Stony Brook
University

Stony Brook University

Creating Tableau Dashboards with IPEDS Data: How To, Tips, and Tricks

2016 Association for Institutional Research Annual Forum

Sean V. Hoffman, Institutional Research Analyst

Office of Institutional Research, Planning & Effectiveness

Stony Brook University

Goals

- To learn what data are available in the IPEDS data center, and how to retrieve them.
- To be able to use these data to create a basic benchmarking dashboard with Tableau.
- To review some advanced techniques for creating more useful and informative visualizations in Tableau.
- To gain an understanding of how these dashboards can be used to aid in institutional research and planning.

Agenda

Tableau basics

The IPEDS Data Center

Building a dashboard – Admissions Data

- Basic – Filters and calculated fields
- Intermediate – Parameters and more calculated fields

Advanced techniques

- Comparison charts
- Chart switching on a dashboard
- Dashboard actions

Uses for Institutional Research

Questions

Tableau Desktop

- Create, manage, edit, and update workbooks locally. Can be deployed to a server (campus, public or online).
- Personal vs Professional – Need professional for DB connections

Tableau Server

- View and edit published workbooks in a secure environment

Tableau Online

Tableau Public

- Free, but not secure

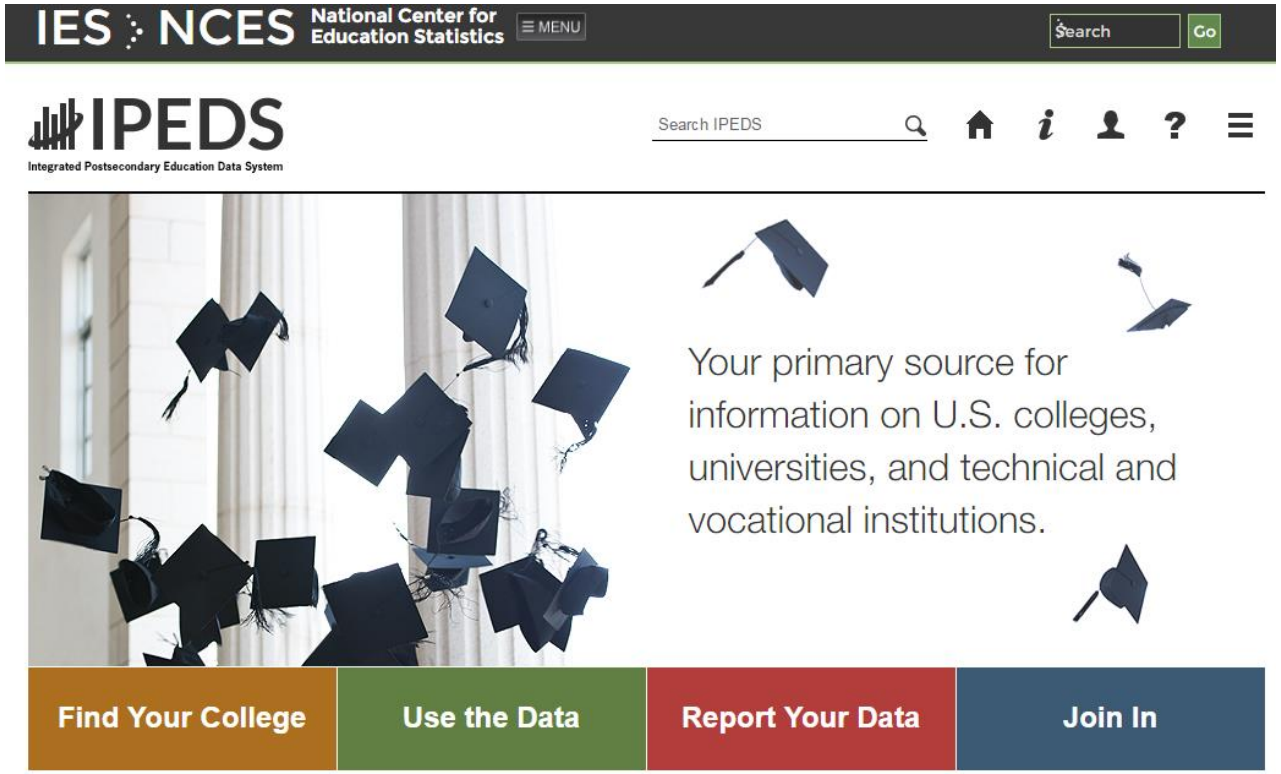
Tableau Reader

- View and interact with dashboards

Backwards compatibility issues

Stony Brook University

IPEDS DATA CENTER: WHAT'S AVAILABLE



All data reported to IPEDS is available, as well as copies of the actual surveys submitted

Find Your College

-College navigator

-College scorecard

Use the Data

-IPEDS Data Center

-Customizable, downloadable data

Report Your Data

-Log in to complete surveys

-Collection Level Data Center (Most recent data available)

Join In

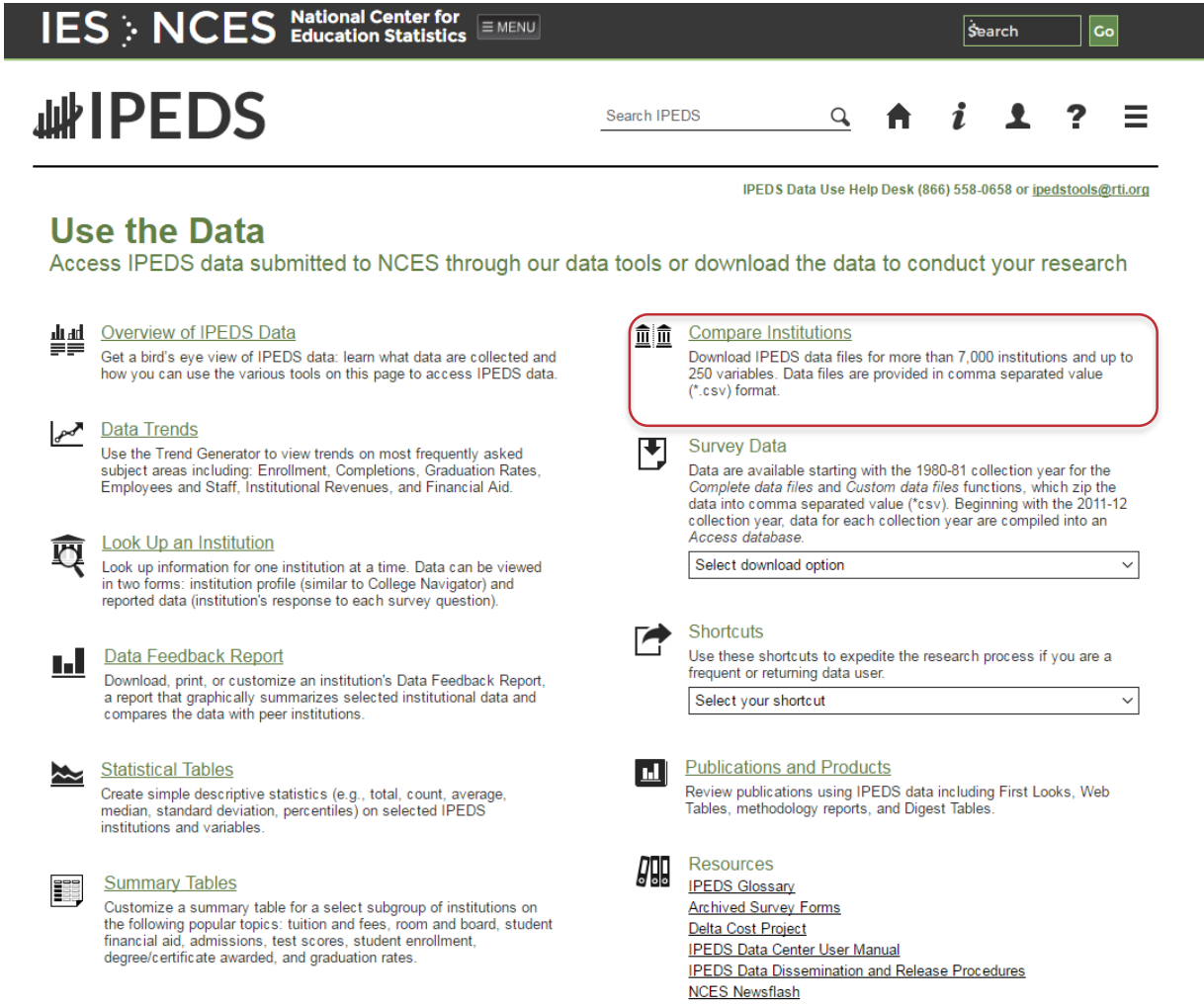
-Training

-Resources

Stony Brook University

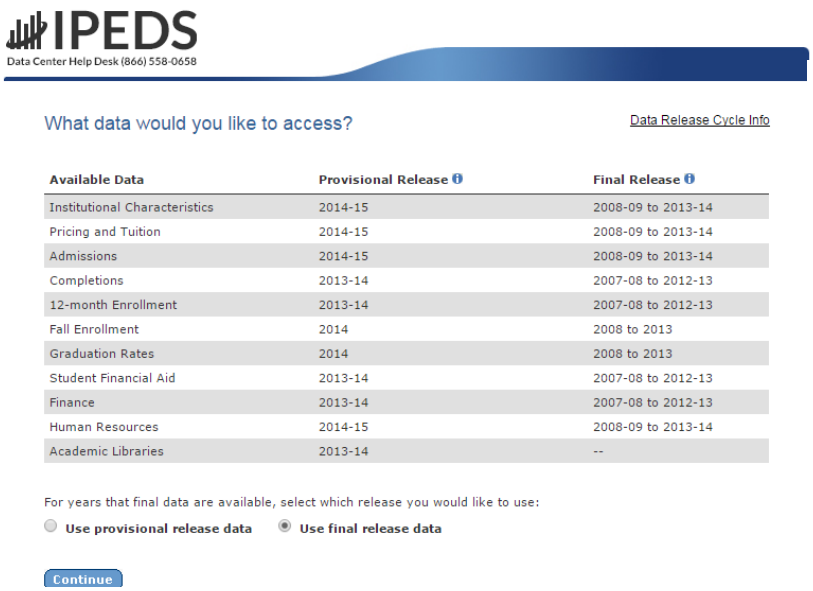
IPEDS DATA CENTER: WHAT'S AVAILABLE

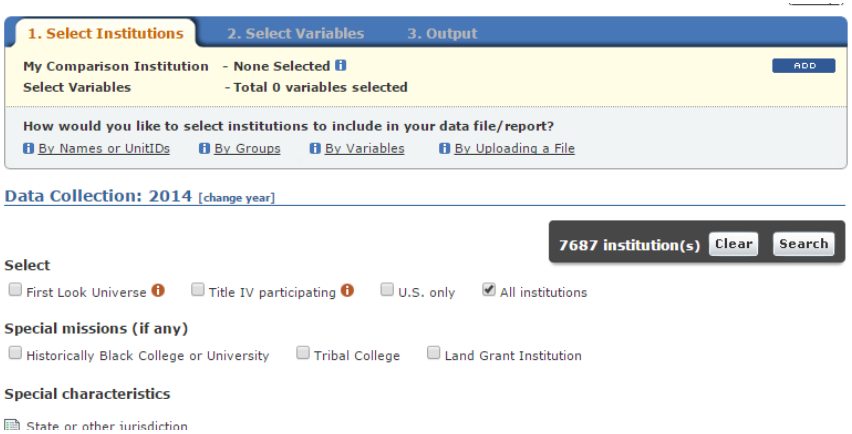
- For this exercise we will use "Compare Institutions"



Stony Brook University

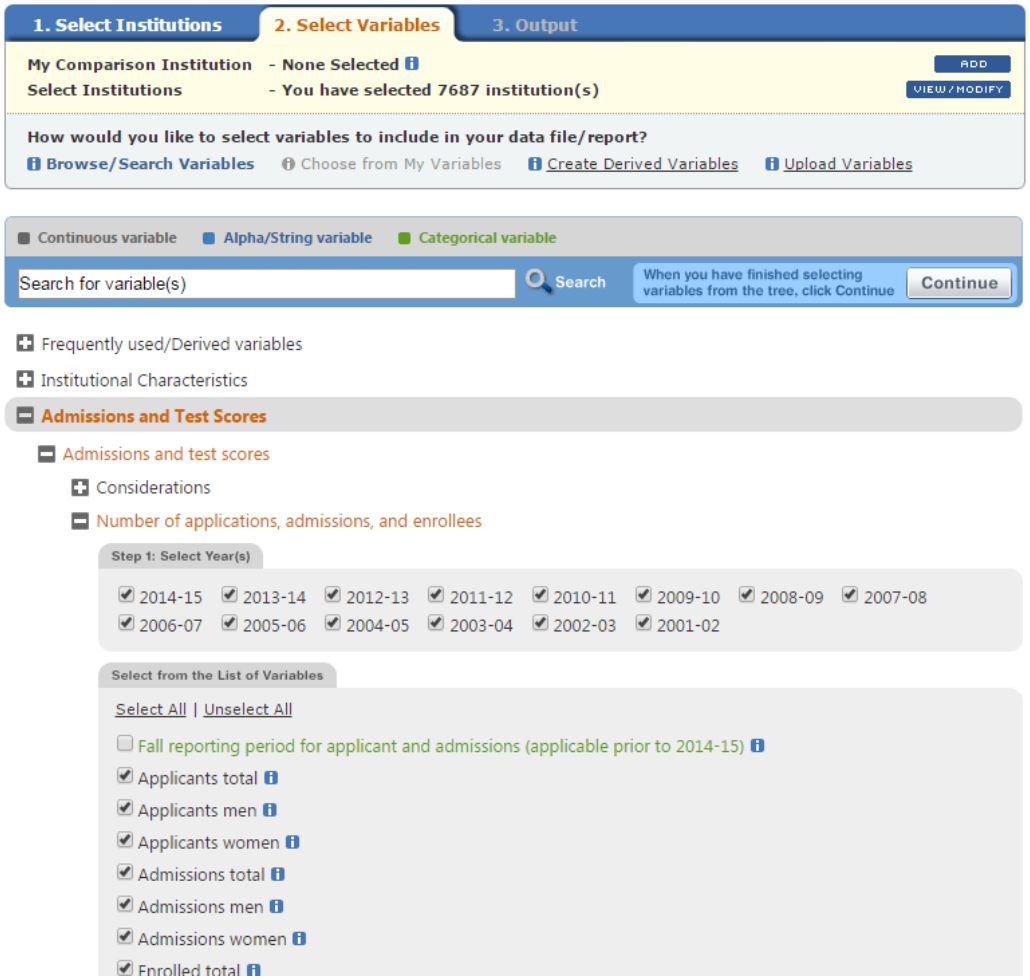
IPEDS DATA CENTER: WHAT'S AVAILABLE





- Data from all surveys are available (final or provisional)
- Collection level data center allows access to current year (Go back to main page → Click Report Your Data → "Answer The Current Survey" → Log In → Click "Tools" → Click "Go to Collection Level Data Center)
- Select institutions: can create groups, use groups, or download all (By groups → EZ Group → "All Institutions")

IPEDS DATA CENTER: EXPORTING DATA



-Select the variables you would like (up to 250 for “Compare Institutions”)

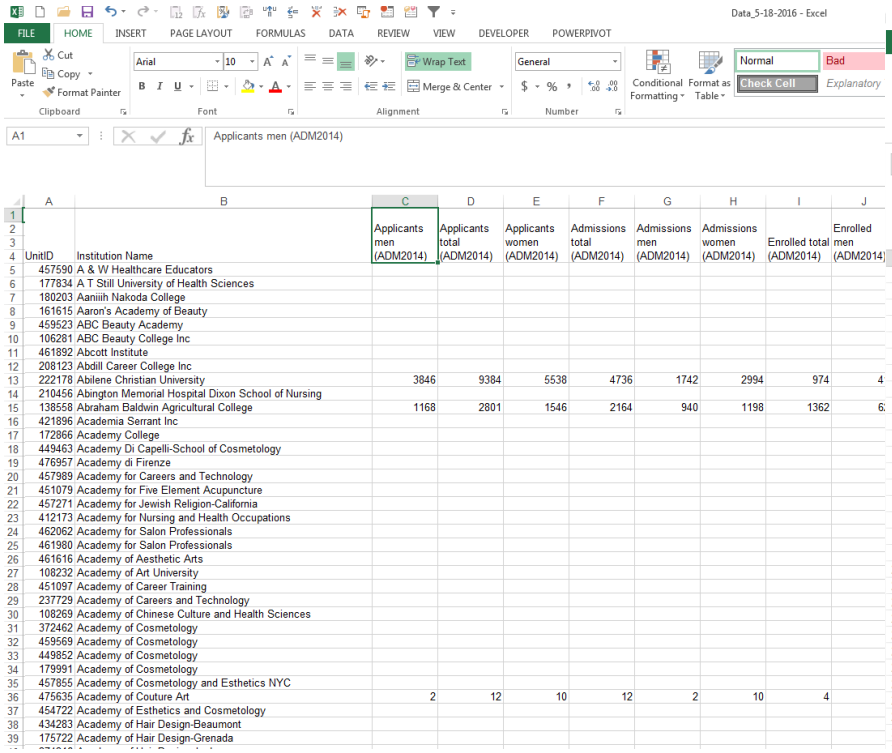
-Click continue

-Download a CSV file

-You can create derived variables if you desire

Stony Brook University

IPEDS DATA CENTER: EXPORTING DATA

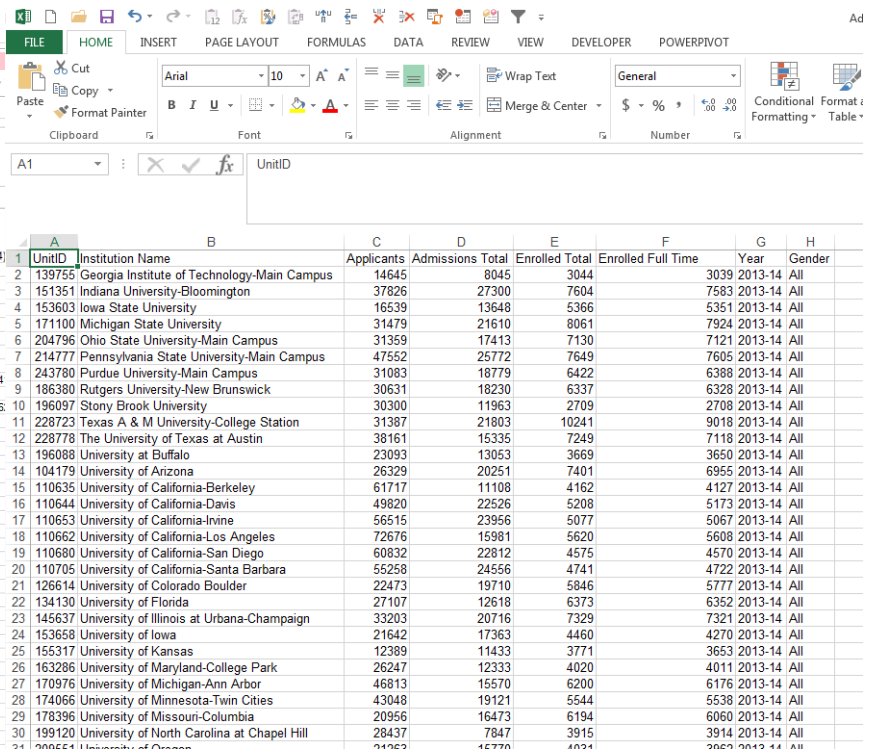


Data_5-18-2016 - Excel

A1: Applicants men (ADM2014)

UnitID	Institution Name	Applicants men (ADM2014)	Applicants total (ADM2014)	Applicants women (ADM2014)	Admissions total (ADM2014)	Admissions men (ADM2014)	Admissions women (ADM2014)	Enrolled total (ADM2014)	Enrolled men (ADM2014)
457590	A & W Healthcare Educators								
177834	A T Still University of Health Sciences								
180203	Aaniiih Nakoda College								
161615	Aaron's Academy of Beauty								
459523	ABC Beauty Academy								
106281	ABC Beauty College Inc								
461892	Abcott Institute								
208123	Abdill Career College Inc								
222178	Abilene Christian University	3846	9384	5538	4736	1742	2994	974	4
210456	Abington Memorial Hospital Dixon School of Nursing								
138558	Abraham Baldwin Agricultural College	1168	2801	1546	2164	940	1198	1362	6
421896	Academia Serrant Inc								
172866	Academy College								
449463	Academy Di Capelli-School of Cosmetology								
476957	Academy di Firenze								
457989	Academy for Careers and Technology								
451079	Academy for Five Element Acupuncture								
457271	Academy for Jewish Religion-California								
412173	Academy for Nursing and Health Occupations								
462062	Academy for Salon Professionals								
461980	Academy for Salon Professionals								
461616	Academy of Aesthetic Arts								
108232	Academy of Art University								
451097	Academy of Career Training								
237729	Academy of Careers and Technology								
108269	Academy of Chinese Culture and Health Sciences								
372462	Academy of Cosmetology								
459569	Academy of Cosmetology								
449852	Academy of Cosmetology								
179991	Academy of Cosmetology								
457855	Academy of Cosmetology and Esthetics NYC								
475635	Academy of Couture Art	2	12	10	12	2	10	4	
454722	Academy of Esthetics and Cosmetology								
434283	Academy of Hair Design-Beaumont								
175722	Academy of Hair Design-Grenada								

CSV from IPEDS



A1: UnitID

UnitID	Institution Name	Applicants	Admissions Total	Enrolled Total	Enrolled Full Time	Year	Gender
139755	Georgia Institute of Technology-Main Campus	14645	8045	3044	3039	2013-14	All
151351	Indiana University-Bloomington	37826	27300	7604	7583	2013-14	All
153603	Iowa State University	16539	13648	5366	5351	2013-14	All
171100	Michigan State University	31479	21610	8061	7924	2013-14	All
204796	Ohio State University-Main Campus	31359	17413	7130	7121	2013-14	All
214777	Pennsylvania State University-Main Campus	47552	25772	7649	7605	2013-14	All
243780	Purdue University-Main Campus	31083	18779	6422	6388	2013-14	All
186380	Rutgers University-New Brunswick	30631	18230	6337	6328	2013-14	All
196097	Stony Brook University	30300	11963	2709	2708	2013-14	All
228723	Texas A & M University-College Station	31387	21803	10241	9018	2013-14	All
228778	The University of Texas at Austin	38161	15335	7249	7118	2013-14	All
196088	University at Buffalo	23093	13053	3669	3650	2013-14	All
104179	University of Arizona	26329	20251	7401	6955	2013-14	All
110635	University of California-Berkeley	61717	11108	4162	4127	2013-14	All
110644	University of California-Davis	49820	22526	5208	5173	2013-14	All
110653	University of California-Irvine	56515	23956	5077	5067	2013-14	All
110662	University of California-Los Angeles	72676	15981	5620	5608	2013-14	All
110680	University of California-San Diego	60832	22812	4575	4570	2013-14	All
110705	University of California-Santa Barbara	55258	24556	4741	4722	2013-14	All
126614	University of Colorado Boulder	22473	19710	5846	5777	2013-14	All
134130	University of Florida	27107	12618	6373	6352	2013-14	All
145637	University of Illinois at Urbana-Champaign	33203	20716	7329	7321	2013-14	All
153658	University of Iowa	21642	17363	4460	4270	2013-14	All
155317	University of Kansas	12389	11433	3771	3653	2013-14	All
163286	University of Maryland-College Park	26247	12333	4020	4011	2013-14	All
170976	University of Michigan-Ann Arbor	46813	15570	6200	6176	2013-14	All
174066	University of Minnesota-Twin Cities	43048	19121	5544	5538	2013-14	All
178396	University of Missouri-Columbia	20956	16473	6194	6060	2013-14	All
199120	University of North Carolina at Chapel Hill	28437	7847	3915	3914	2013-14	All

Stacked Panel

-Each element is downloaded as a separate column. This file can be quickly chopped up to work well in Tableau.

-For this example, we can stack the panel based on year and gender, leaving only 8 columns. This will allow for a better layout in Tableau.

BASIC DASHBOARD: IMPORTING DATA

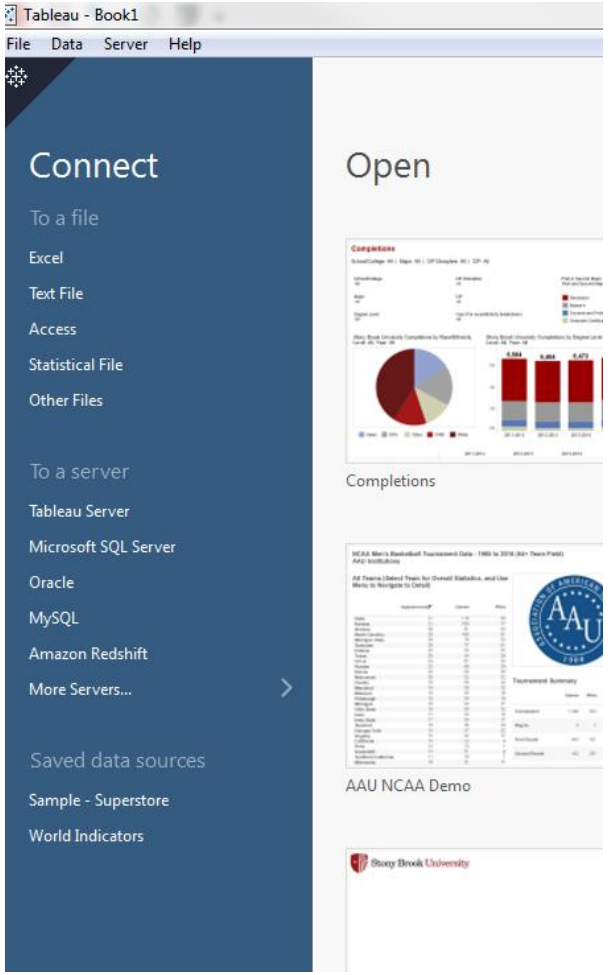
Connect to a file →

-You can edit the file and refresh once you've started.

Connect to a server →

-Need Tableau Desktop Professional

-Can create an extract



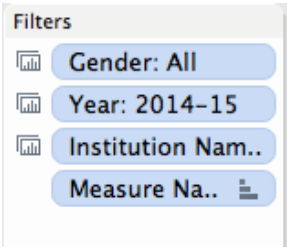
- Let's begin with:

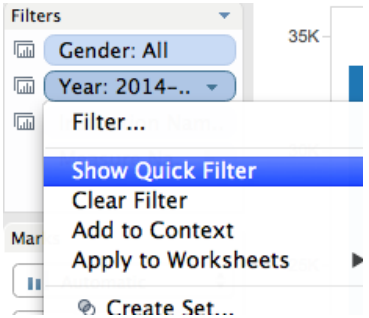
– Filters

» Filters are based off of certain fields (columns)

» Because of the way we stacked the example panel, we can filter, gender, year and school

» *To create, drag the item to the filter shelf. To show, right click and choose "Show Quick Filter"*



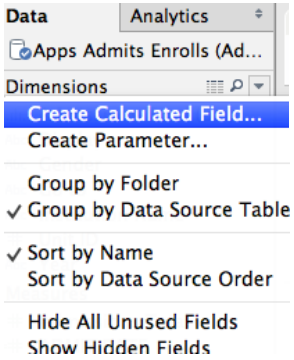


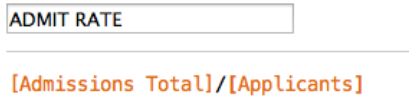
– Calculated fields

» Calculated fields are similar to excel formulas

» We can create fields to calculate admit rate and yield

» *To create, right click in the data tab and select "Create Calculated Field"*





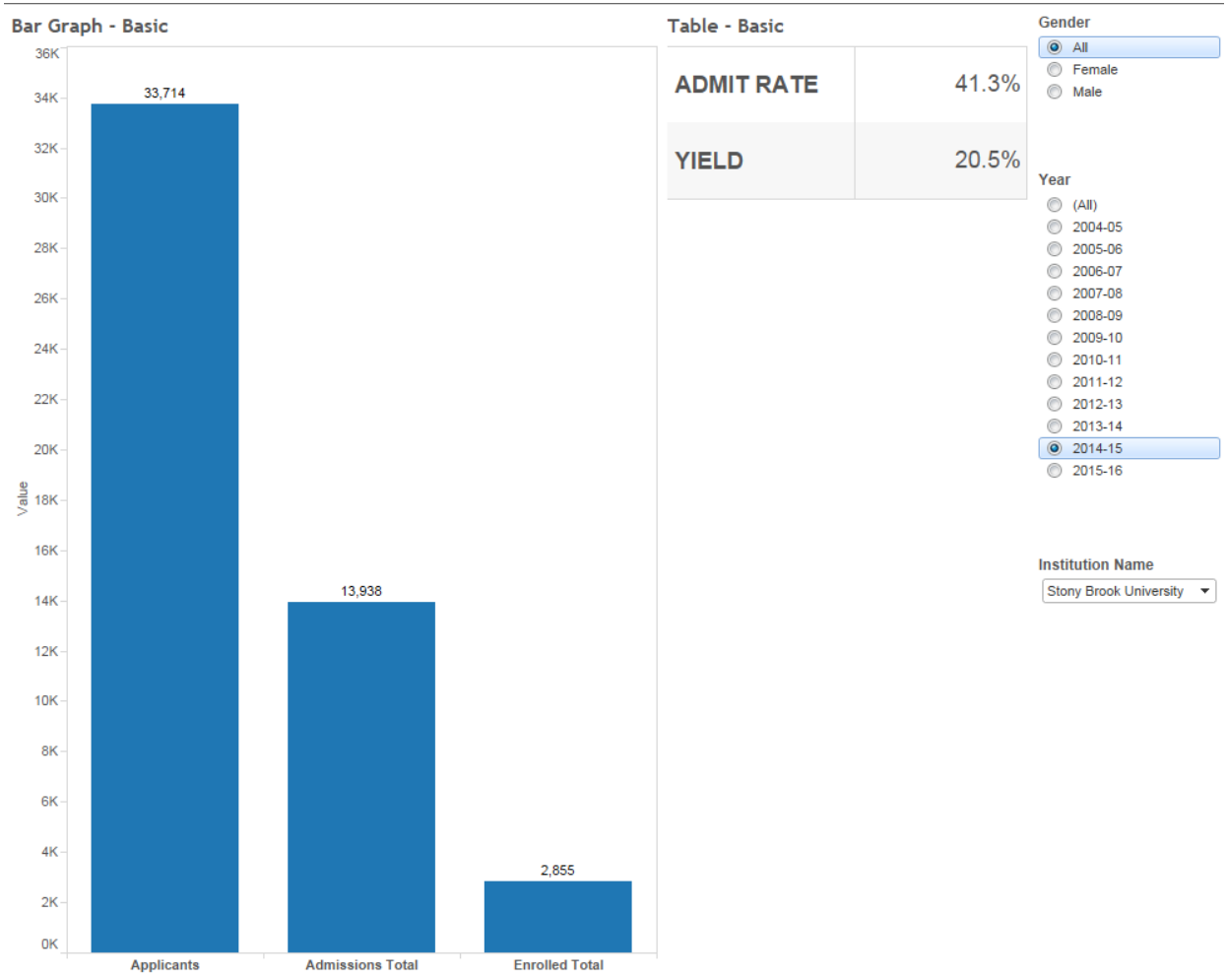
- Now let's create two charts based on the items we have:

– A column chart to display Applications, Admissions and Enrollments

– A table to display Admit rate and yield

Stony Brook University

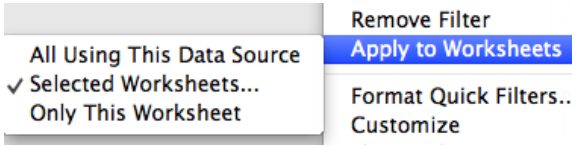
BASIC DASHBOARD

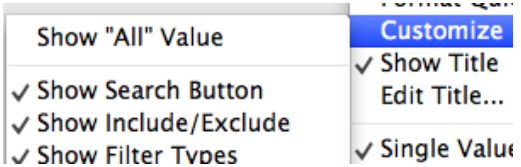


- Now, we can create a new dashboard and add the two charts to it
- Drag the sheets from the dashboard shelf to the dashboard page
- All charts and filters from the sheets will be brought to the dashboard
- We can select each object, and use the dropdown menu to choose to make the object floating (free placement)

Notes about filters:

1) A filter can be set to apply to a sheet, or all sheets using the same source. This allows for you to only need one filter with multiple charts
2) A filter can be set to only show relevant values. This is helpful with long lists of related items. Example: Colleges/Schools and Majors
3) Filters can be set to include an “All” option. In this example, it has been deactivated, as the data set already has an all option

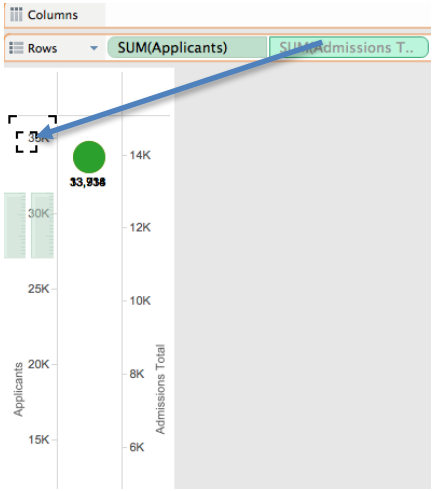




All options can be accessed from the drop down menu on the quick filter

Notes about the charts:

1) To add multiple measures to the measure shelf, start by adding two measures to the row shelf. Then drag one from the row shelf into the axis of the other. This will bring the measures shelf up, and allow you to add more measures directly to it.



- Here is another step to add some functionality to our dashboard. We will use a parameter and calculated field to select one metric to display at a time.

– Parameter

» Parameters allow you to create more complex filters

» Let's create a parameter to choose what specific metric we want to look at in a chart

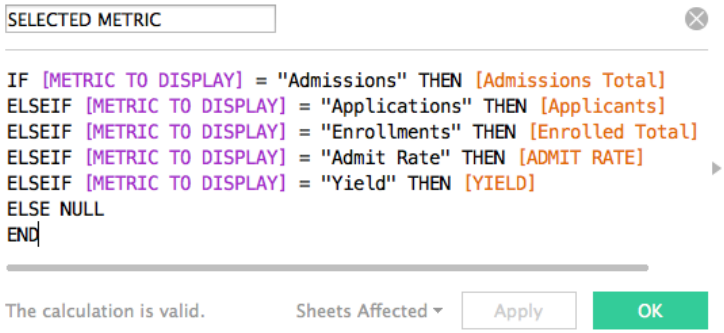
» Create a parameter that allows you to choose from the strings: "Applications", "Admissions", "Enrollments", "Admit Rate" or "Yield Rate"

» *To create, right click in the data tab and select "Create Parameter"*

– Calculated field

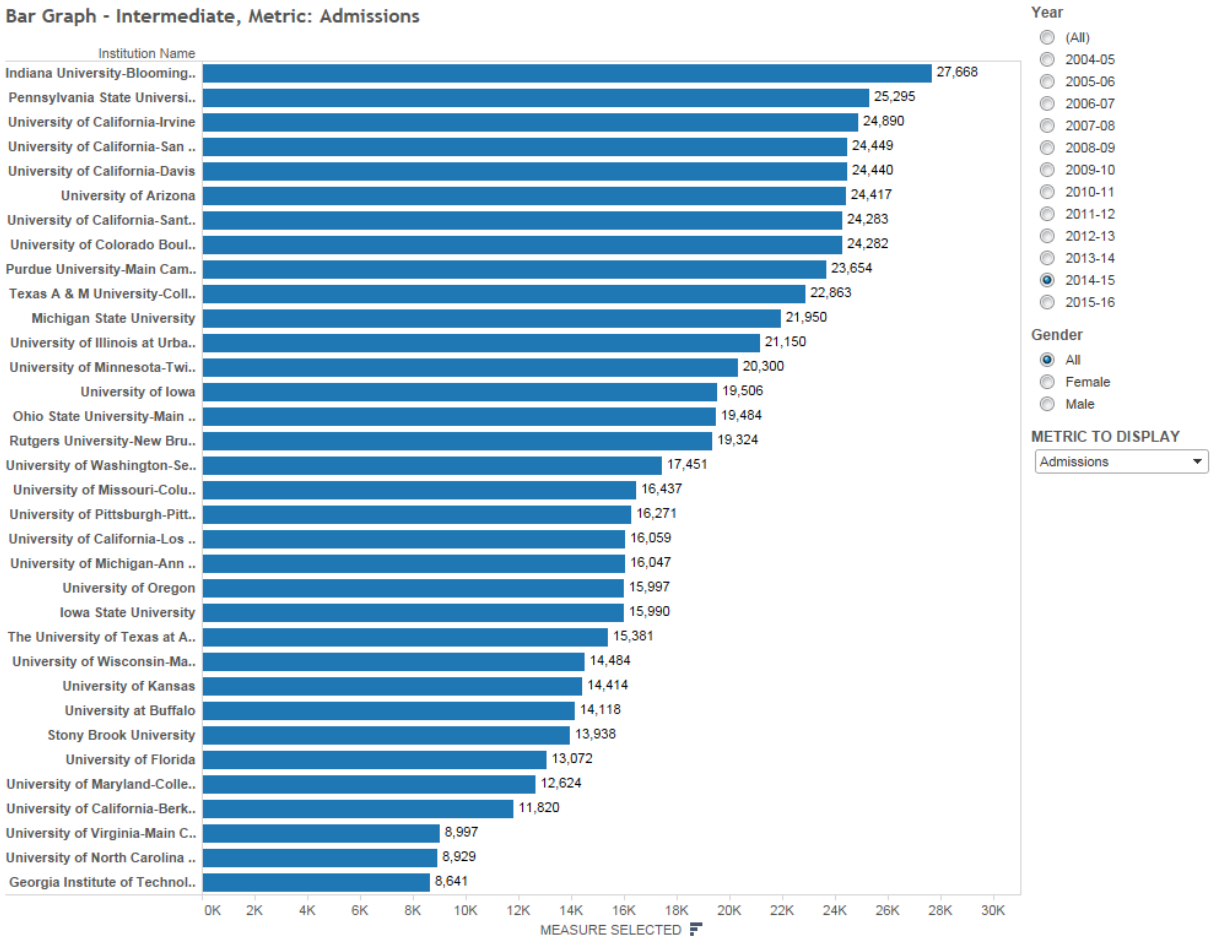
» We can now create a calculated field that uses the parameter to select the item. For example, this field will show Admissions if parameter selected is Admissions.

» This will be a multiple IF statement. In Tableau you must end an IF statement with "END"



- Now let's update our dashboard!

- Observe that we do not need to store multiple metrics in multiple tables (or one table with multiple columns)
- This can help when space is limited
- This allows for easy benchmarking on one metric



Limitations of the dashboard

1. Benchmarking: What if we want to focus on our institution, or another selected institution?
2. Data types: Our graphs and labels will not work for multiple data types
3. Size and content: How much is too much for one dashboard?

Advanced techniques to address the limitations

1. Comparison Charts – Create a benchmarking chart
2. Chart Switching – Select a chart based on the data you wish to display
3. Dashboard Actions – Switch between dashboards (or other links) and create filters that pass between charts

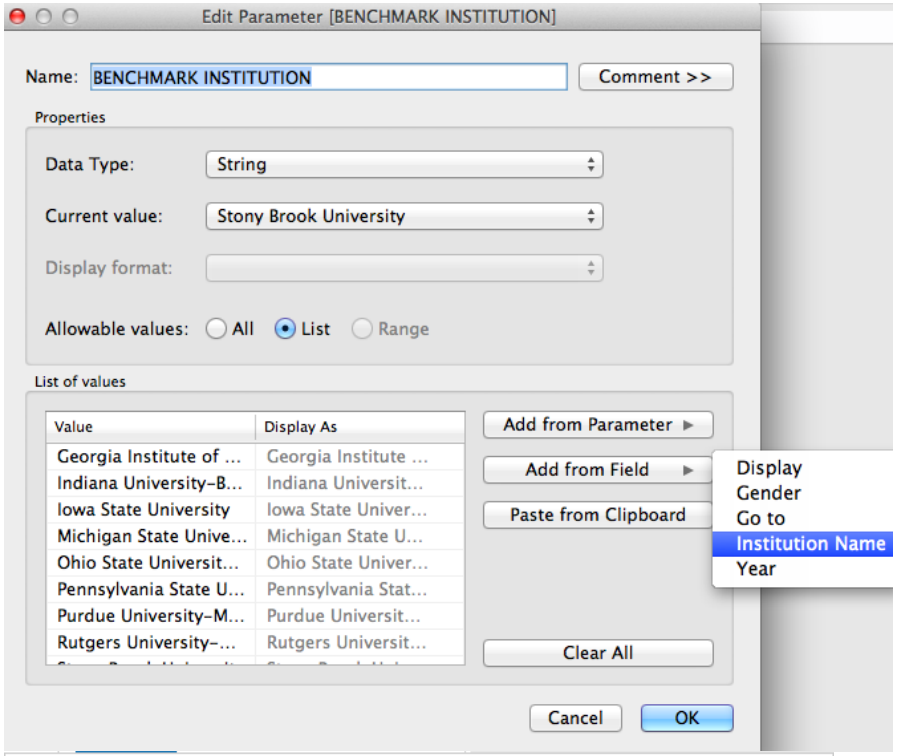
ADVANCED: COMPARISON CHART

Goal – Highlight a selected institution and compare to the average (quartiles also possible)

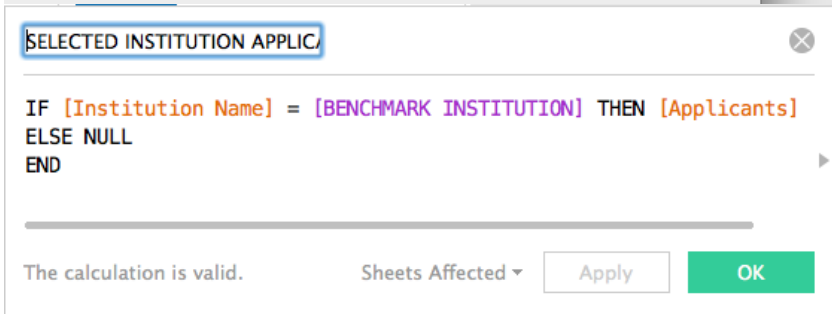
Solution – Create a comparison chart

- Step 1 – Add a parameter using the institution names field
- Step 2 – Create a calculated field that sets its value based on the parameter. For example, create a parameter called: “Selected Institution Applications”
- Step 3 – Set this field to be equal to the number of applications when the Institution Name field is equal to the parameter, and null otherwise. This will make sure this field only displays data for the institution you are interested in

Step 1



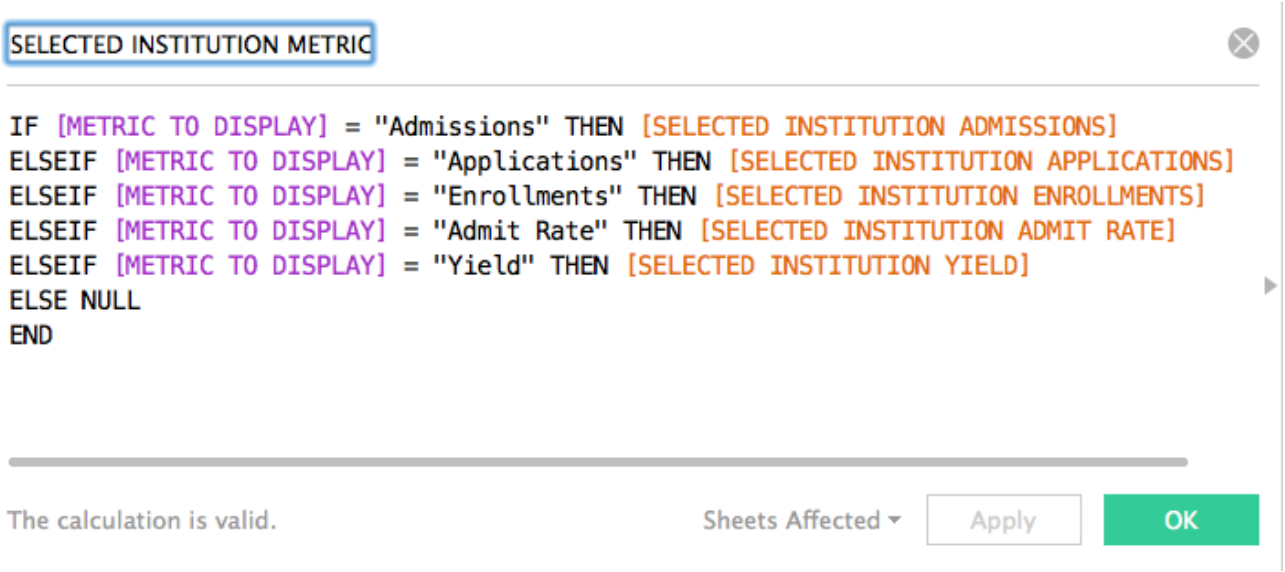
Step 2/3



ADVANCED: COMPARISON CHART

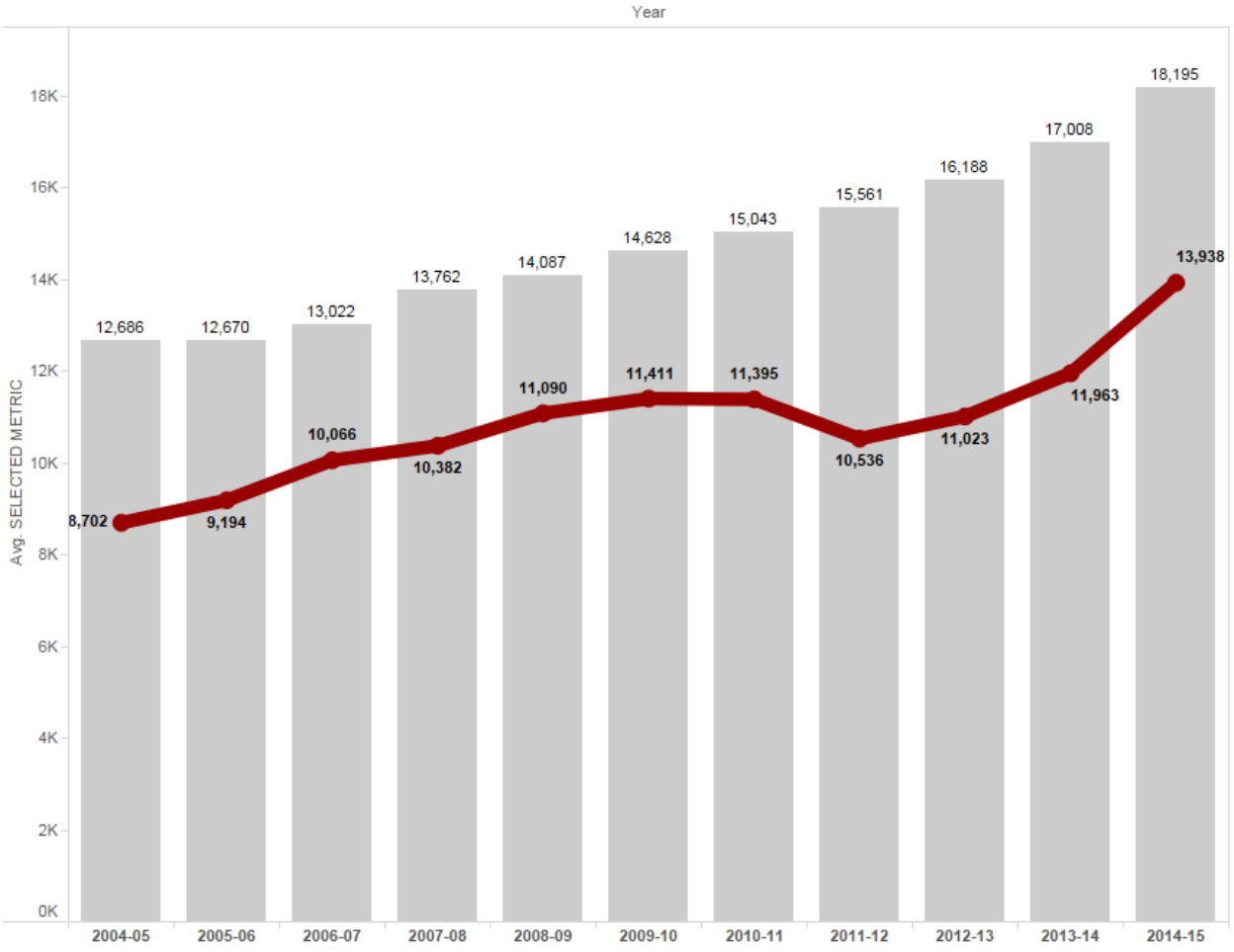
Let's examine how to merge this with the chart we created in the intermediate dashboard

- In that chart, we created a calculated field to display our metric of choice.
- Now, we will create another calculated field to display our metric of choice for our focus institution. For example, call the calculated field: "Selected Institution Metric"
- We can then add both metrics to a chart, and create a dual axis chart.
- *To merge both axis, ensure both calculated fields are the same data type, by adding the float function to your calculated field: (FLOAT(calculation)) Not applicable for this data set.*



Stony Brook University

ADVANCED: COMPARISON CHARTS



- Gray = Average selected measure for all institutions – this is determined by the metric parameter
- Red = Selected measure for our focus institution – determined by the metric and focus institution parameters

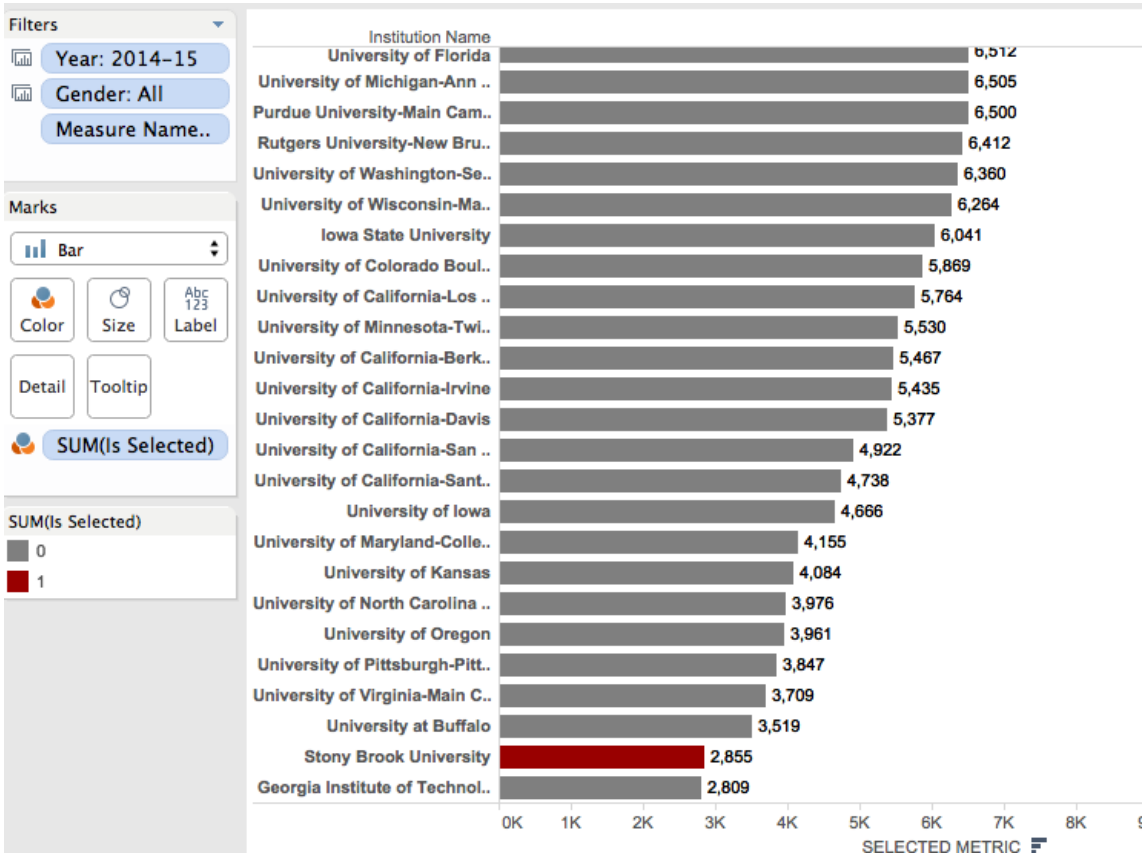
Alternate Comparison Chart

Highlighting the selected institution

- Create a calculated field called “Is Selected”. This will be binary (1 or 0)
- Drag the field over to the color shelf, change it to discrete, and assign a highlight color to 1 and standard color to 0.

Is Selected

```
IF [Institution Name] = [BENCHMARK INSTITUTION] THEN 1
ELSE 0
END
```



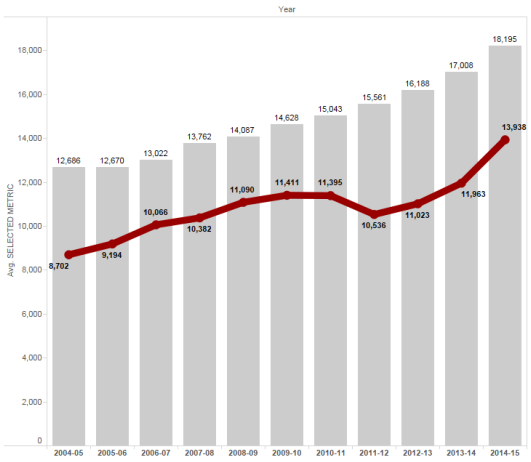
ADVANCED: CHART SWITCHING

Goal – Display all metrics in one chart area

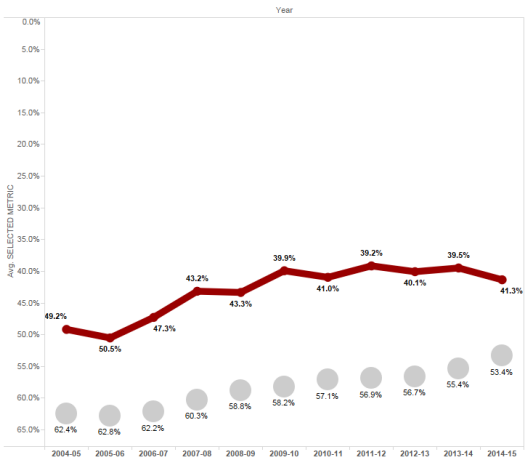
- This is made challenging by different data types, and different trend representations (we would like to trend admit rate along a reversed axis and yield along a regular axis).

Solution – Place multiple charts in the same location on the dashboard, and display only one at a time

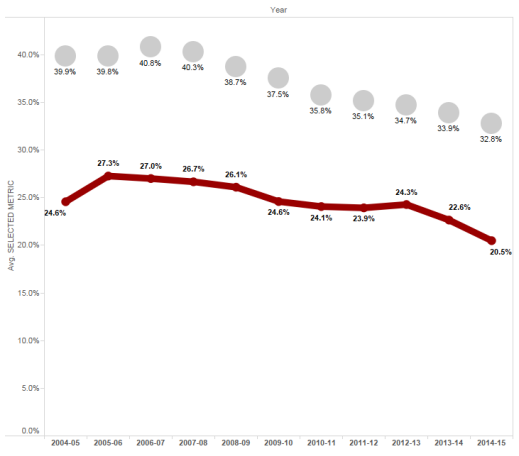
- This is will be done through the use of a parameter, a calculated field, and custom list filters.
- For this dashboard, there will be three charts
  1. Admissions, Applications, and Enrollments displayed as numbers, trended along a regular axis
  2. Admit Rate displayed as a percentage, trended along a reversed axis
  3. Yield displayed as a percentage, trended along a normal axis



1



2



3

ADVANCED: CHART SWITCHING

Step 1 – Create all charts needed for the dashboard

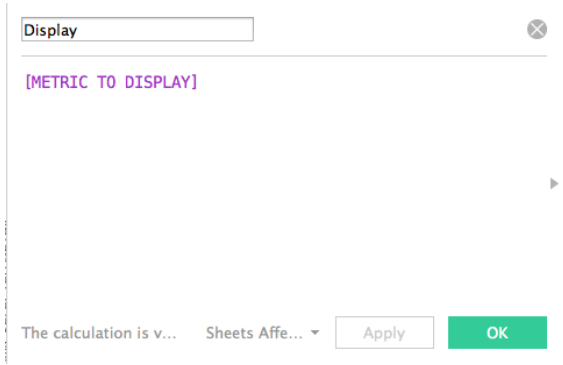
- Three, as mentioned previously

Step 2 – We will need a parameter that has the values we want to switch between

- Use the parameter created in the intermediate dashboard

Step 3 – Create a calculated field that is equal to the parameter

- This will help to switch between charts



Step 4 – On each chart, add the calculated field as a filter, using a custom list. Set the custom list to the appropriate metrics for the chart

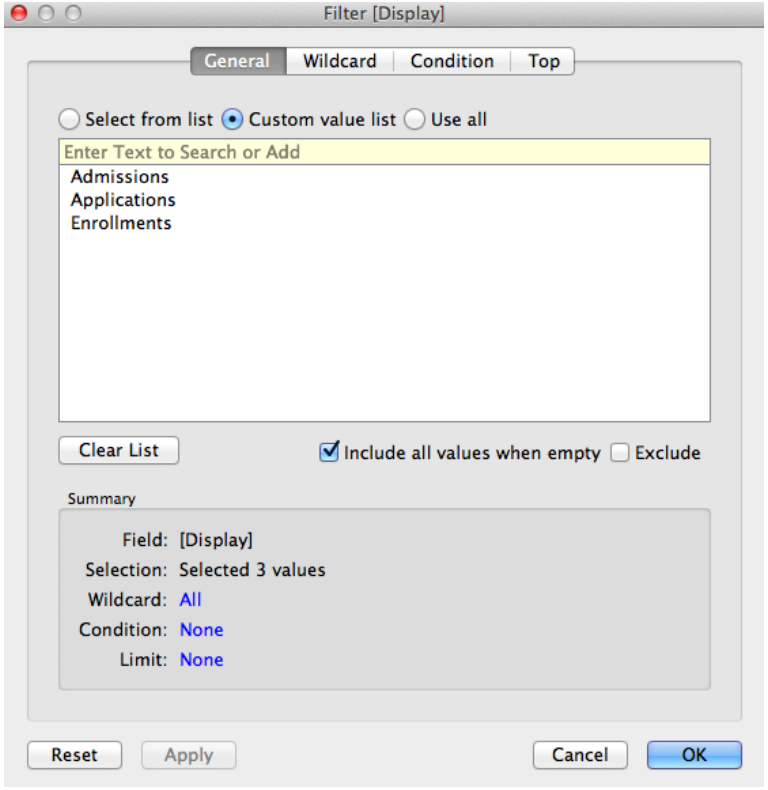
- For example, the Admit Rate chart should have the calculated field filtered only on “Admit Rate”. When the parameter is switched to “Admit Rate”, it will trigger the calculated field filter and display any chart with “Admit Rate” filtered

Step 5 – Apply filters to all charts, and stack them on the dashboard

- As long as each value in the parameter is included in only ONE of the stacked charts, then only one chart at a time will be visible

Note: if chart titles are different, hide the titles, and use a separate sheet to create a universal title

To stack, set all charts to “floating” and place them at the same coordinate location, using the manual coordinate entry section of the dashboard (bottom left)



Filter for the Applications, Admissions, and Enrollments chart. The Admit Rate and Yield charts will only have one element each.

Dashboard Actions

- Actions allow for dynamic interaction between objects on dashboards
- These actions can be used to communicate between sheets, dashboards, and external objects as well
- To add a dashboard action go to “Dashboard” → “Actions” → “Add Action”
- All actions offer the choice to run on: Hover, Select, or Menu
  - Hover – When the mouse hovers over the target, the action will trigger
  - Select – When the target is selected, the action will trigger (the target will have to be unselected and then selected again to re-trigger)
  - Menu – When the target is selected, a menu will display, giving you the option to trigger the action

Dashboard Action – Filter

For passing filters between sheets

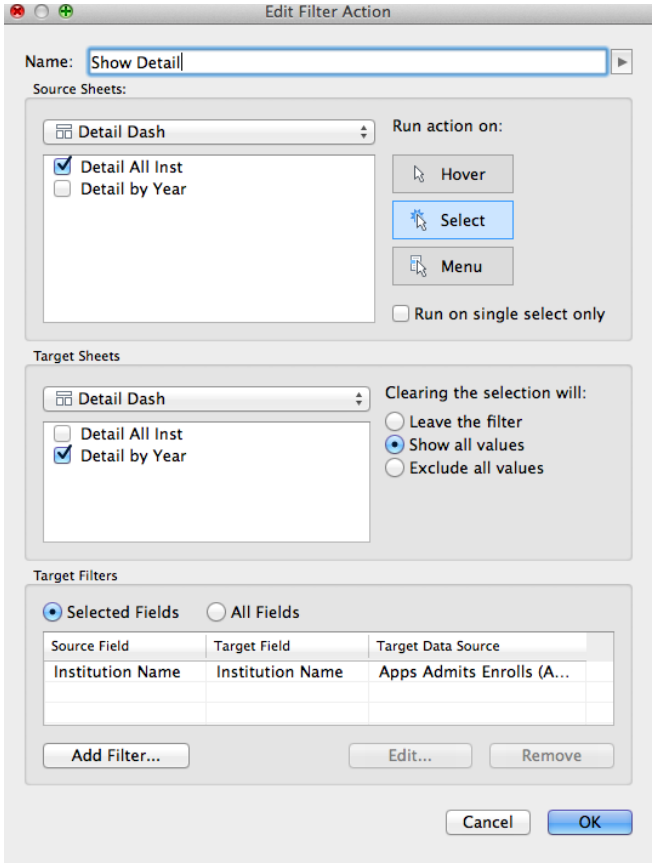
- Choose a source and a target. The source is the object being clicked, and the target is what will be filtered.
- For example, if there is a table showing all institutions, we can use a filter action to display institution detail when the name is clicked.
- If the target sheet is on another dashboard, this will switch to that dashboard.

For switching between dashboards

- Using the above knowledge, we can use the filter actions to navigate between sheets without passing filters as well. Simply choose all items as targets on the dashboard you wish to navigate to
- Instead of using a chart as a source, a navigation button can be created by adding a calculated field with the value of “image”, and setting the mark type to Shape *(see example Tableau workbook)*

Dashboard Action – Filter

- “Show all values” will pass the filter when selected, but remove it when the source is unselected *(Exclude all will pass the filter as an exclusion filter)*
- “Leave the filter” will leave the filter until a different element of the source is selected
- This filter will show the detail for institution name that is clicked on the “Detail All Inst” chart (Source). It will be displayed on the “Detail by Year” chart (Target).



Dashboard Action – URL

- URL actions all for navigation to external addresses, such as a webpage or a file on a file share
- When adding the action, choose the target on the dashboard that will activate the action, then input the URL.

Dashboard Action – Highlight

- Highlight actions allow for focusing on subsets of the dashboards. You can pass the action between sheets to filter a graph based on something clicked in a table
- We will not add a highlight action to this visualization, but their uses are well documented in the Tableau forums

USES FOR INSTITUTIONAL RESEARCH

Planning

- Examining position
- Trends and projections

Research

- Highlights areas of interest

Benefits

- Quick, relatively simple, and publicly available
- Well populated
- Customizable peer groups

Going further

- Adding institutional data (dashboard example on next slides)

Stony Brook University

USES FOR INSTITUTIONAL RESEARCH

Stony Brook University — Office of Institutional Research, Planning & Effectiveness — Back

Admissions: Stony Brook University

2008-09 Data anamolies in IPEDS Data Center have been smoothed

Institution: Stony Brook Unive...

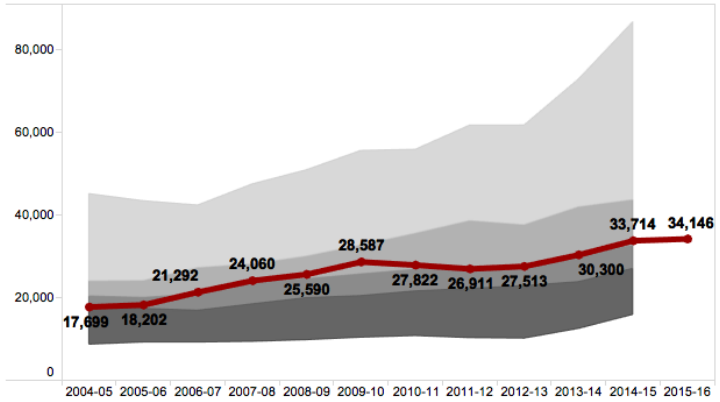
Choose Metric to Benchmark: Applicants

Gender: All

Detail Year: 2015-16

- 0-25th Percentile
- 25th-50th Percentile
- 50th-75th Percentile
- 75th-100th Percentile
- Selected Institution

Benchmark: Stony Brook University vs Public AAU Institutions - Applicants



Fall Headcount Enrollment

Academic Career: **All** | Academic Load: **All** | College/School: **All** | Tuition Residency: **All** | Major: **All**

Type: First Major, Second Major

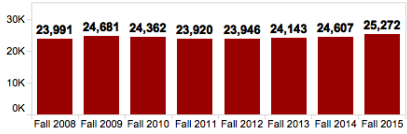
Filters

Career: (All) | Academic Load: (All)

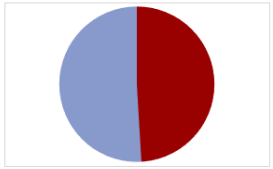
College/School: (All) | Tuition Residency: (All)

Major: (All) | Term (Detail for 2011 and o..: Fall 2015

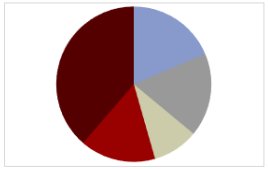
Trend



Gender Distribution - Fall 2015



Race/Ethnicity Distribution - Fall 2015



***Note:* URM** = *"Underrepresented Minority and includes: "American Indian or Alaska Native", "Black or African American", "Hispanic or Latio", and "Native Hawaiian or Other Pacific Islander"*
NRA = *"Nonresident Alien"* | **Other** includes: "Two or More Races", and "Race/Ethnicity Unknown"

Completions

School/College: All | Major: All | CIP Discipline: All | CIP: All

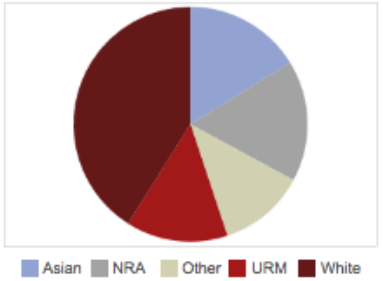
School/College: (All) | CIP Discipline: (All) | First or Second Major: First Major Only

Major: (All) | CIP: (All)

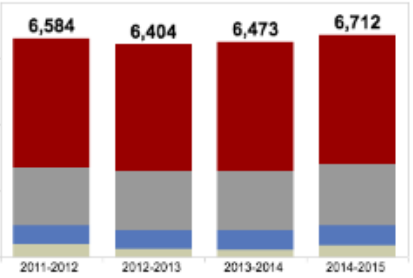
Degree Level: (All) | Year (For race/ethnicity breakdown): (All)

- Bachelor's
- Master's
- Doctoral and Professional
- Graduate Certificate

Stony Brook University Completions by Race/Ethnicity
Level: All, Year: All



Stony Brook University Completions by Degree Level
Level: All, Year: All



		2011-2012	2012-2013	2013-2014	2014-2015
Male	Bachelor's	1,838	1,847	1,840	1,884
	Doctoral and Professional	271	281	309	303
	Graduate Certificate	135	77	78	127
	Master's	708	759	772	799
Female	Bachelor's	2,044	1,952	2,046	2,018
	Doctoral and Professional	266	272	267	297
	Graduate Certificate	263	174	150	218
	Master's	1,059	1,042	1,011	1,066
Grand Total		**6,584**	**6,404**	**6,473**	**6,712**

***Note:* URM** = *"Underrepresented Minority and includes: "American Indian or Alaska Native", "Black or African American", "Hispanic or Latio", and "Native Hawaiian or Other Pacific Islander"*
NRA = *"Nonresident Alien"* | **Other** includes: "Two or More Races", and "Race/Ethnicity Unknown"

Updated on February 25, 2016 | Source: IRPE Completions Panel and IPEDS Data Center

Stony Brook University

Questions or comments?

Feel free to contact me:

Sean Hoffman
Stony Brook University
Office of Institutional Research, Planning & Effectiveness
sean.hoffman@stonybrook.edu
(631)632-1462

http://www.stonybrook.edu/commcms/irpe/index.html (Main IRPE site)

http://www.stonybrook.edu/commcms/irpe/reports/ (Presentations)

http://paintbynumbersblog.blogspot.com/2014/10/a-rough-guide-to-tableau-dashboard.html (Dashboard Actions)

https://community.tableau.com/community/forums (Tableau Community Forums)

Stony Brook
University