title We Can Add Our Own Text



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



Adding Filters “Slicers”

The screenshot shows the Power BI filter pane with several filter categories:

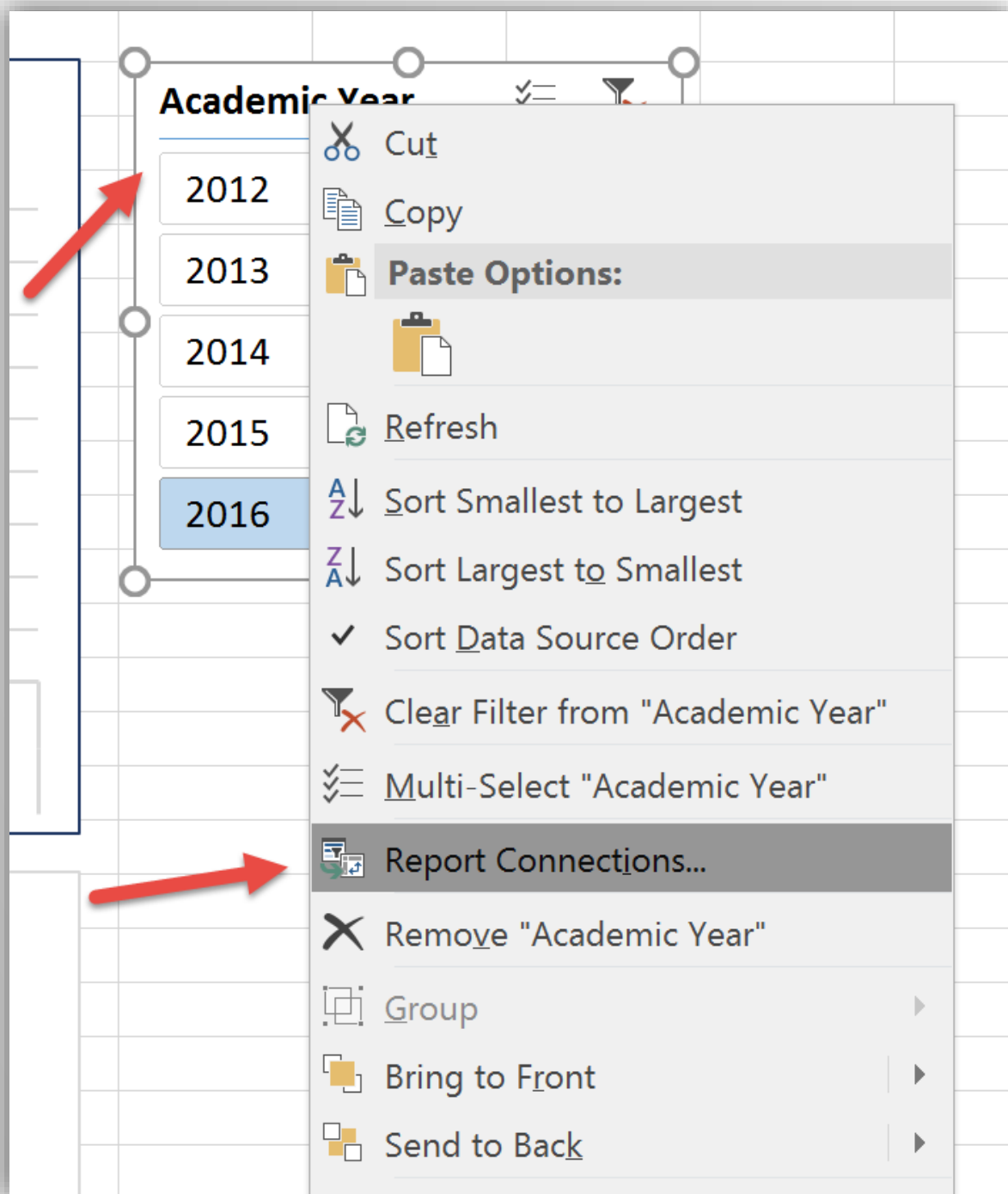
- Academic Year:** 2012, 2013, 2014, 2015, 2016
- Gender:** Female, Male
- Citizenship:** Argentina, Armenia, Austria, Bangladesh, Belarus, Bermuda (...), Brazil, Cameroon, Canada, Chile
- Quarter:** 1, 2, 3, 4
- School:** A, B, C, D, E
- Academic Level:** Graduate, Professional, Undergraduate
- Degree:** BS, MS

The screenshot shows a Power BI report area with a context menu open over the 'Academic Year' field. The menu options are:

- Add to Report Filter
- Add to Axis Fields (Categories)
- Add to Legend Fields (Series)
- Add to Values
- Add as Slicer** (highlighted)
- Add as Timeline

Red arrows point to the 'Add as Slicer' option in the context menu and the 'Academic Year' field in the report area.

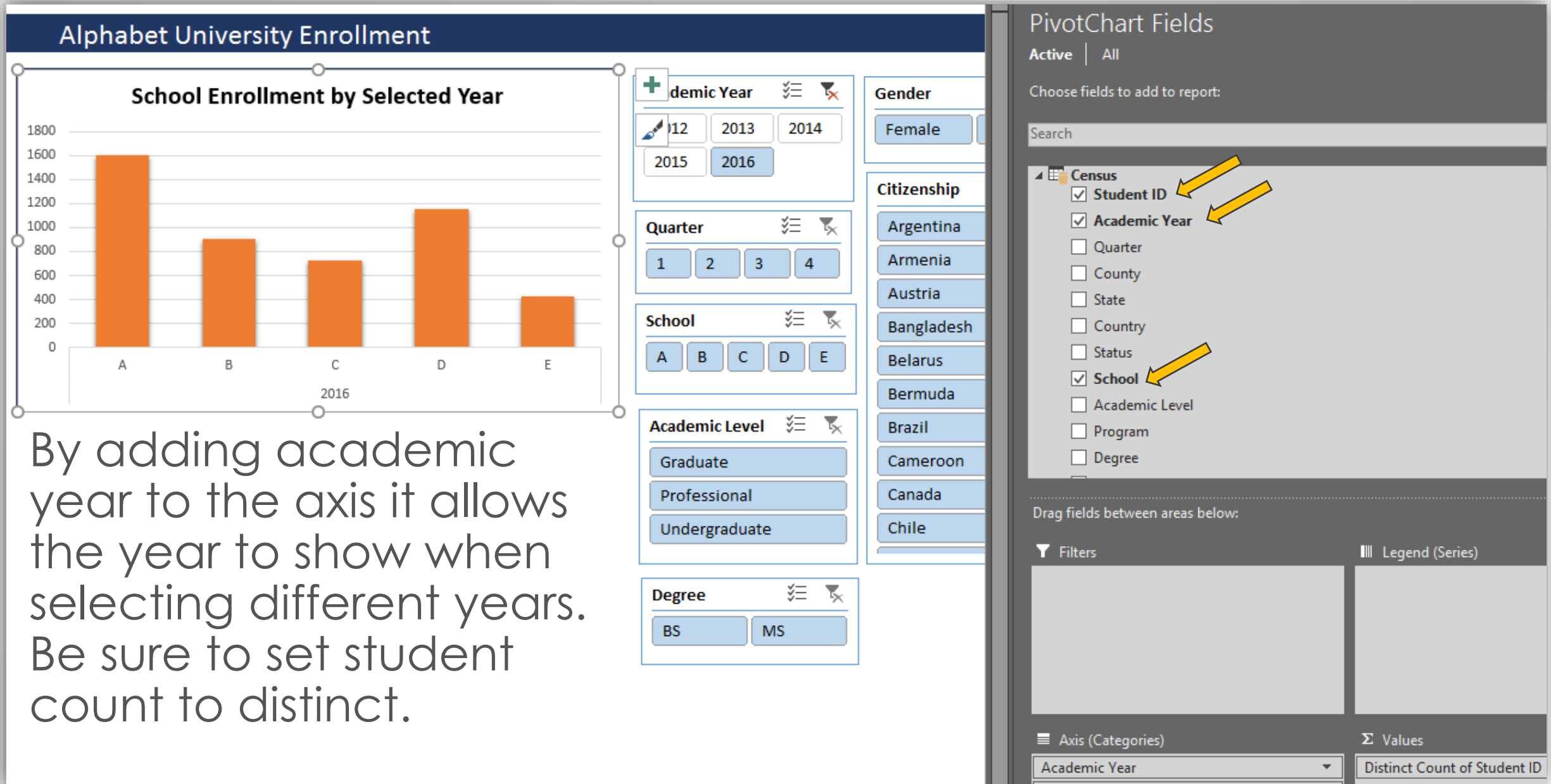
report:
Search
Census
Student ID
Academic Year
School
Drag fields between areas below:



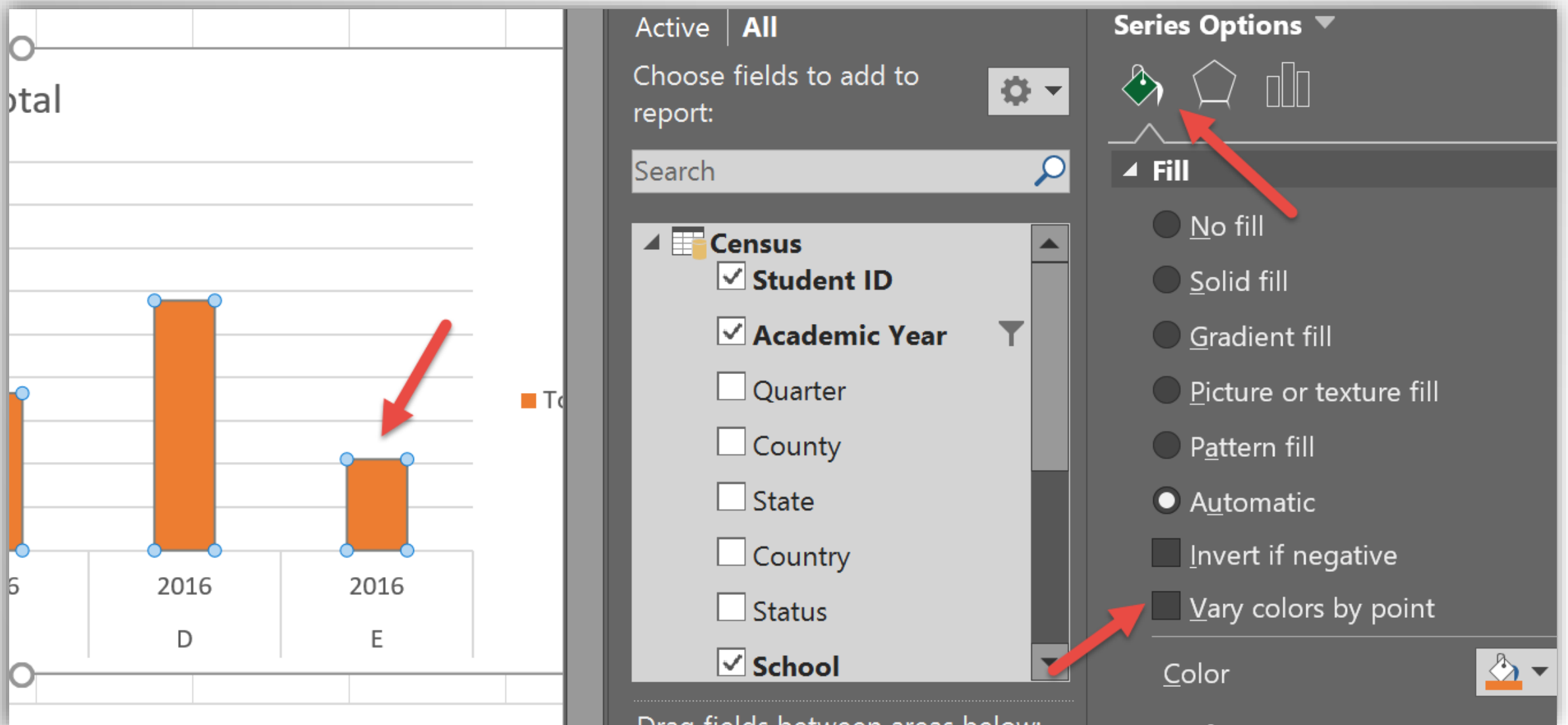
When adding a filter you should select which visualizations are to be impacted by the filter.

This is selected under "Report Connections" as shown on left.

Adding the Enrollment Bar Chart



Vary Colors in the Bar Chart



Adding the Pie Chart for Academic Level

Alphabet University Enrollment

School Enrollment by Selected Year

School	Enrollment (2016)
A	1600
B	900
C	700
D	1150
E	400

Academic Level

Academic Level	Count
Graduate	1631
Professional	1608
Undergraduate	1581

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)

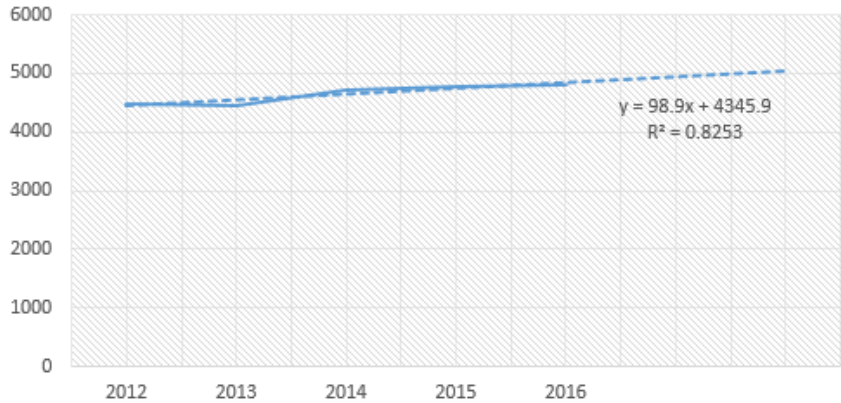
Academic Level

Values

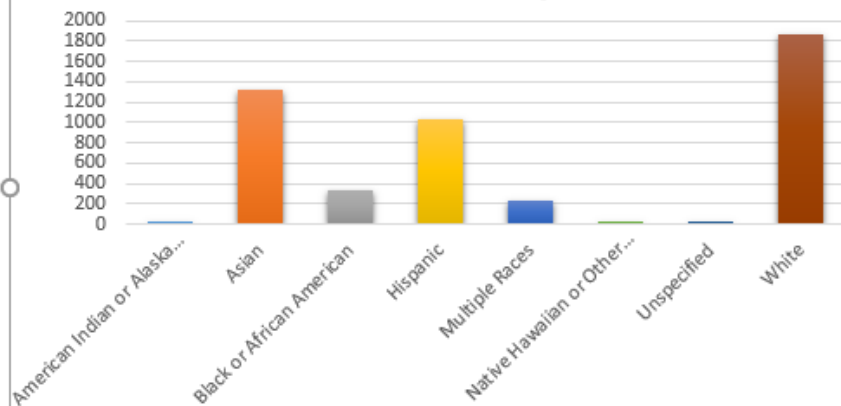
Distinct Count of Student ID

Adding the Race/Ethnicity Chart

Enrollment Trend



Race/Ethnicity



PivotChart Fields

Active | All

Choose fields to add to report:

Search

Student ID

Academic Year

Quarter

County

State

Country

Status

School

Academic Level

Program

Degree

Zip Code

Race/Ethnicity

Drag fields between areas below:

Filters

Legend (Series)

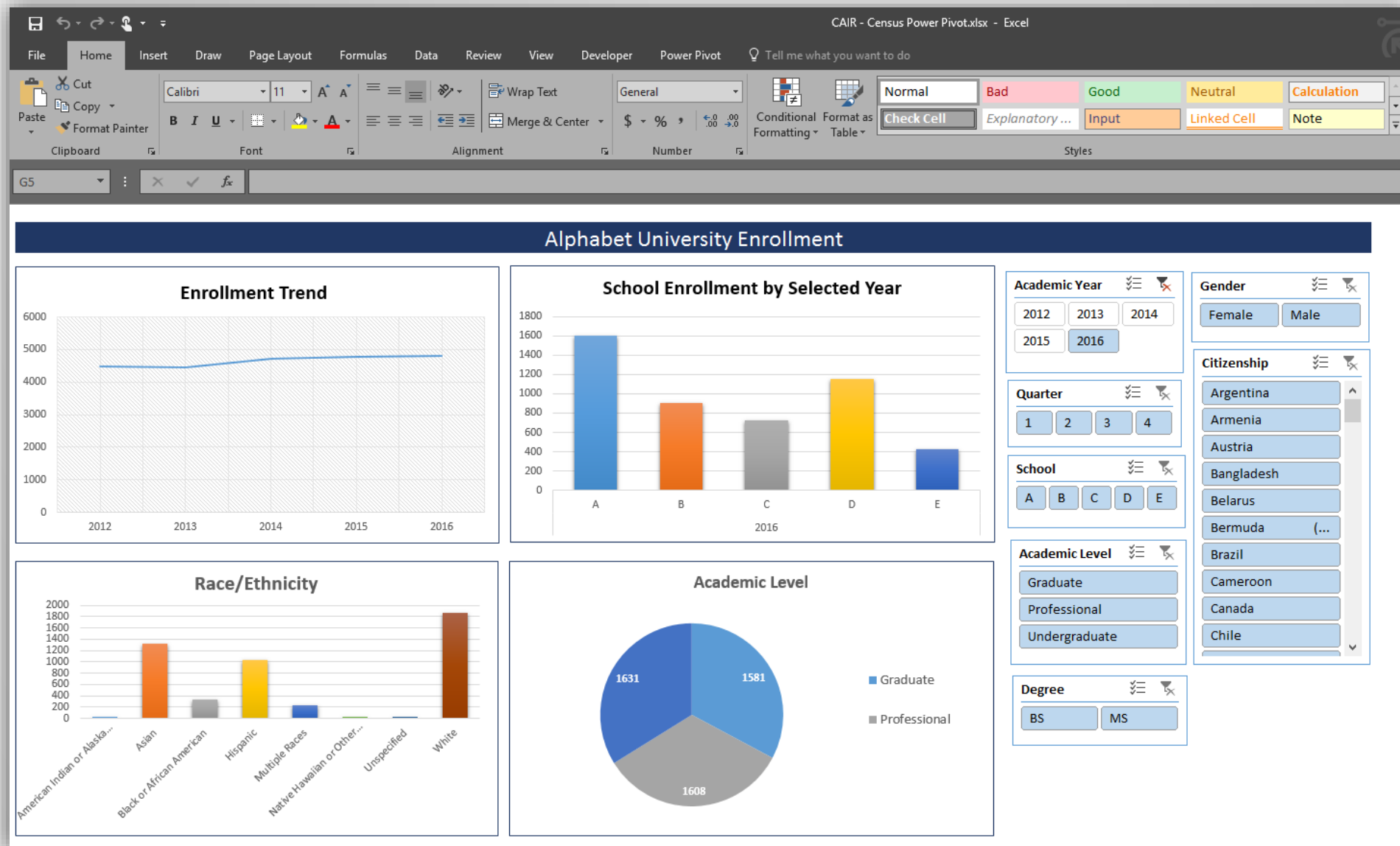
Axis (Categories)

Race/Ethnicity

Σ Values

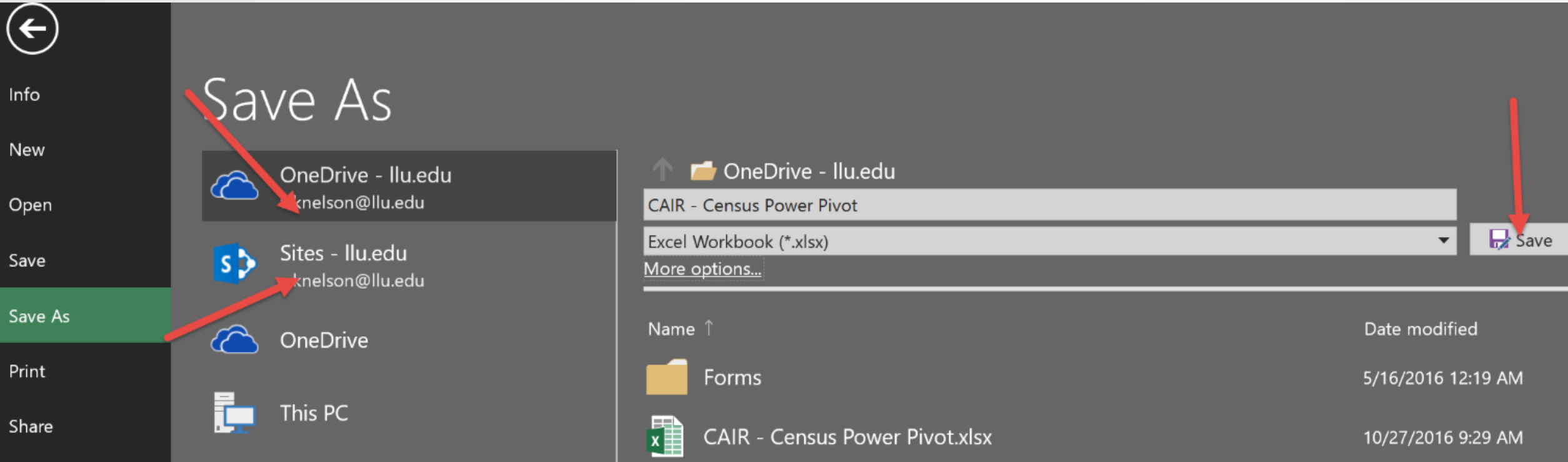
Distinct Count of Student ID

Dashboard should now look something like this

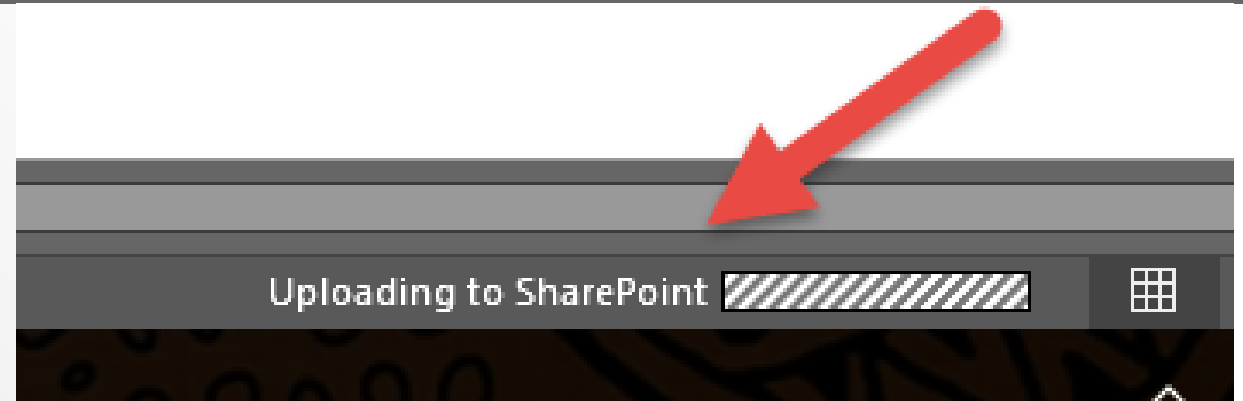


Uploading to SharePoint

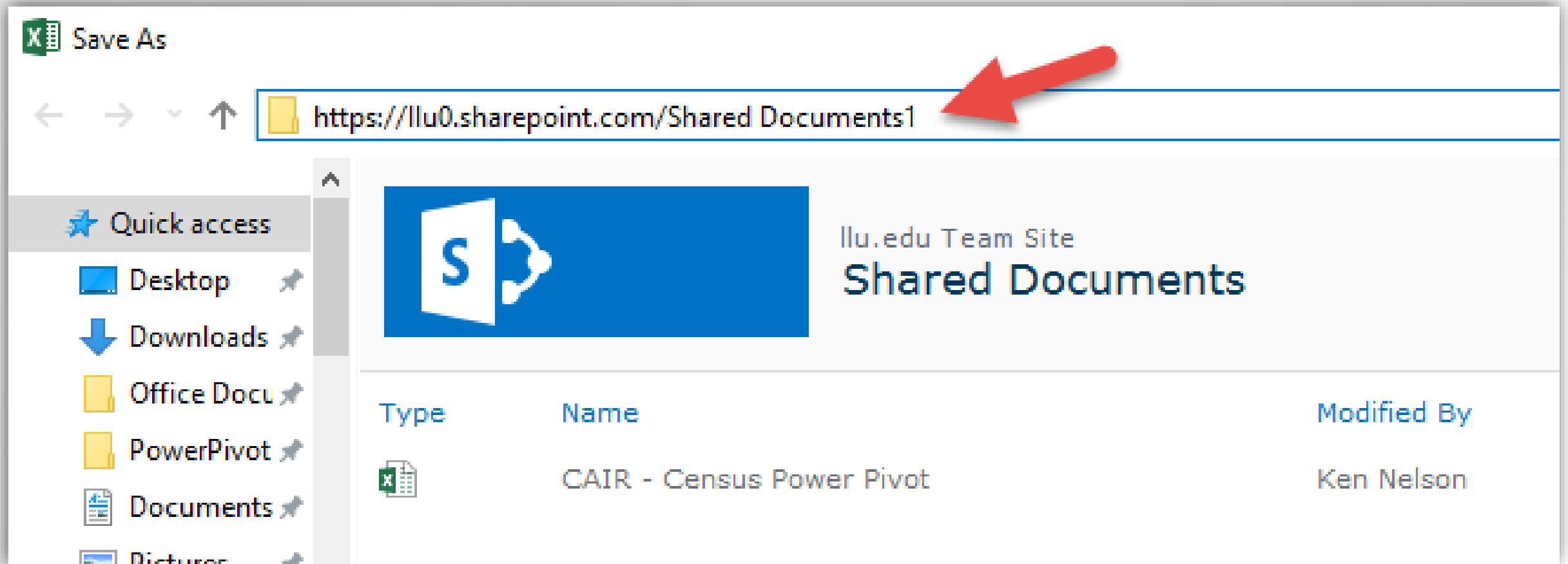
Location depends on your Office 365 configuration




You can also save your file to a local folder.



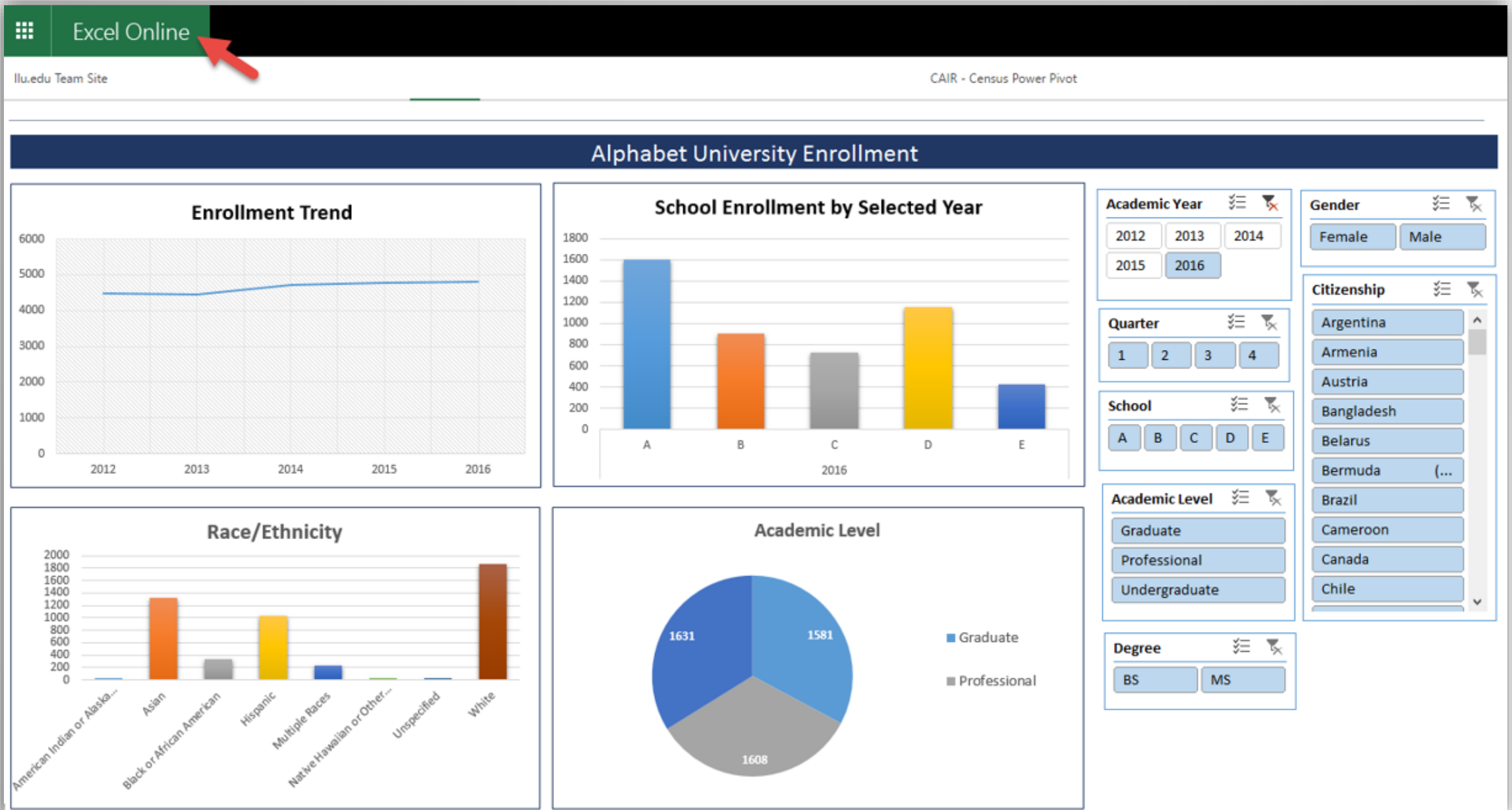
Identifying the URL for your SharePoint file is easy
Click on “Save As” and copy the address in the bar



The screenshot shows the 'Save As' dialog box in Microsoft Excel. The address bar at the top contains the URL <https://llu0.sharepoint.com/Shared Documents1>, which is highlighted with a blue border. A red arrow points to this URL. Below the address bar, the left sidebar shows 'Quick access' with links to Desktop, Downloads, Office Documents, PowerPivot, Documents, and Pictures. The main area displays the SharePoint site 'llu.edu Team Site' and the folder 'Shared Documents'. Below this, a table lists the files in the folder.

Type	Name	Modified By
	CAIR - Census Power Pivot	Ken Nelson

Excel Services Running in SharePoint



Building a Dashboard in Power BI Desktop

The image shows the Microsoft Power BI website landing page. At the top, there is a navigation bar with the Microsoft logo, 'Power BI', and links for 'Products', 'Solutions', 'Partners', and 'Learn'. On the right side of the navigation bar, there are links for 'Sign in' and 'Sign up free', with two black arrows pointing to them. The main content area has a yellow background with the text 'Bring your data to life' in large, bold, black font. Below this, a smaller text block reads: '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.' In the center of this text block, there is a white rectangular button with a black border that says 'Get started free'. Two black arrows point towards this button from the bottom left and bottom right. At the bottom of the page, there is a preview of the Power BI desktop application interface on a laptop and a smartphone. The laptop screen shows a dashboard with several tiles: 'Expected Revenue' (85.22M), 'Total Invoice' (\$2.22M), 'Discount Savings' (\$4.07M), 'Total Invoice by Month Category' (line chart), and 'Total Invoice by Subcategory' (stacked bar chart). The smartphone screen shows a mobile view of the 'Executive Metrics' dashboard.

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

Expected Revenue: 85.22M
Total Invoice: \$2.22M
Discount Savings: \$4.07M

Executive Metrics

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

The screenshot displays the Power BI Desktop application interface. At the top, the title bar reads "Untitled - Power BI Desktop" and the user name "Ken Nelson" is visible in the top right corner. The ribbon menu includes tabs for "File", "Home", "View", and "Modeling", with various icons for actions like "Cut", "Copy", "Paste", "Get Data", "Recent Sources", "Enter Data", "Edit Queries", "Refresh", "New Page", "New Visual", "Image", "Shapes", "Page View", "Manage Relationships", "New Measure", and "Publish".

A yellow notification bar at the top of the workspace area contains the text: "Auto Recovery contains some recovered files that have not been opened" and a "View Auto Recovery" button.

The main workspace is dominated by a large yellow "Welcome" dialog box. On the left side of this dialog, the text reads "Power BI Desktop" and "Power BI has recovered files that you might want to keep". Below this, there are buttons for "Show Recovered Files", "Get Data", and "Recent Sources". A list of recovered files is shown, including "AMS Report ID Rev.pbix" and "AMS Report.pbix", both located at "C:\Office Documents\OEE\Po...". There is also an "Open Other Reports" button.

The right side of the dialog box features a profile picture of "Ken Nelson" and a "WHAT'S NEW" section with the text: "Take a look at what's new and improved in Power BI in this month's update." Below this are sections for "FORUMS" (with text: "Visit the Power BI Forum to ask questions or interact with other users in the Power BI community.") and "POWER BI BLOG" (with text: "Keep up to date with the latest news, resources, and updates from the Power BI team."). A "TUTORIALS" section follows, with text: "Watch our tutorials to learn about all the powerful features inside of Power BI." and links for "Analyzing Sales Data", "Facebook Analytics", and "Importing data from a Web page".

At the bottom of the dialog box, there is a checkbox labeled "Show this page on startup" which is checked.

On the right side of the main workspace, there are two vertical panels: "Visualizations" and "Fields". The "Visualizations" panel shows various chart and table icons. The "Fields" panel has a search bar and three "Drag data fields here" sections under "Values", "Page level filters", and "Report level filters".

A red arrow points from the top right of the dialog box towards the "Visualizations" panel.

At the bottom left of the application, the "Page 1" tab is visible with a "+" button next to it.

File

- New
- Open
- Save
- Save As
- Import
- Export

Import

- Excel Workbook Contents
- Power BI Template
- Power BI Custom Visual

Insert

- New Visual
- Text Box
- Image
- Shapes

Locate your Excel file – this is what I named mine:

Name

- CAIR - Census Power Pivot.xlsx

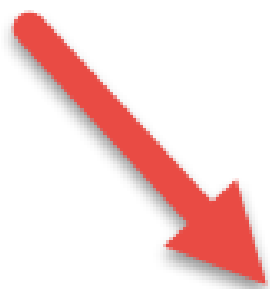


Import Excel Workbook Contents

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



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 an Excel spreadsheet with a table of student data. The table has 13 columns: Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, Zip Code, and Race/Ethnicity. The data consists of 30 rows of student records. To the right of the table is the PivotTable Fields task pane, which is currently empty, showing a search bar and a list of fields from the data model, including Academic Level, Academic Year, Country, County, Degree, Distinct Count of St..., Program, Quarter, Race/Ethnicity, School, Status, Student ID, Sum of Student ID, Zip Code, Age Group, Birth Country, Citizenship, Gender, Race_Ethnicity, and Student ID.

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 DAX formula bar with the formula `Race/Ethnicity = RELATED(Demographics[Race_Ethnicity])`. Two red arrows point from the formula bar to the PivotTable below. The PivotTable has columns for Student ID, Academic Year, Quarter, County, State, Country, Status, School, Academic Level, Program, Degree, Zip Code, Race/Ethnicity, and Program Degree. The data is filtered to show only two rows where the Race/Ethnicity is White.

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

CAIR sample PBI - Power BI Desktop

File Home View Modeling

Paste Cut Copy Format Painter Clipboard

Get Data Recent Sources External Data Enter Data Edit Queries Refresh

New Page New Visual Insert Text Box Image Shapes Page View View

Census

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

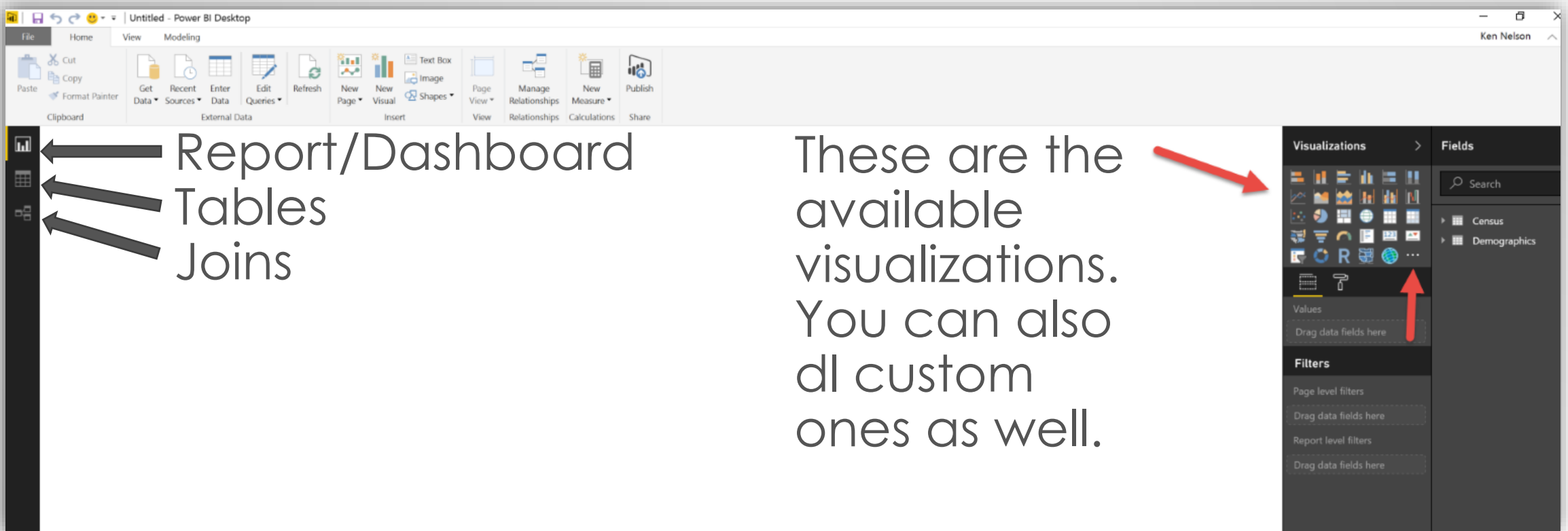
Demographics

- Σ Student ID
- Age Group
- Birth Country
- Citizenship
- Race_Ethnicity
- Gender

* — 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



The screenshot shows the Power BI Desktop interface. The ribbon at the top includes tabs for File, Home, View, and Modeling, with various icons for actions like Cut, Copy, Paste, Get Data, Recent Sources, Enter Data, Edit Queries, Refresh, New Page, New Visual, Image, Shapes, Page View, Manage Relationships, New Measure, and Publish. On the left, the navigation pane has three icons: a report/dashboard icon, a table icon, and a join icon. On the right, the task pane is divided into Visualizations and Fields sections. The Visualizations section shows a grid of visualization types, and the Fields section shows a search bar and data sources like Census and Demographics.

Report/Dashboard
Tables
Joins

These are the available visualizations. You can also do custom ones as well.

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

No problem! Export from Excel to Power BI



Power BI My Workspace

Excel Online

Alphabet University Enrollment

Enrollment Trend

Year	Enrollment
2012	4500
2013	4400
2014	4700
2015	4750
2016	4800

School Enrollment by Selected Year

School	Enrollment (2016)
A	1600
B	900
C	700
D	1150
E	400

Academic Year

2012 2013 2014
2015 2016

Gender

Female Male

Quarter

1 2 3 4

Citizenship

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

School

A B C D E

Race/Ethnicity

Race/Ethnicity	Enrollment
American Indian or Alaska Native	100
Asian	1300
Black or African American	300
Hispanic	1000
Multiple Races	200
Native Hawaiian or Other Pacific Islander	50
Unspecified	100
White	1800

Academic Level

Academic Level	Count
Graduate	1631
Professional	1608
Undergraduate	1581

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

The screenshot shows the Power BI Visuals library website. At the top, there is a yellow header with the Power BI logo and navigation links: "Browse gallery", "How to use", "How to submit", and "Docs". Below the header, the main content area is titled "Visuals library" and includes a "Sort by" dropdown menu set to "Most Recent" and a search bar labeled "Search Visuals". There are two tabs: "Custom visuals" (selected) and "R-powered visuals". A paragraph of text explains that an active developer community creates custom visuals, and users can download and use them in their reports. Below this text is a grid of 15 different visualization thumbnails, each with a title and a small "OK Viz" logo. The thumbnails include: Infographic Designer, Stock Chart, Liquid Fill Gauge, Sparkline by OKViz - v1.0.0, Strippet Browser, Cluster Map, Facet Key, Smart Filter by SQLBI, BowtieChart, Brick Chart, Bullet Chart by SQLBI, Pulse Chart, HierarchySlicer, Circular Gauge, and Donut Chart.

The screenshot shows the visualization pane in a Power BI report. It is divided into two main sections: "Visualizations" and "Fields". The "Visualizations" section contains a grid of 20 different visualization icons. A red arrow points to the first icon in the grid, which is a bar chart. The "Fields" section is on the right and includes a search bar, a list of data sources (Census and Demographics), and three "Axis" sections, each with a "Drag data fields here" prompt. The "Values" section also has a "Drag data fields here" prompt. The "Tooltips" section is partially visible at the bottom.

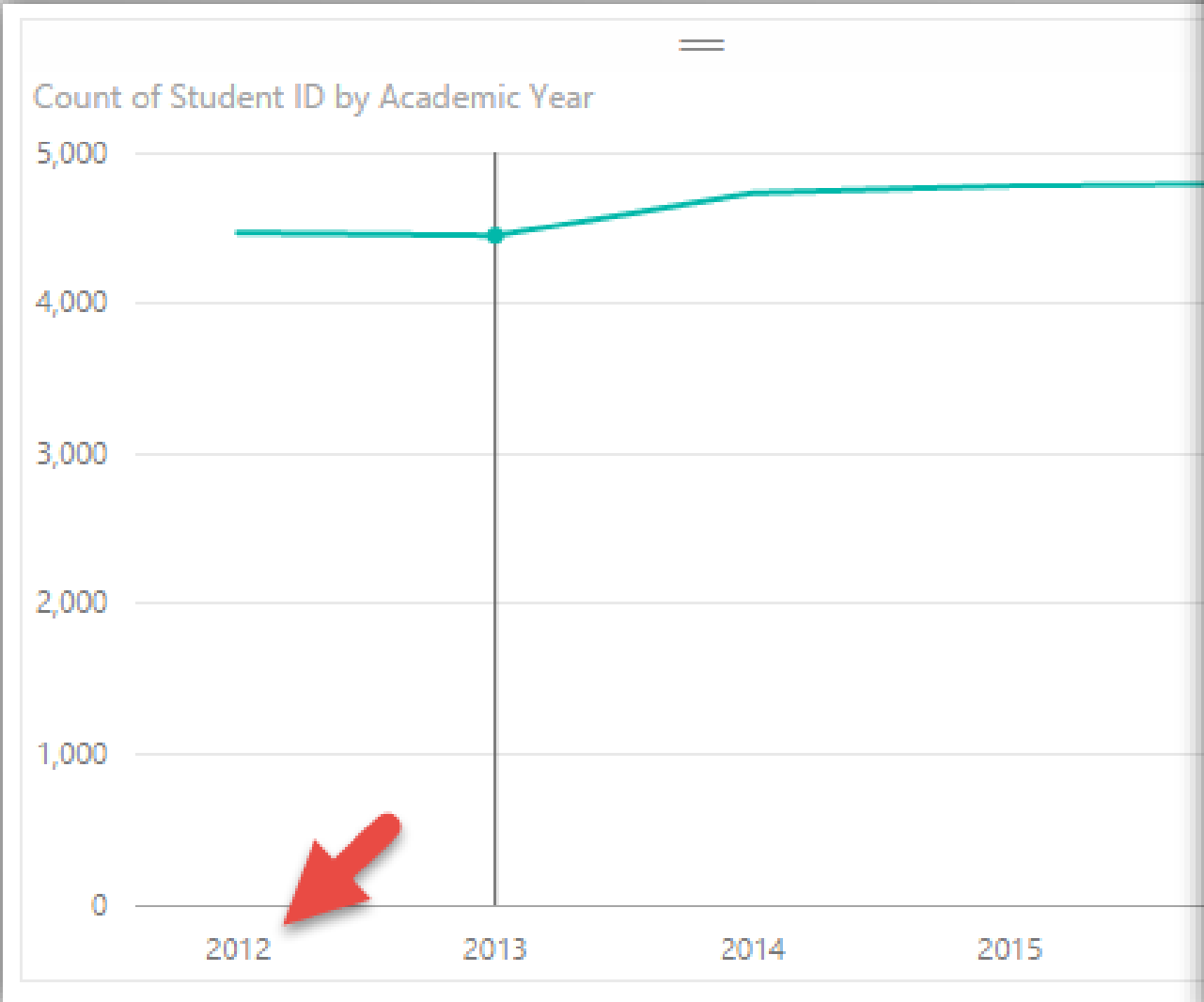
Creating the Line Chart
– *select the line chart icon*

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

The screenshot displays the configuration interface for a data visualization tool. It is divided into several sections:

- Visualizations:** A grid of chart icons where the line chart icon is highlighted with a yellow border.
- Fields:** A list of data fields from a source named 'Census'. Fields include 'Academic Level', 'Academic Year' (checked with a yellow checkmark), 'Country', 'County', 'Degree', 'Distinct Count ...', 'Program', 'Quarter', 'Race/Ethnicity', 'School', and 'State'.
- Axis:** A dropdown menu showing 'Academic Year' is selected.
- Legend:** A dashed box with the text 'Drag data fields here'.
- Values:** A dropdown menu showing 'Student ID' is selected.
- Filters:** A section with 'Visual level filters' containing 'Academic Year(All)' and 'Student ID(All)'. A red arrow points to 'Academic Year(All)'.
- Context Menu:** A white menu is open over 'Student ID' in the Values section, listing aggregation options: 'Remove field', 'Quick Calc', 'Sum' (checked with a green checkmark), 'Average', 'Minimum', 'Maximum', 'Count (Distinct)' (highlighted in grey), 'Count', and 'Standard deviation'.

Setting Range on the Chart



The visualization pane shows the configuration for the chart. The 'Data colors' icon is highlighted with a yellow arrow. The 'Start' field is highlighted with a red arrow and contains the value 'd'. The 'End' field is set to 'Auto'. The 'Y-Axis' is set to 'On'.

Visualization Pane Settings:

- Data colors:** (Icon highlighted with yellow arrow)
- X-Axis:** On
- Y-Axis:** On
- Position:** Left
- Scale type:** Linear
- Start:** d (highlighted with red arrow)
- End:** Auto
- Title:** Off
- Style:** Show title ...

Field List (Census):

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

Tip to get the visualization looking right

Untitled - Power BI Desktop

Home View Modeling

Calculations Sort

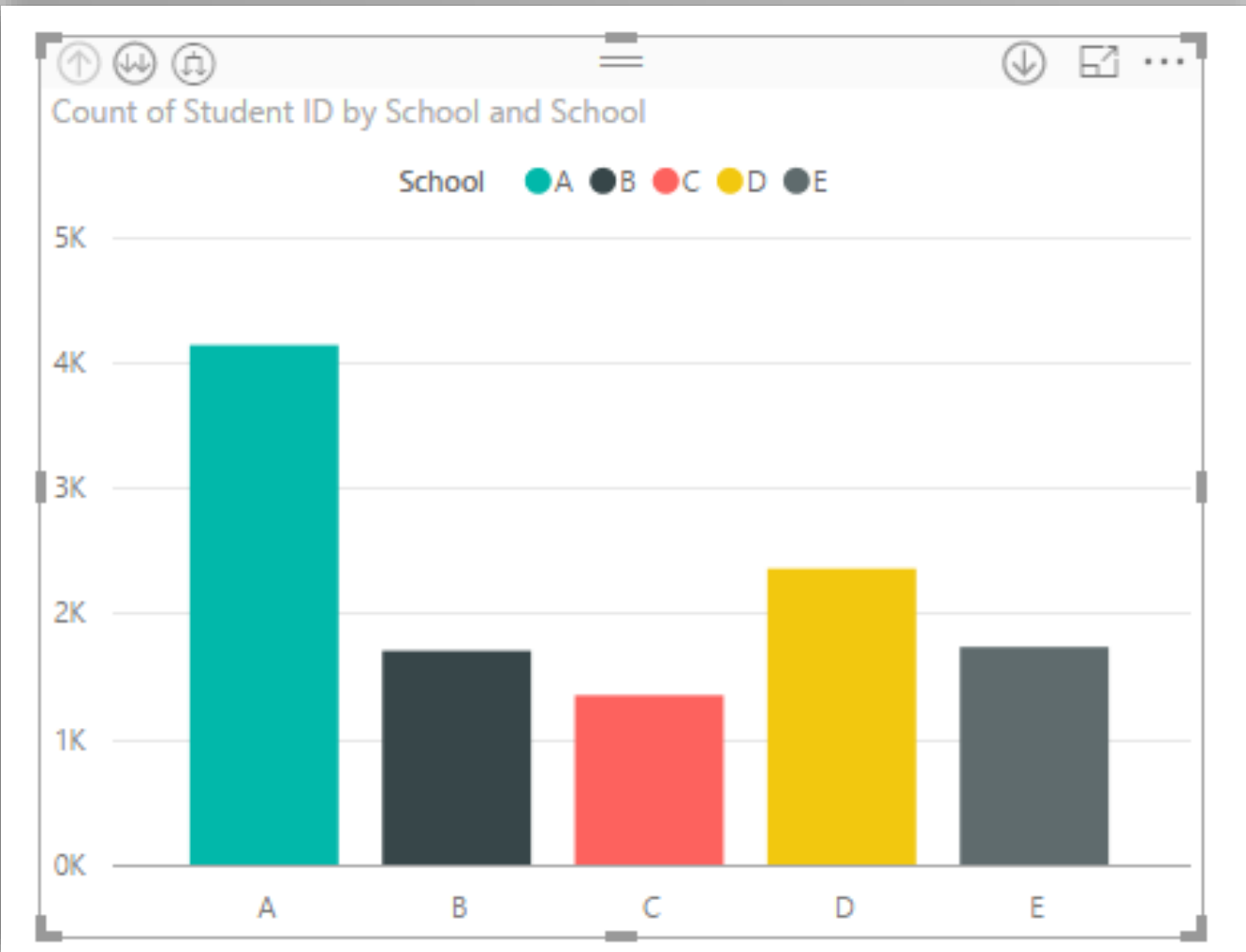
New Measure New Column New Table Sort By Column

Data Type: Decimal Number

- Decimal Number
- Fixed Decimal Number
- Whole Number
- Date/Time
- Date
- Time
- Text
- True/False
- Binary

Student ID	Academic Year	Qu	e	Country	
166959633072710	2012			United Sta	
167812269210776	2012			United Sta	
169749814917892	2012			United Sta	
170298791620710	2012			United Sta	
166174890255015	2012	4	San Bernardino	CA	United Sta
167432699716314	2012	4	San Bernardino	CA	United Sta
168265749969900	2012	4	San Bernardino	CA	United Sta
168437278001200	2012	4	San Bernardino	CA	United Sta

Adding Enrollment 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

Axis

- School
- Program Degree

Legend

- School

Value

- 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)

'Census'[Count of Student ID]

Count of Student ID

Color saturation

Drag data fields here

Tooltips

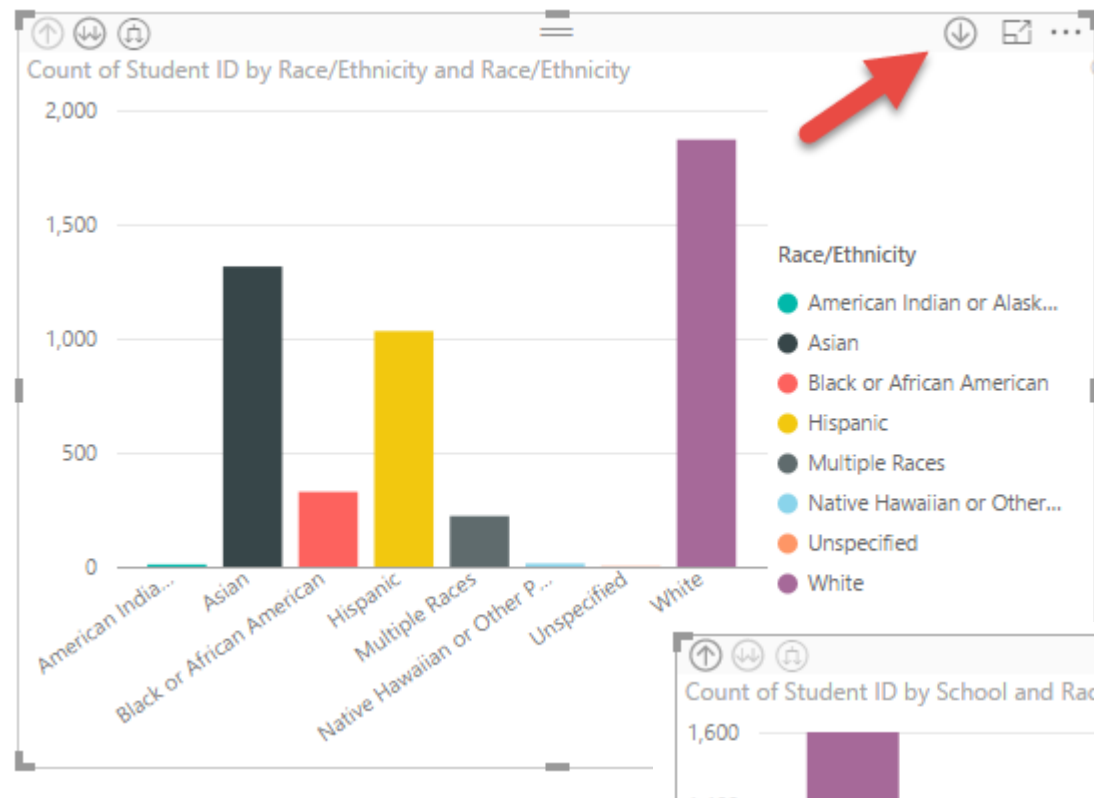
Drag data fields here

Filters

Visual level filters

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

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



Just drag columns to the axis to enable drill down

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

Axis

- Race/Ethnicity
- School

Legend

- Race/Ethnicity

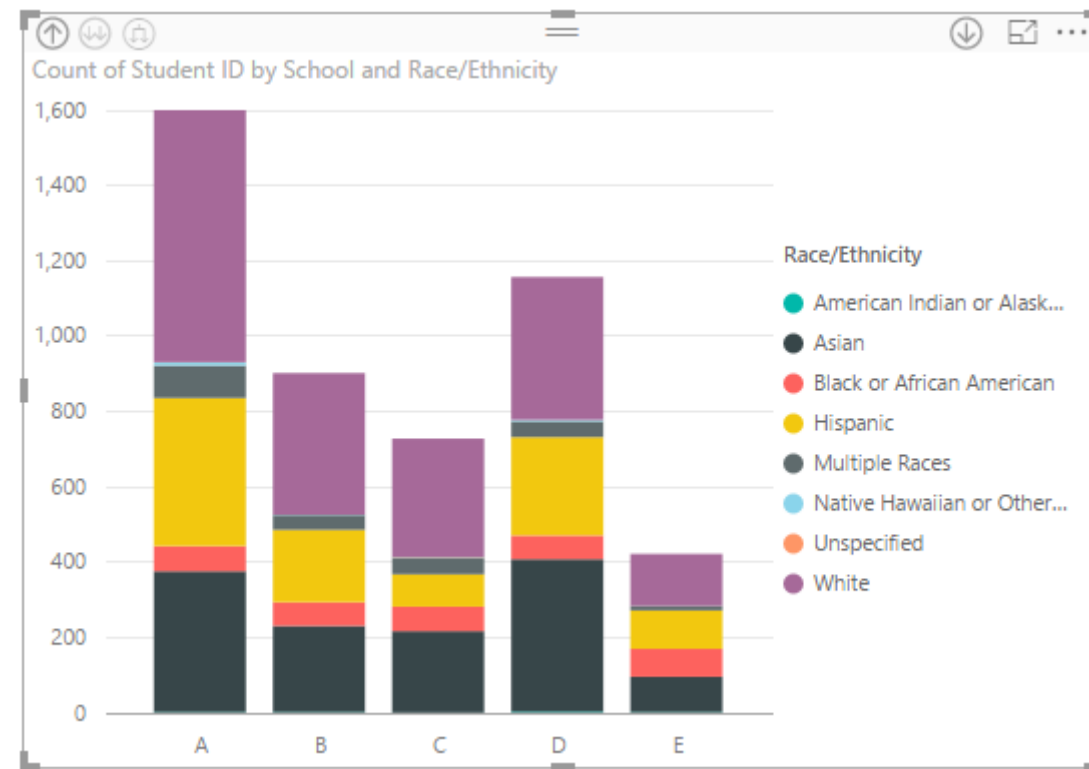
Value

- Count of Student ID

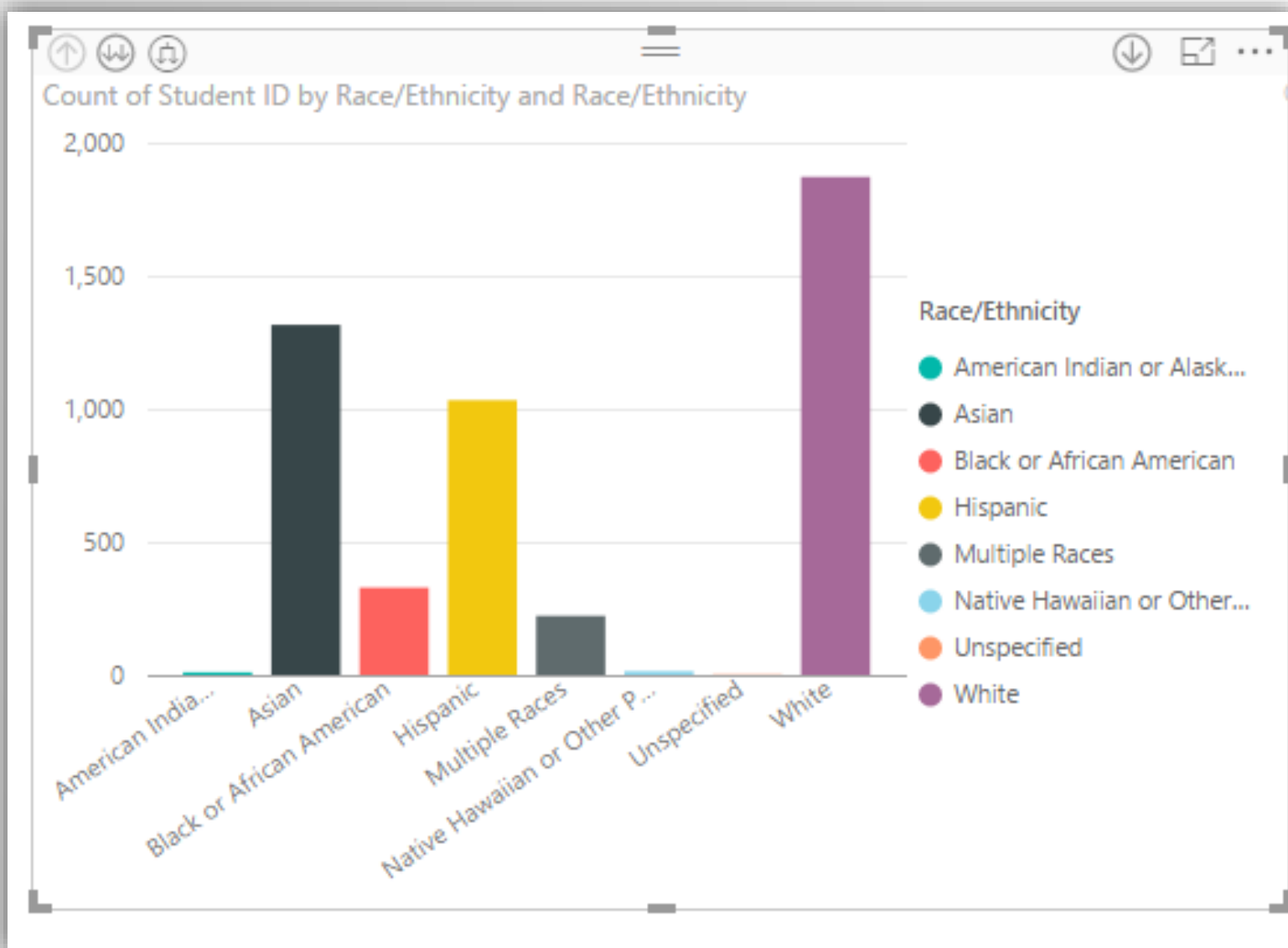
Color saturation

Drag data fields here

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



Adding Race/Ethnicity Chart



Visualizations

Fields

Search

Census

- Academic Level
- Academic Year
- Country
- County
- Degree
- Distinct Count ...
- Program
- Program Degree
- 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 of Student ID(All)

Race/Ethnicity(All)

Remove field

Quick Calc

Sum

Average

Minimum

Maximum

Count (Distinct)

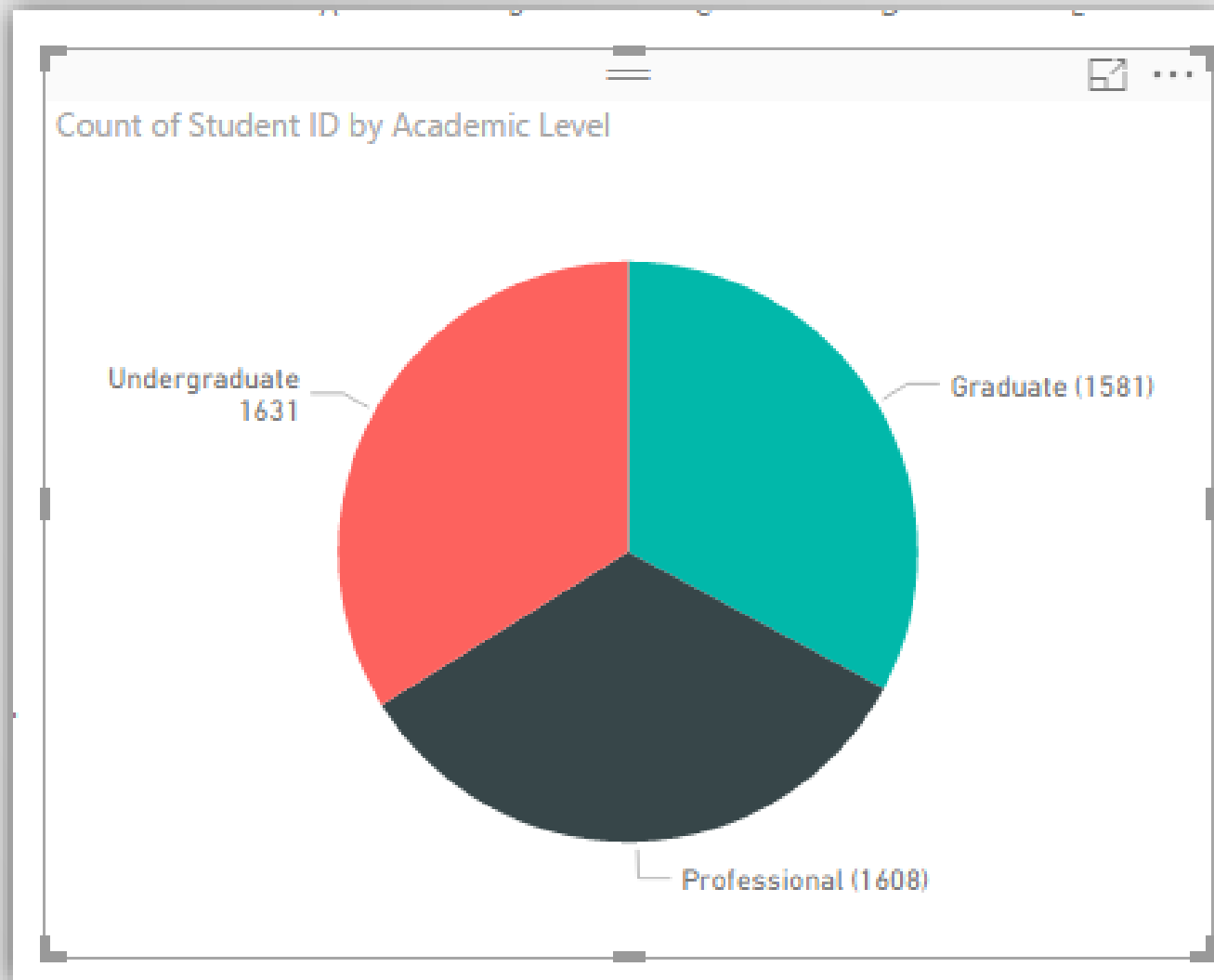
Count

Standard deviation

Variance

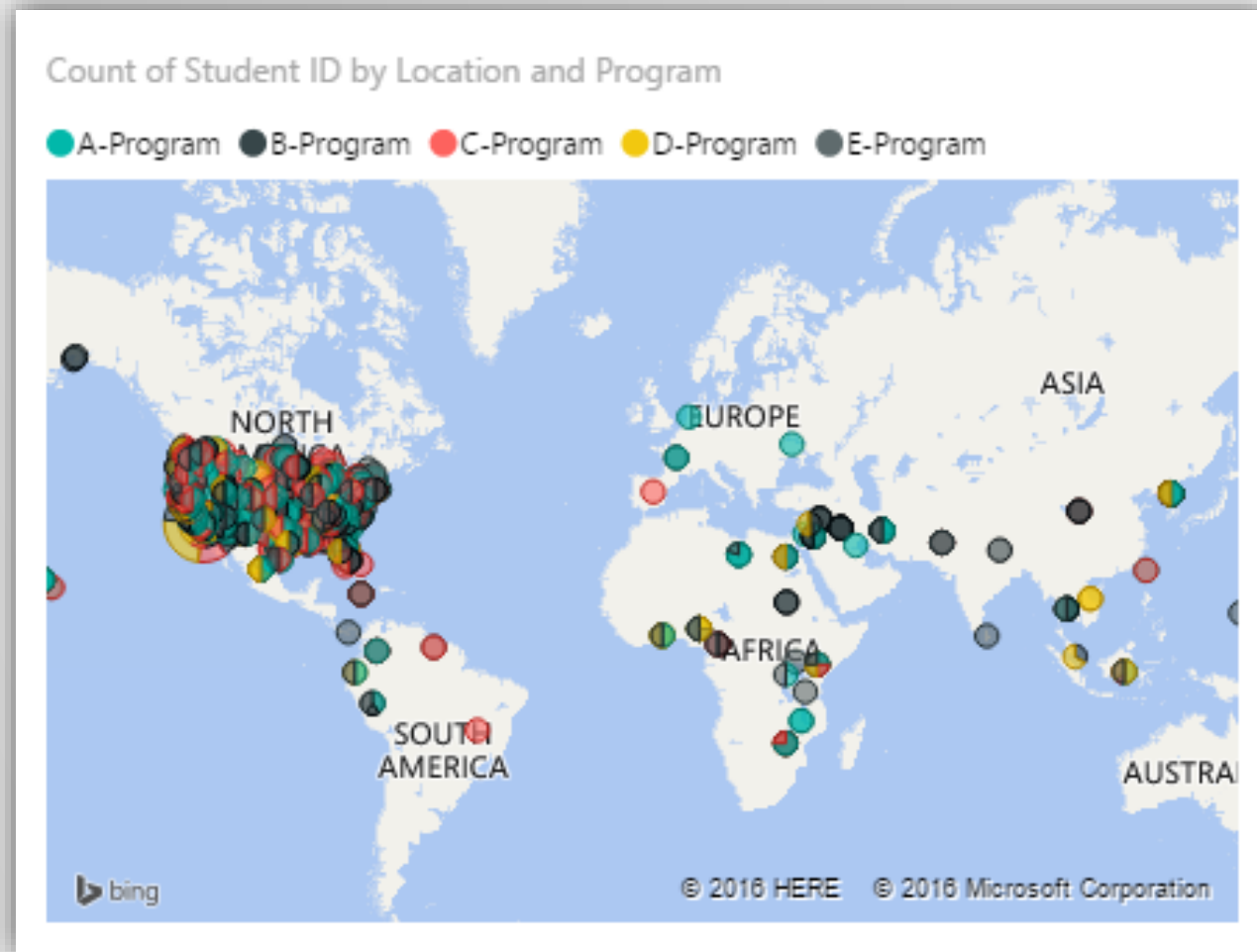
Median

Academic Level Pie Chart



The screenshot shows the configuration interface for a data visualization. The 'Visualizations' panel on the left contains a grid of chart types, with a pie chart icon highlighted. Below the grid are sections for 'Legend' (set to 'Academic Level'), 'Details' (with a 'Drag data fields here' prompt), and 'Values' (set to 'Count of Student ID'). The 'Filters' section at the bottom shows 'Academic Level(All)' and 'Count of Student ID(All)'. The 'Fields' panel on the right features a search bar and a list of fields from a 'Census' dataset. The 'Academic Level' field is checked, while others like 'Academic Year', 'Country', 'County', 'Degree', 'Distinct Count ...', 'Program', 'Program Degree', 'Quarter', 'Race/Ethnicity', 'School', 'State', 'Status', 'Student ID', 'Sum of Studen...', and 'Zip Code' are unchecked. A 'Demographics' section is also visible at the bottom of the fields list.

Adding a Citizenship Map



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

Location

Location

Legend

Program

Latitude

Drag data fields here

Longitude

Drag data fields here

Size

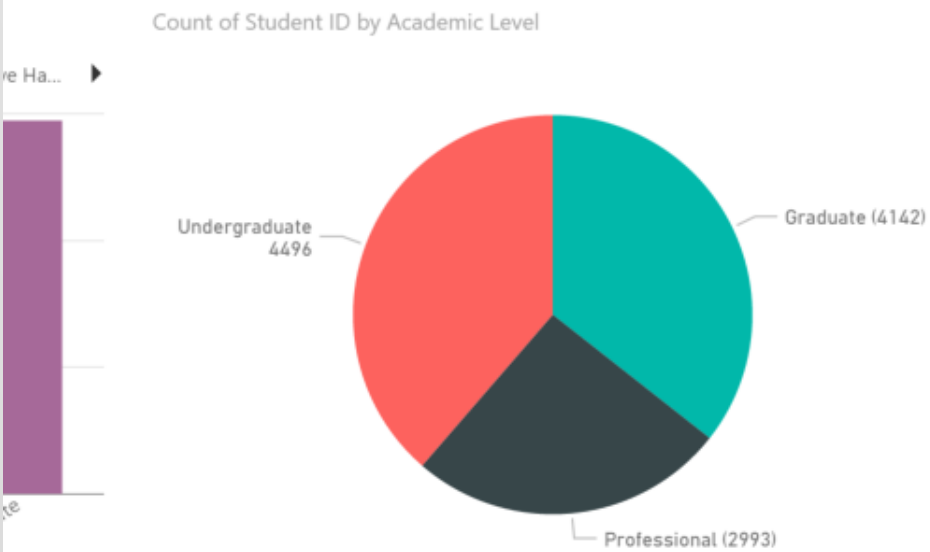
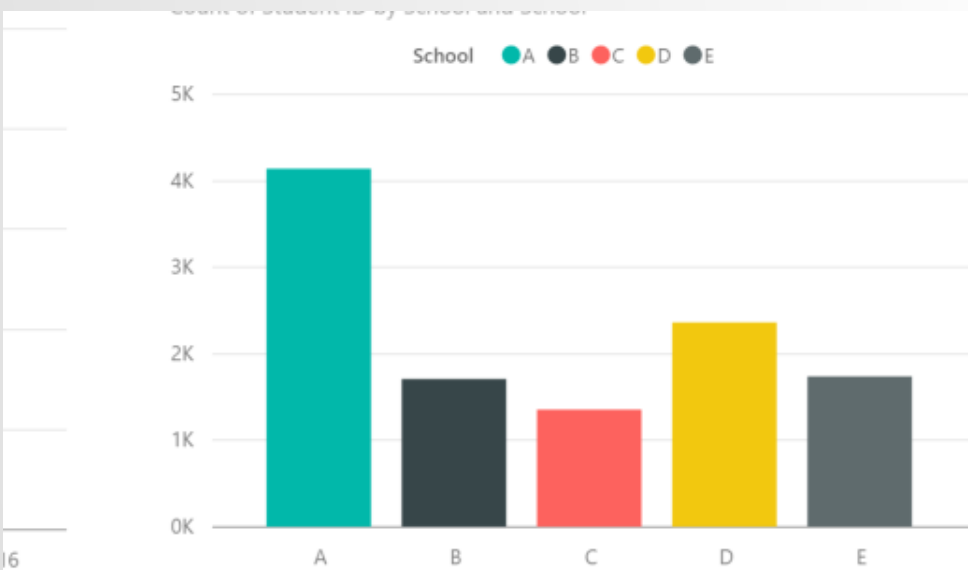
Count of Student ID

DAX to do this is:

Location = [Zip Code] & "," & [Citizenship]

Adding Filters

The screenshot shows the Power BI interface with two panes: Visualizations and Fields. The Visualizations pane contains a grid of chart types, with a bar chart icon highlighted by a red arrow. The Fields pane contains a search bar and a list of fields under the 'Census' category. The 'Academic Year' field is checked and highlighted by a red arrow. Below the Fields pane, the Filters pane is visible, showing a list of filters. The 'Academic Year' filter is highlighted by a red arrow.



Academic Year

- 2012
- 2013
- 2014
- 2015
- 2016

Configuring Filter Interactions

The image shows the Power BI Desktop interface. The ribbon is set to the **Format** tab, with the **Interactions** group expanded. Three red arrows point to the **Interactions** group, the **Format** tab, and the filter interaction icons on the chart.

The chart is titled "Count of Student ID by Academic Year" and shows a single data point at approximately 4,800. The y-axis ranges from 4,000 to 5,000. In the top right corner of the chart area, there are two icons: a funnel icon and a circle with a diagonal line through it.

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
167812269210776	2012	4	San Bernardino	CA	United States	PT	E	Graduate	E-Program	MS	92354	White	E-Program MS
169749814917892	2012												
170298791620710	2012												
166174890255015	2012												
167432699716314	2012												
168265749969900	2012												
168437278001200	2012												
171996573474750	2012												
168677177127920	2012												
168435826798368	2012												

Data Sources Data Queries Page Visual

External Data Insert

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

Student ID	Academic Year	Quarter	County	State	Country
33072710	2012		San Bernardino	CA	United States
59210776	2012		San Bernardino	CA	United States
14917892	2012		San Bernardino	CA	United States
91620710	2012		San Bernardino	CA	United States
90255015	2012		San Bernardino	CA	United States

DAX Statement to Concatenate – Easy as “&”

Power BI ribbon: Data Sources Data Queries Page Visual
External Data Insert



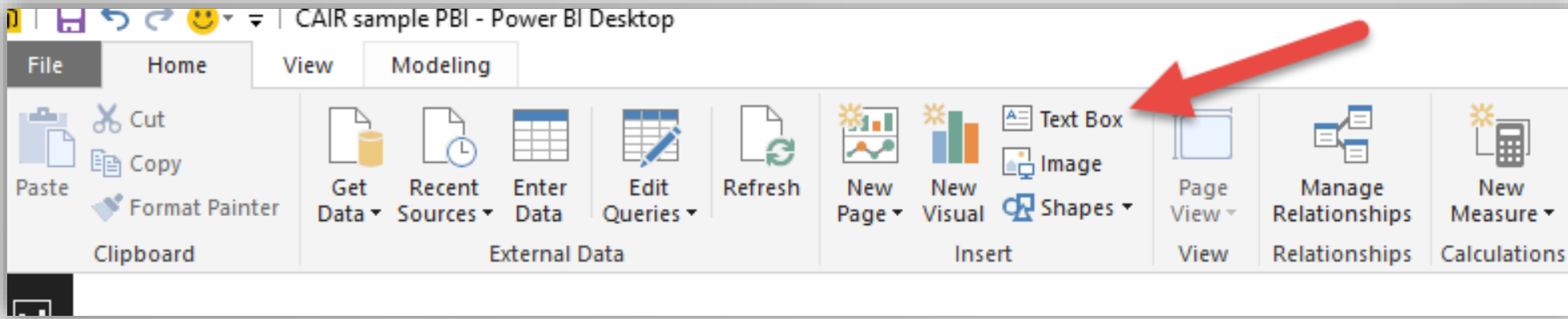
```
Program Degree = [Program]&" "&[Degree]
```



ID	Academic Year	Quarter	County	State	Country
33072710	2012	4	San Bernardino	CA	United States
59210776	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

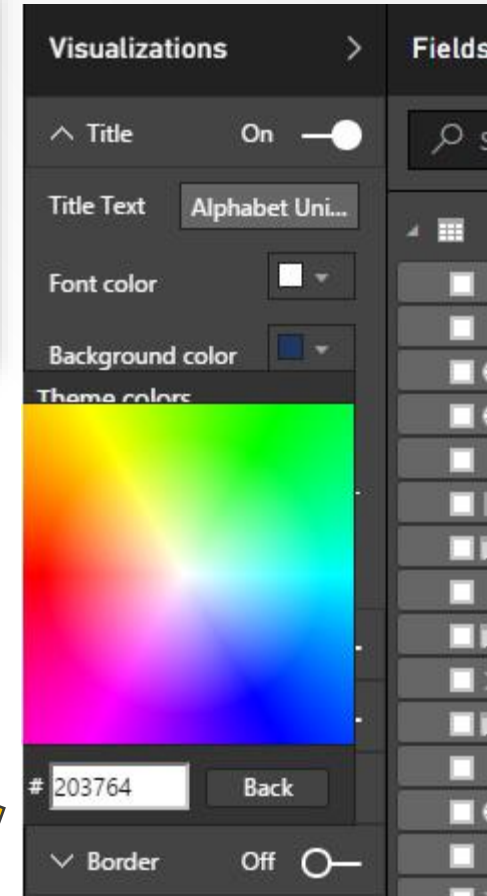
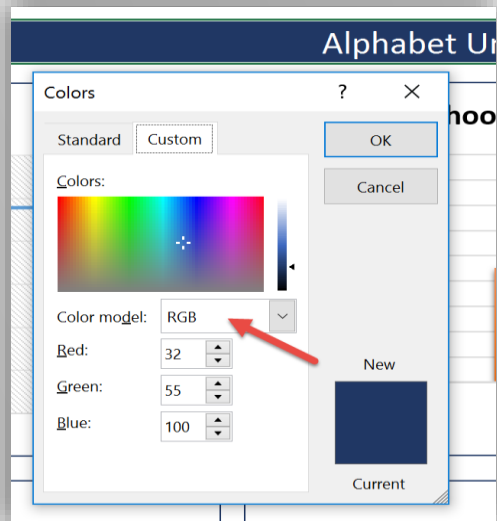
San Bernardino

Adding a Title



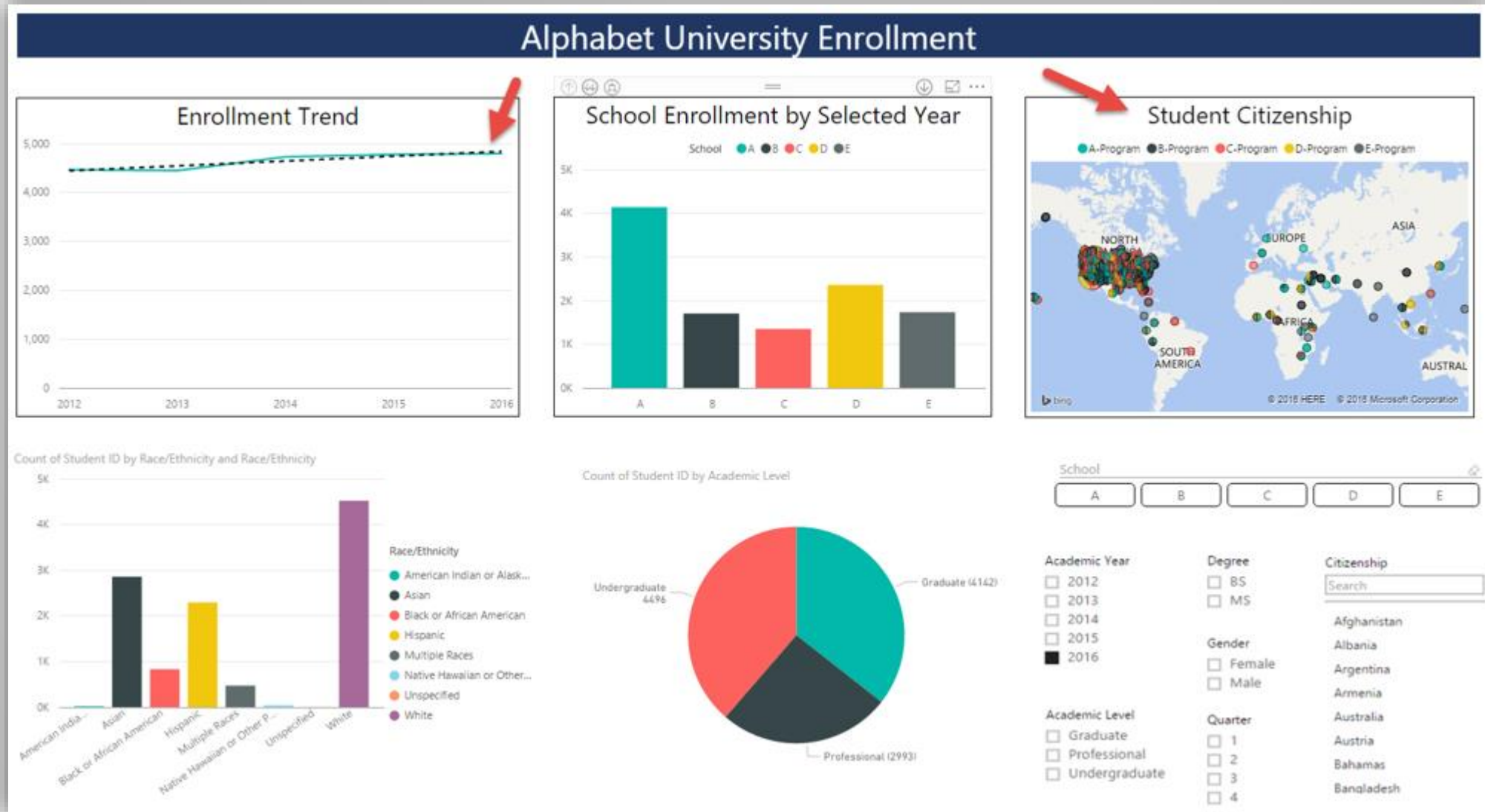
Alphabet University Enrollment

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

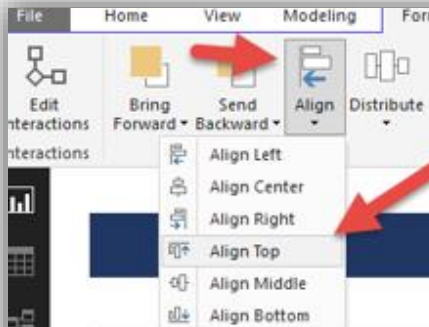


Bringing it All Together

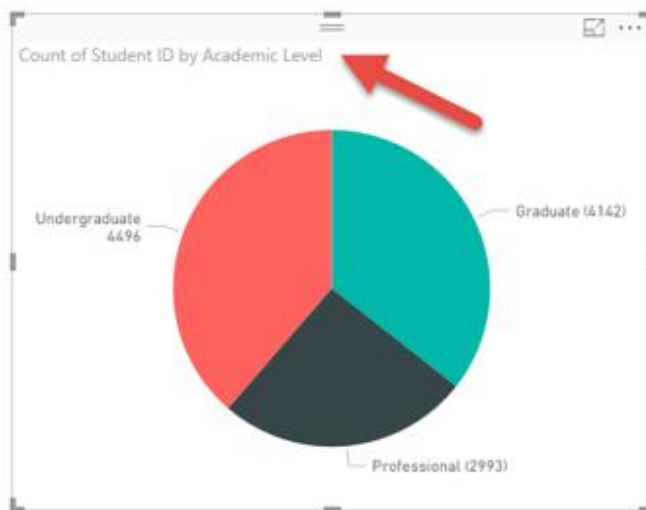
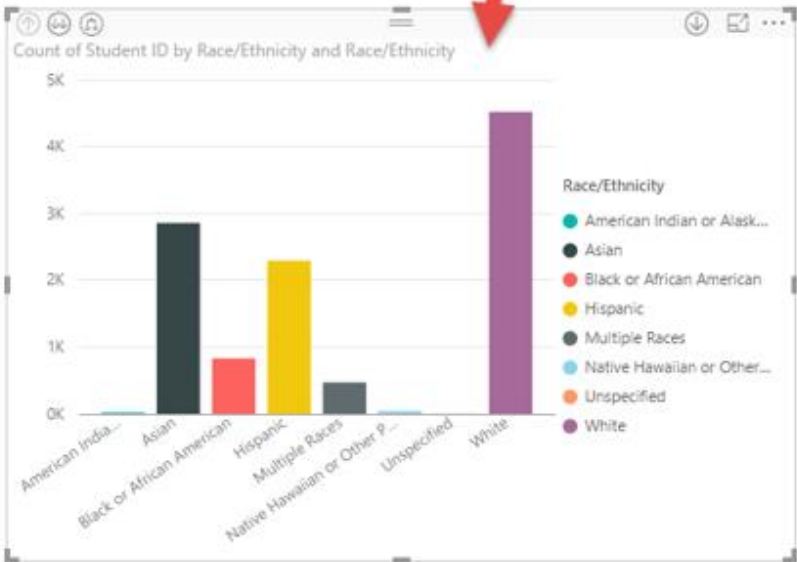
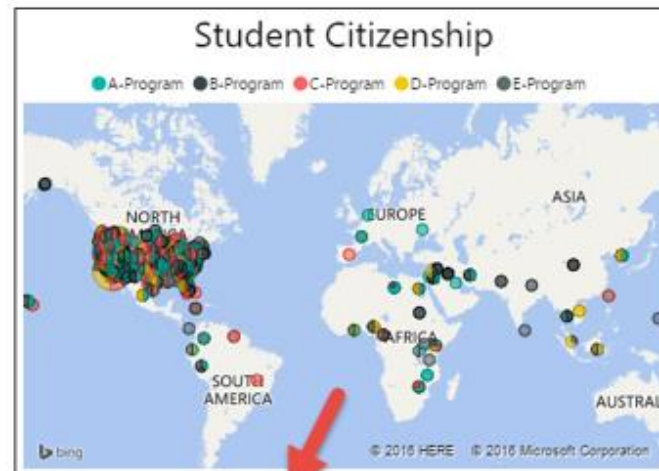
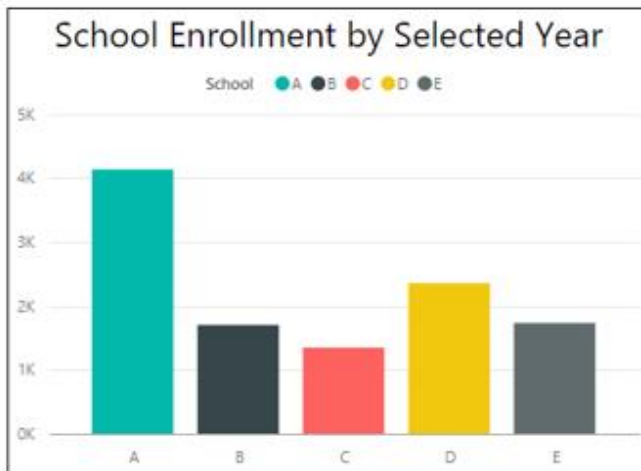
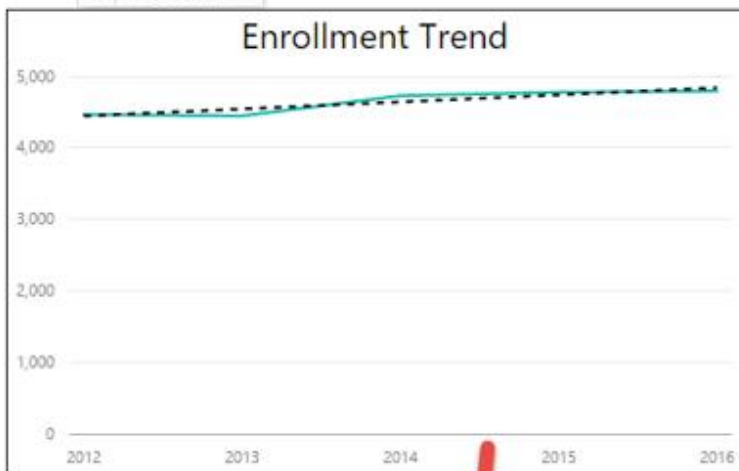
We've added some titles – still more to add below



Formatting Alignment



Alphabet University Enrollment



School

A B C D E

Academic Year

2012 2013 2014 2015 2016

Degree

BS MS

Citizenship

Search

Afghanistan
Albania
Argentina
Armenia
Australia
Austria
Bahamas
Bangladesh

Gender

Female Male

Academic Level

Graduate Professional Undergraduate

Quarter

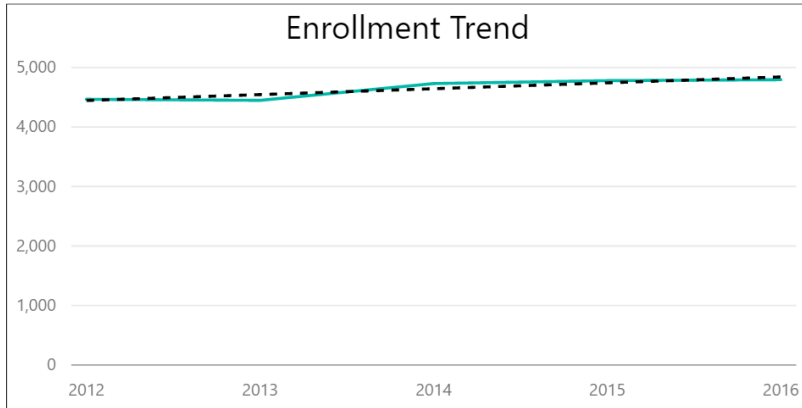
1 2 3 4

Ready to Publish

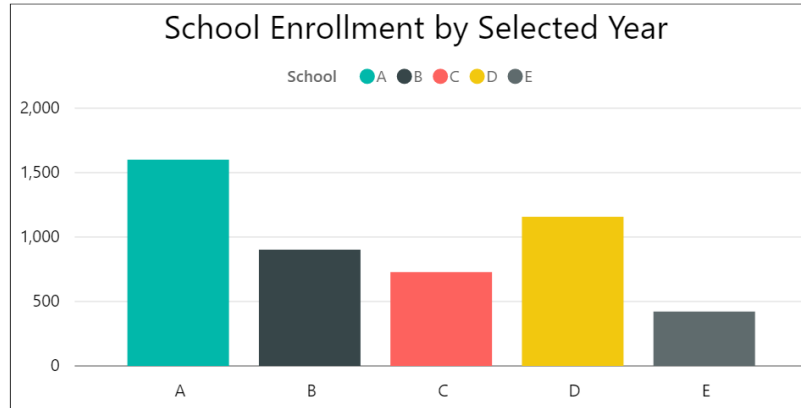
Alphabet University Enrollment

Selected Students = 4794

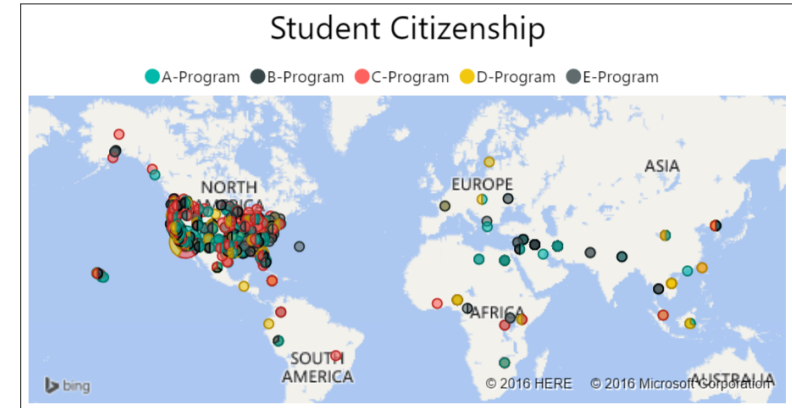
Enrollment Trend



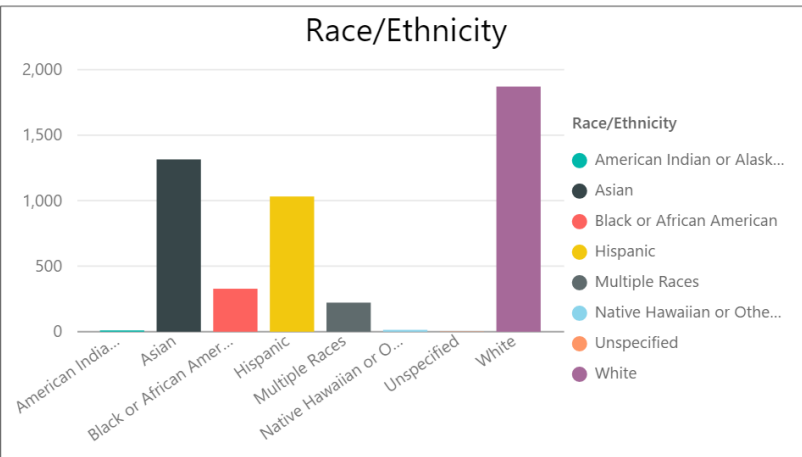
School Enrollment by Selected Year



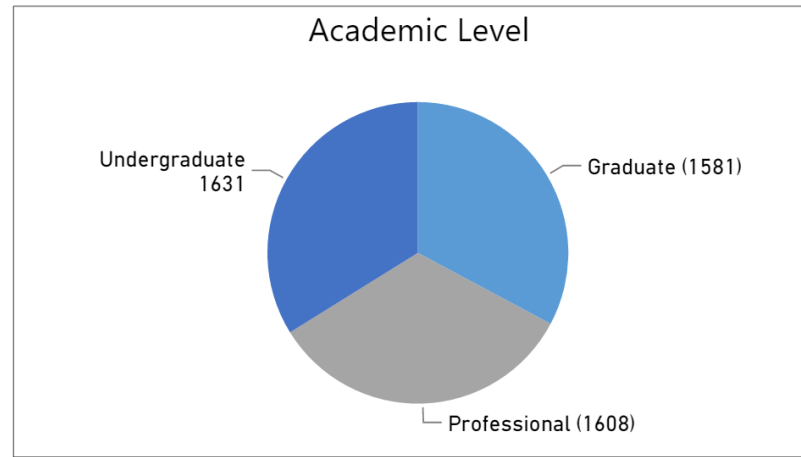
Student Citizenship



Race/Ethnicity



Academic Level



School

A
 B
 C
 D
 E

Academic Year

2012
 2013
 2014
 2015
 2016

Degree

BS
 MS

Gender

Female
 Male

Academic Level

Graduate
 Professional
 Undergraduate

Quarter

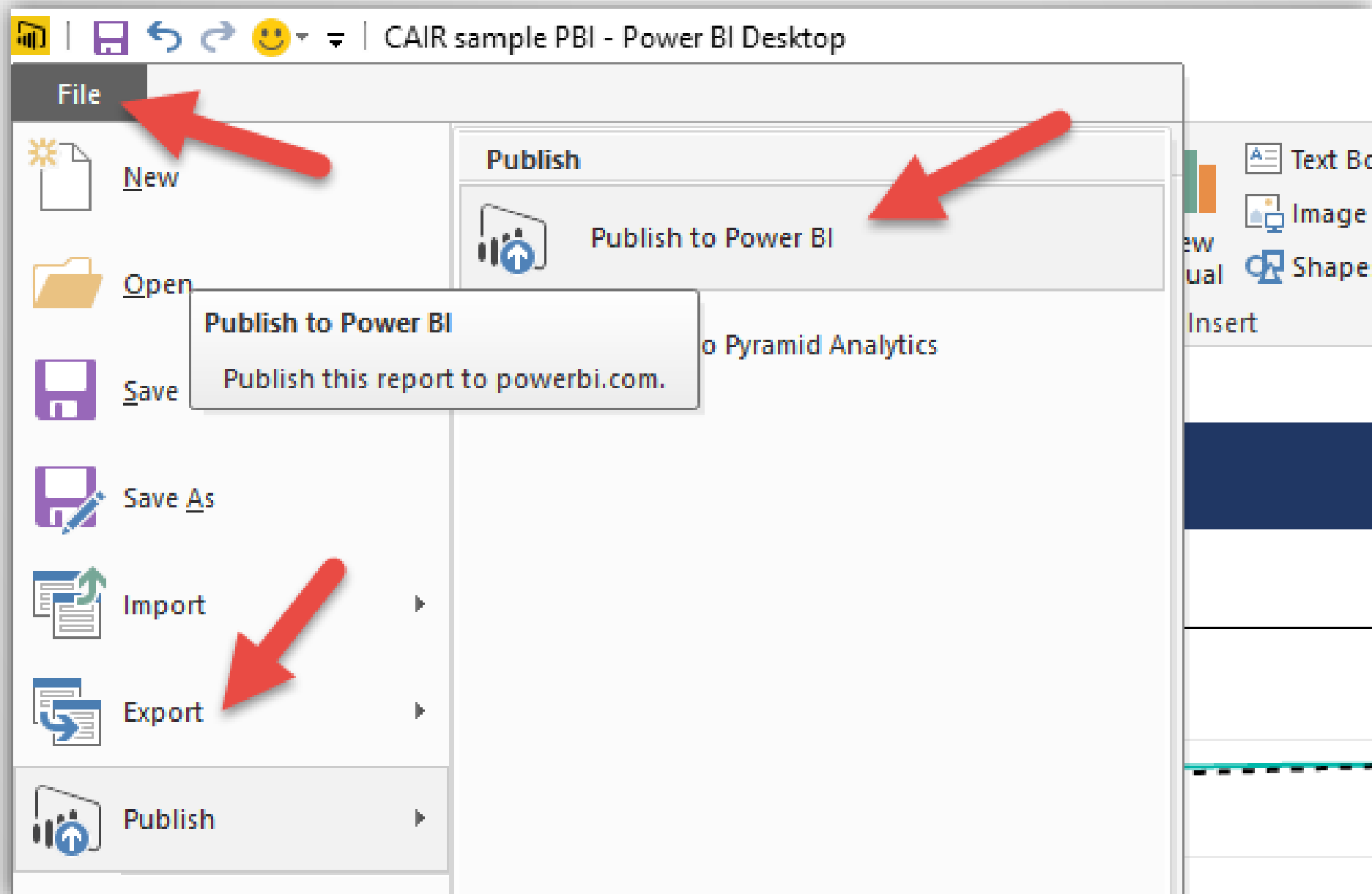
1
 2
 3
 4

Citizenship

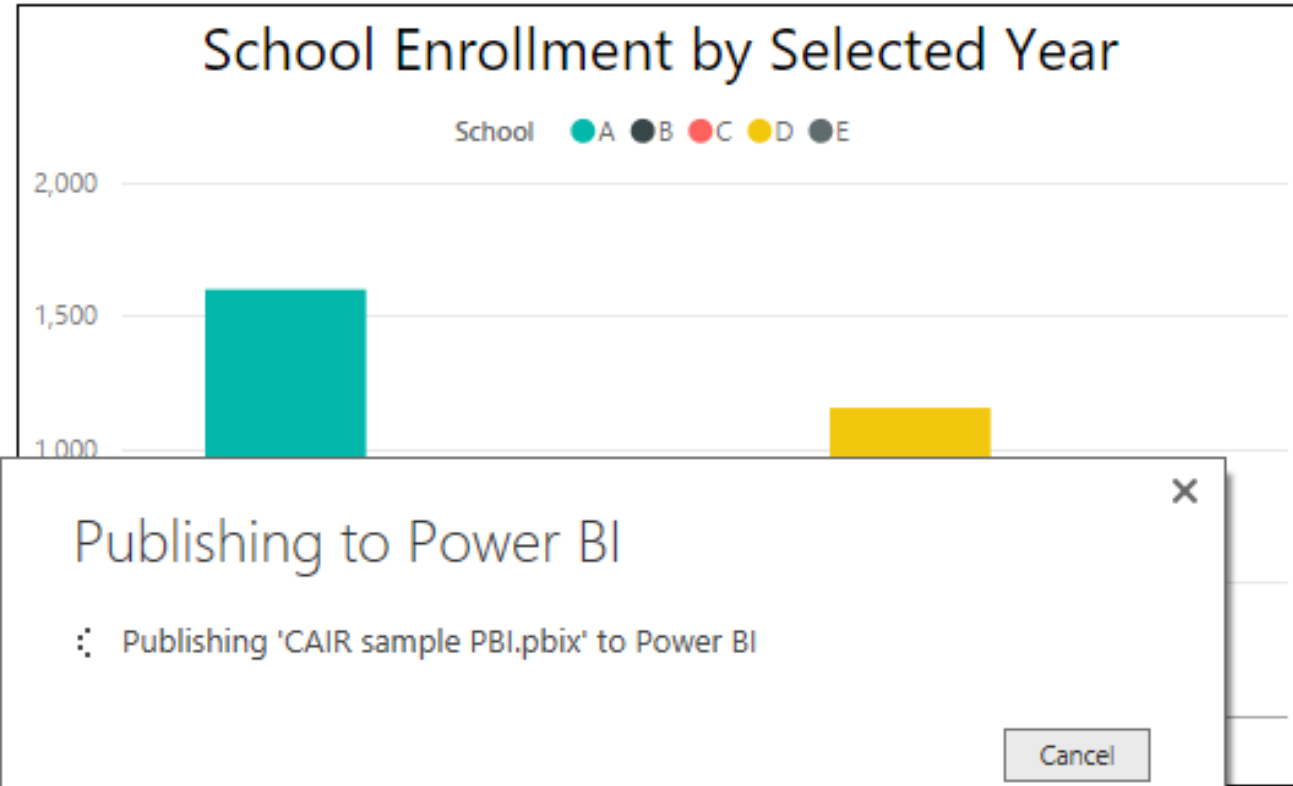
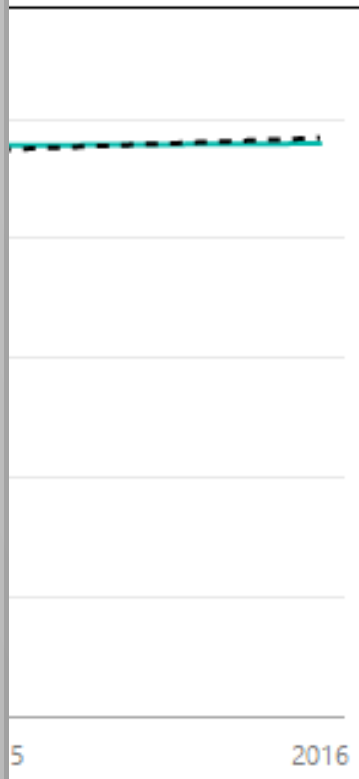
Search

- Argentina
- Armenia
- Austria
- Bangladesh
- Belarus
- Bermuda (UK)
- Brazil
- Cameroon

Select File, Export, Publish to Power BI



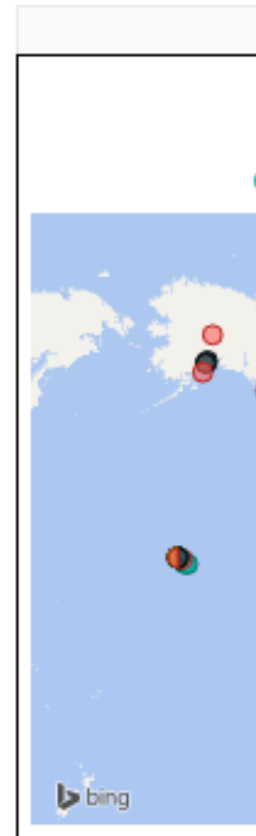
Alphabet University Enrollment



Publishing to Power BI

⌄ Publishing 'CAIR sample PBI.pbix' to Power BI

Cancel



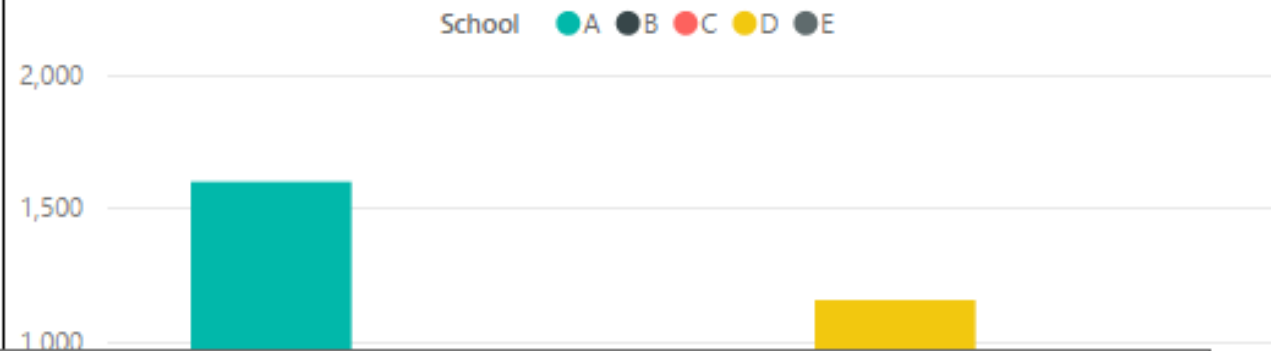
School

A

Academic

Alphabet University Enrollment

School Enrollment by Selected Year



Publishing to Power BI

✓ Success!

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

[Get Quick Insights](#)

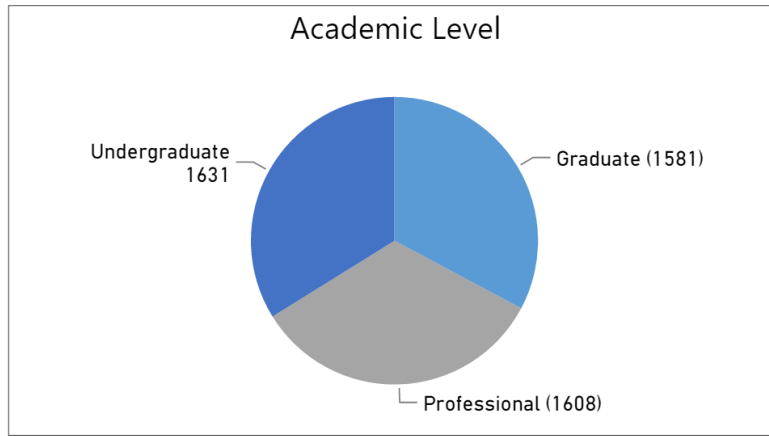
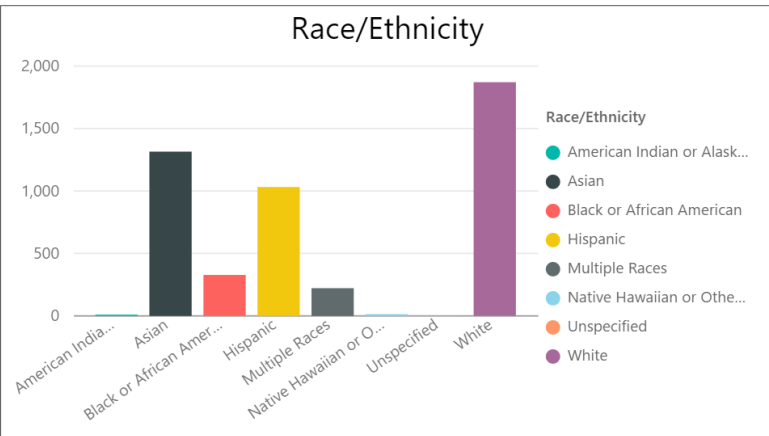
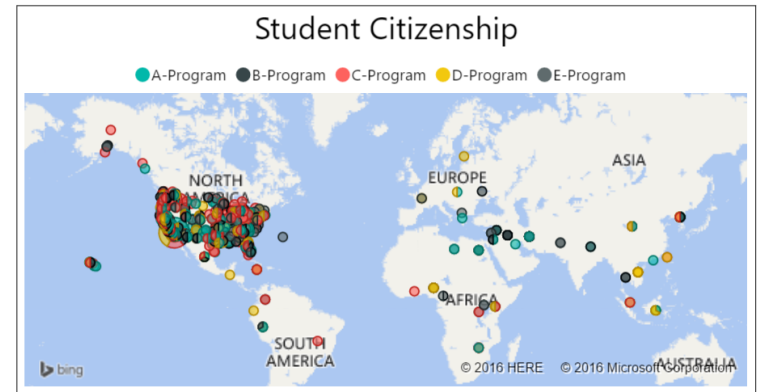
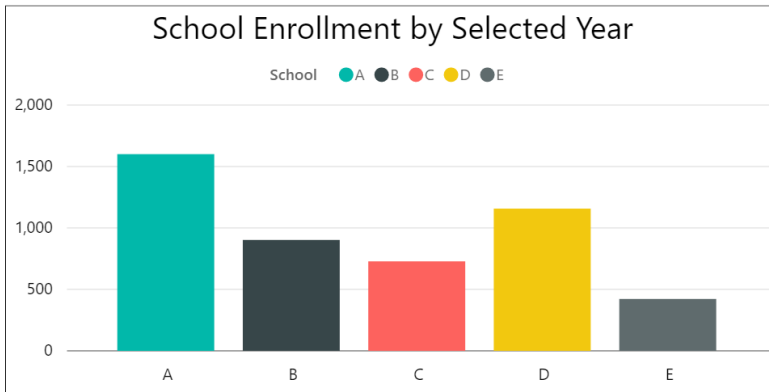
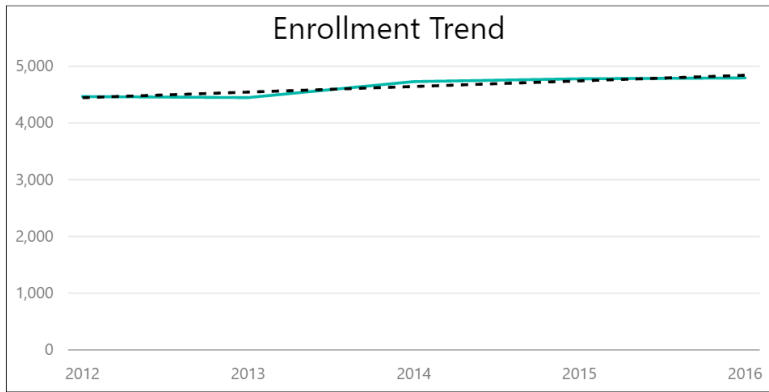
Got it

2016

School

Success – Now We Need a URL

Alphabet University Enrollment Selected Students = 4794



School

A B C D E

Academic Year: 2012 2013 2014 2015 2016

Degree: BS MS

Gender: Female Male

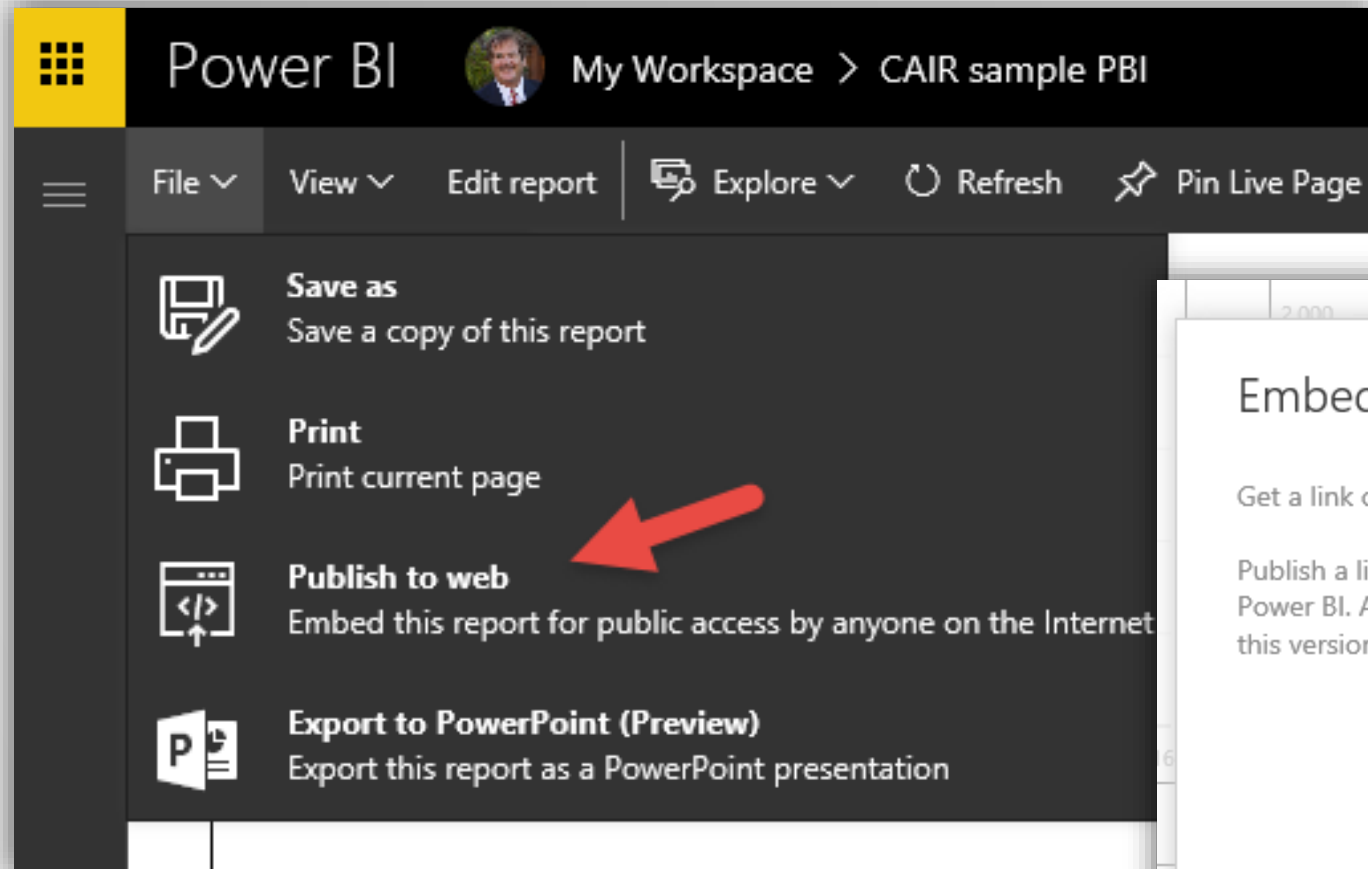
Academic Level: Graduate Professional Undergraduate

Quarter: 1 2 3 4

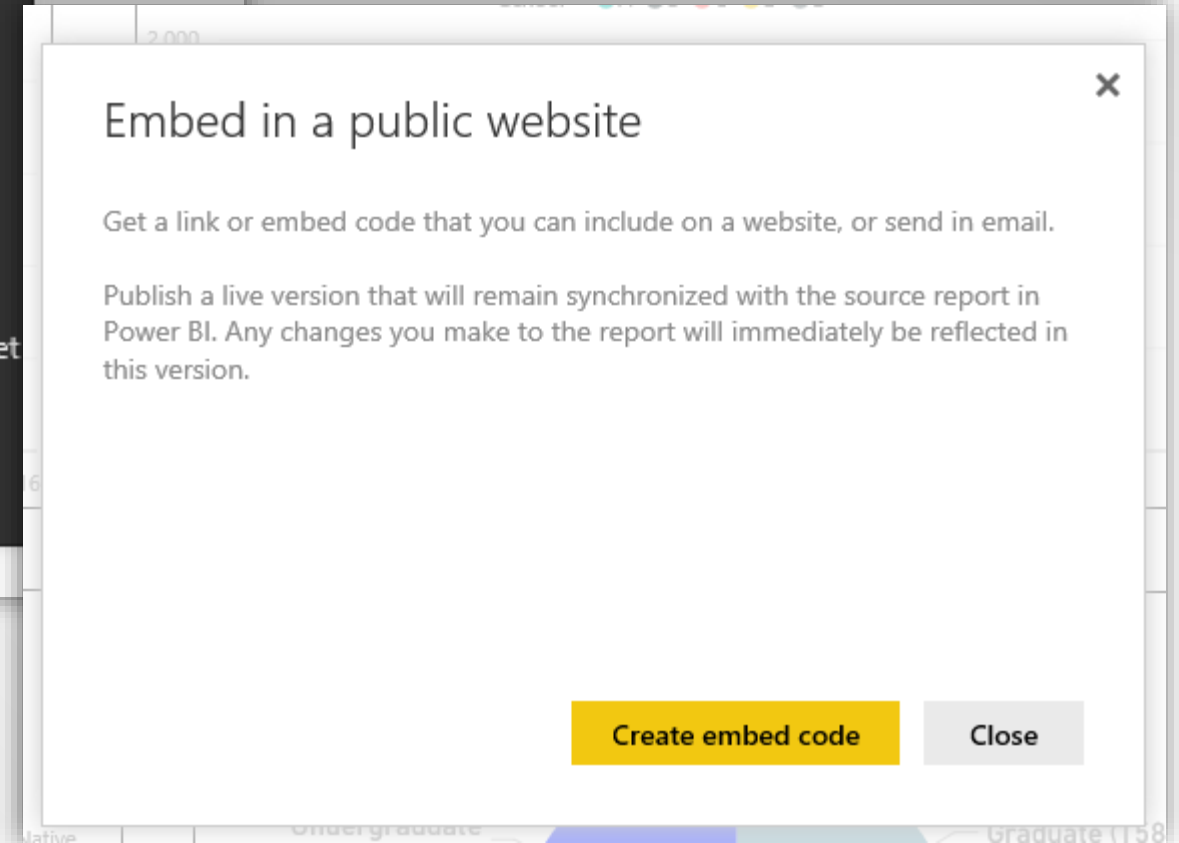
Citizenship:

- Argentina
- Armenia
- Austria
- Bangladesh
- Belarus
- Bermuda (UK)
- Brazil
- Cameroon

Publish to Web – URL or Embed Code



The screenshot shows the Power BI application interface. At the top, the title bar reads "Power BI" followed by a user profile picture and "My Workspace > CAIR sample PBI". Below this is a ribbon with tabs for "File", "View", "Edit report", "Explore", "Refresh", and "Pin Live Page". The "File" tab is active, displaying a list of actions: "Save as" (Save a copy of this report), "Print" (Print current page), "Publish to web" (Embed this report for public access by anyone on the Internet), and "Export to PowerPoint (Preview)" (Export this report as a PowerPoint presentation). A red arrow points to the "Publish to web" option.



The dialog box is titled "Embed in a public website" and contains the following text:

Get a link or embed code that you can include on a website, or send in email.

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 of the dialog, there are two buttons: "Create embed code" (highlighted in yellow) and "Close".

MAJOR CAUTION

Embed in a public website


You are about to create an embed code for this report. Once published, anyone on the Internet will be able to access the report and the data it contains.

Before publishing this report, ensure you have the right to share the data and visualizations publicly. Do not publish confidential or proprietary information. If in doubt, check your organization's policies before publishing.


Publish Close

URL and Embed Code

Success! ✕

Link you can send in email 

```
https://app.powerbi.com/view?r=eyJrljoiN2U3ODNmYjQtZjgyYS00MmY1
```

Html you can paste into your blog or website 

```
<iframe width="800" height="600" src="https://app.powerbi.com/view?r
```

Size

680 x 510 px
800 x 600 px
933 x 700 px

Close

URL for the Dashboard

<https://app.powerbi.com/view?r=eyJrIjoiaN2U3ODNmYjQtZjgyYS00MmY1LWExMDgtNjg1MTU0MjM2NWQ2IiwidCI6ImYwNjdhMGY4LWIyNzQtNGE5Ni1hMTcwLTJlY2JhNmIxYmI1YSIsImMiOiZ9>

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
Total	100 %	4794	4794

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
Total	100 %	4794	4794

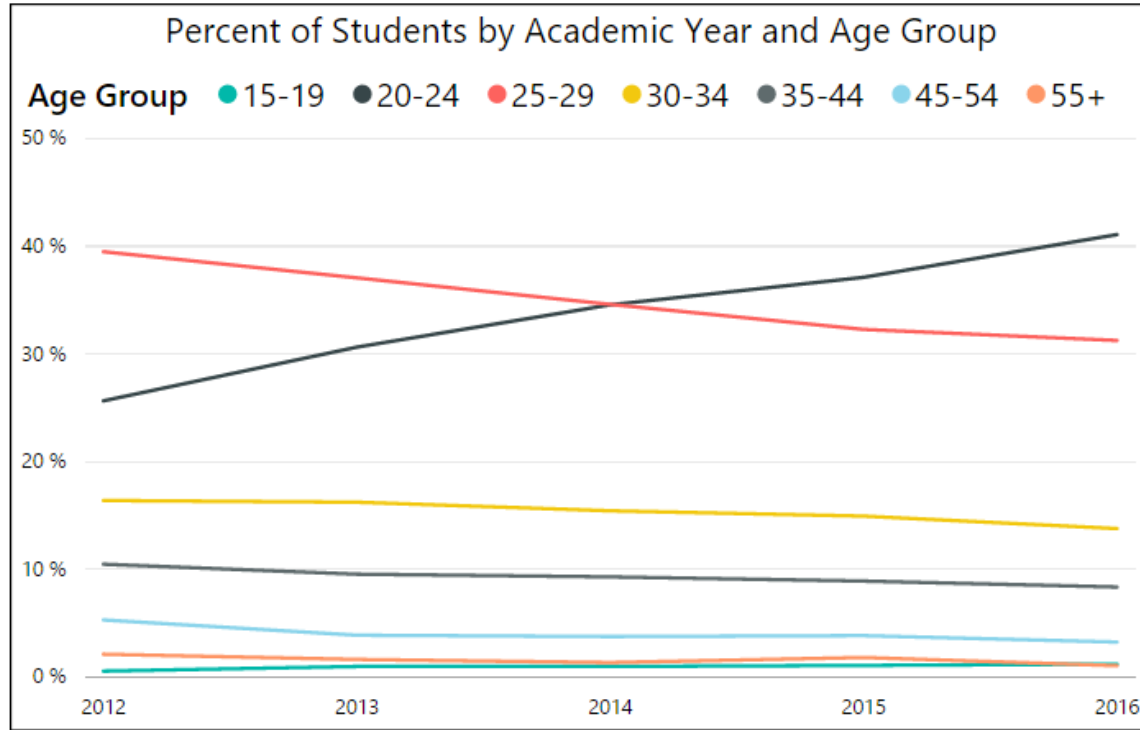
Percent of Students =

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



Age Group

- 15-19
- 20-24
- 25-29
- 30-34
- 35-44
- 45-54
- 55+

Race/Ethnicity

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

Academic Year

- 2012
- 2013
- 2014
- 2015
- 2016

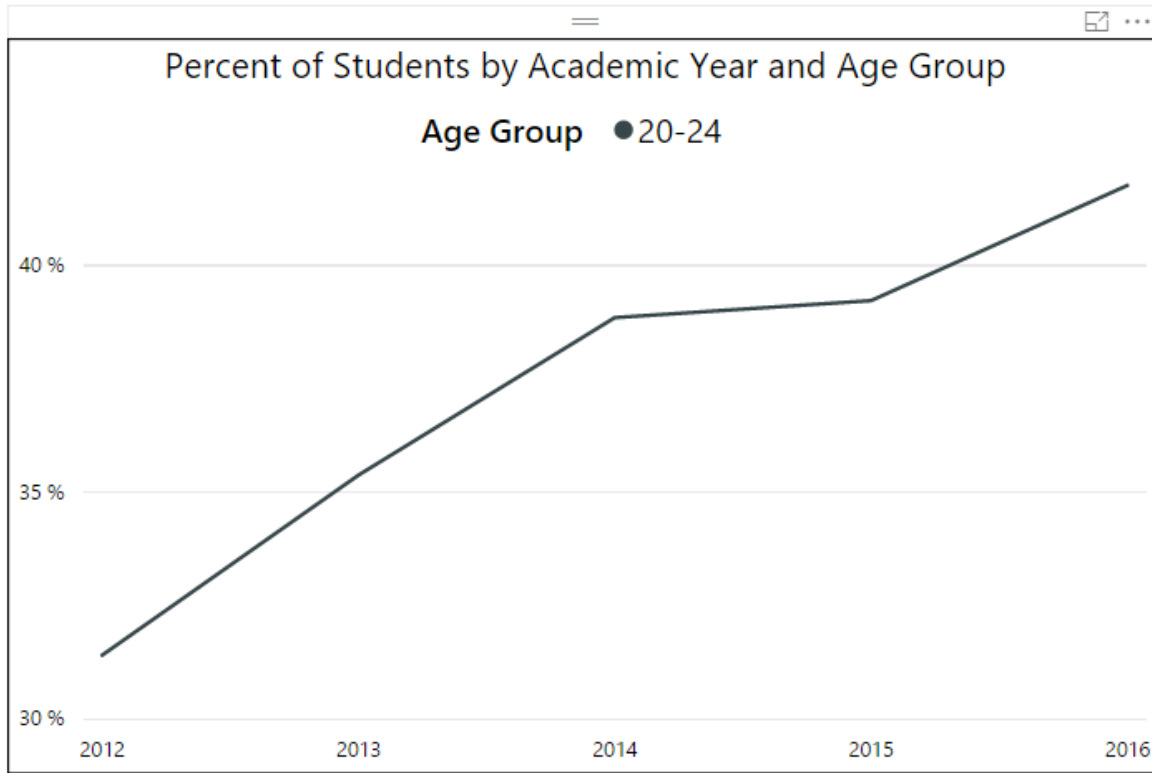
Age Group	Percent of Students	Students	Calculate Age Group
15-19	1 %	58	4794
20-24	41 %	1969	4794
25-29	31 %	1498	4794
30-34	14 %	661	4794
35-44	8 %	401	4794
45-54	3 %	156	4794
55+	1 %	51	4794
Total	100 %	4794	4794

4794
Students

4794
Calculate Age Group

100 %
Percent of Students

CALCULATE Function - Age Group as a Percentage of Enrollment Selected



Age Group

- 15-19
- 20-24
- 25-29
- 30-34
- 35-44
- 45-54
- 55+

Race/Ethnicity

- American Indian or Alaska Native
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- Black or African American
- Hispanic
- Multiple Races
- Native Hawaiian or Other Pacific Islander
- White

Academic Year

- 2012
- 2013
- 2014
- 2015
- 2016

Age Group	Percent of Students	Students	Calculate Age Group
20-24	42 %	431	1032
Total	42 %	431	1032

431

Students

1032

Calculate Age Group

42 %

Percent of Students



THANKS FOR ATTENDING!

Contact Info:

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