

Our BCSSE Student Story in Tableau

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BCSSE NOT Bessie?



Source:

[https://apnews.com/article/b9464f6002209d0930e5e51500f84f22#:~:text=SAN%20ANTONIO%20\(AP\)%20_%20Bessie,ninth%20set%20of%20twin%20calves.&text=From%201986%20to%201993%2C%20Bessie,be%20bred%20again%2C%20Bredewater%20said.](https://apnews.com/article/b9464f6002209d0930e5e51500f84f22#:~:text=SAN%20ANTONIO%20(AP)%20_%20Bessie,ninth%20set%20of%20twin%20calves.&text=From%201986%20to%201993%2C%20Bessie,be%20bred%20again%2C%20Bredewater%20said.)

What BCSSE is



The Beginning College Survey of Student Engagement collects data related to students' academic expectations and perceptions for the coming year.



Institutions administer BCSSE to first-year, transfer, and older students prior to the start of fall or winter classes



Institutions can pair their BCSSE results with an end of the first college year survey to providing an in-depth understanding of first-year student engagement on your campus.

How is BCSSE Administered?



BCSSE by each institution, regardless of whether you are administering by paper, Web, or both



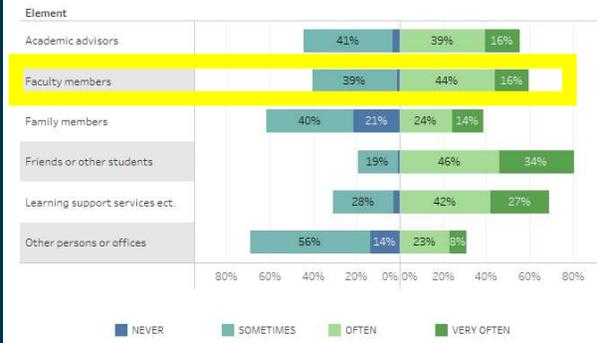
TAMU-CC first administered BCSSE in 2008 using the paper mode and it was administered every 2 years after



2018 TAMU-CC switched to the online mode and yearly administrations

Why visualize the data?

During the *coming* school year, about how often do you expect to seek help with coursework from the following sources?



Expected Academic Help-Seeking

How often expect to seek help *1=Never; 2=Sometimes;*

Faculty members	3
Learning Support Services (tutoring, writing center, success coaching, etc.)	2
Friends or other students	4
Family members	2
Other persons or offices	1

Who are 39% asking for HELP from?



The Challenge

Visualize the BCSSE Survey Results



"I am ready to face any **challenge** that might be foolish enough to face me."-Dwight Schrute

Hurdles



File is an Excel spreadsheet

Tedious data cleansing and preparation

Dashboards needed to be easily updated

Solution:

Tableau Prep

SQL Tables

Tableau

Task: Appending the Excel file data into Historical_bcse



Here I'll be explaining what my part/job is. That is appending the data from a bcse excel file that we download from the Indiana university website into historical_bcse table in SQL server

Overview of BCSSE Database in SQL

- Historical_bcsse
- Bcsse_decode
- Historical_ftic



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Will give a brief introduction of these tables in our bcsse environment

Step 1: Changing data format

	HGRADES17	HALG13	HPRECALC13	HCALC13	HSTATS13	HSATRW17	HSATM17
1	8						
2	8	1	1	0	1	600	450
3	6	1	0	0	1	400	400
4	6					400	600
5	6	1	1	1	0	520	580
6	6	1	1	0	1		
7	8	1	1	0	0	700	600
8	8	1	1	0	0	530	600
9	7	1	1	0	0	640	440
10	7	1	1	0	0		
11	7	1	0	0	1	610	550
12	6	1	1	1	0	550	540
13	5	1	1	0	1	610	530
14	7	1	1	0	0		
15	5	1	1	0	0		
16	7	0	1	0	0	700	600
<							

Historical_bcsse table in SQL

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With these screenshots I'll explain my step 1 in the process of appending: how the data looks like in our historical_bcsse table and why there is a need to change the format of data before appending it to sql server

Bcsse 2020 Excel file

hgrades17	halg13	hprecalc13	hcalc13	hstats13	hsatrw17	hsatm17	hsatmrch1	hact	hacpl13	hdc17	hib17	hwrshrt	hwrmtd	hwrlng	hacadpr13	
B+	Selected	Selected	Not select	Not select	590	540	Yes		21	5-6	11 or mor	0	6-10	None	None	6-10
A	Selected	Selected	Not select	Not select	600	530	Yes		3-4	0	0	None	None	None	6-10	
B+	Not selected	Selected	Not select	Not select	500	490	No		0	3-4	0	1-2	None	None	1-5	
A+	Selected	Selected	Not select	Not select	540	480	Yes		3-4	3-4	0	3-5	None	None	11-15	
A+	Selected	Selected	Not select	Not select	610	600	Yes		3-4	5-6	0	3-5	1-2	None	11-15	
A+	Selected	Selected	Selected	Selected	550	540	Yes		26	0	11 or mor	0	3-5	1-2	None	16-20
A	Selected	Selected	Selected	Not select	480	500			19	7-8	1-2	0	1-2	None	16-20	
A	Selected	Selected	Not select	Not select	610	620	Yes		3-4	3-4	0	6-10	None	None	6-10	
A	Selected	Selected	Selected	Selected	600	610	Yes		26	5-6	5-6	0	6-10	3-5	None	16-20
B	Not selected	Selected	Not select	Not select	430	530	Yes		1-2	1-2	0	None	None	None	1-5	
A	Selected	Not selected	Not select	Not select	505	505	Yes		5-6	5-6	0	11-15	3-5	None	1-5	
B+	Selected	Selected	Not select	Not select	580	530	Yes		3-4	3-4	0	1-2	1-2	None	1-5	
A-	Selected	Not selected	Not select	Not select	490	380	No		18	1-2	7-8	0	6-10	1-2	None	21-25
A	Selected	Selected	Not select	Not select	550	540	Yes		5-6	0	0	3-5	1-2	None	11-15	
A+	Selected	Selected	Selected	Not select	690	560	Yes		0	0	0	None	None	1-2	None	16-20
B	Selected	Selected	Not select	Selected	530	560	No		3-4		3-4	3-5	1-2	More than	1-5	
A	Selected	Not selected	Not select	Not select	610	490	No		1-2	11 or mor	0	1-2	None	None	6-10	
A	Selected	Selected	Not select	Not select	500	570	Yes		1-2	3-4	0	3-5	1-2	None	1-5	
A-	Selected	Selected	Not select	Not select	640	570	Yes		3-4	0	0	3-5	None	None	0	
A	Selected															
A	Selected	Selected	Not select	Selected	560	500	Yes		20	3-4	11 or mor	0	3-5	None	None	1-5
B+	Selected	Selected	Not select	Selected	630	610	Yes		27	9-10	5-6	0	3-5	1-2	None	11-15
A+	Selected	Selected	Selected	Not select	610	690	Yes		28	1-2	3-4	0	3-5	1-2	1-2	6-10
A	Selected	Selected	Selected	Not select	620	570	Yes		3-4	5-6	0	11-15	1-2	None	6-10	
A	Selected	Not selected	Not select	Not select	490	490	Yes		0	0	0	1-2	None	None	1-5	

With these screenshots I'll explain my step 1 in the process of appending: how the data looks like in our historical_bcsse table and why there is a need to change the format of data before appending it to sql server

Bcsse Decode Table

	VARIABLE	CODE	DESCRIPTION
1	halg13	0	not selected
2	halg13	1	selected
3	hgrades17	1	C- or lower
4	hgrades17	2	C
5	hgrades17	3	C+
6	hgrades17	4	B-
7	hgrades17	5	B
8	hgrades17	6	B+
9	hgrades17	7	A-
10	hgrades17	8	A
11	hgrades17	9	A+
12	hgrades17	99	Grades not used
13	htype13	1	Public
14	htype13	2	Private, religiously-affiliated
15	htype13	3	Private, not religiously-affiliated
16	htype13	4	Home school
17	htype13	5	Other (GED, etc.)

BCSSE_decode_table



BCSSE 2019 Codebook
(Blue highlight indicates web mode only)

Item #	Variable	Variable Label	Values and Labels
2.	htype13	From which type of high school did you graduate? (Select only one.) (Paper mode)	1 = Public 2 = Private, religiously-affiliated 3 = Private, not religiously-affiliated 4 = Home school 5 = Other (GED, etc.)
		Recorded response using hsiims, hlookup, and associated NCES data. (Web mode)	
3.	hgrades17	What were most of your high school grades? (Select only one.)	1 = C- or lower 2 = C 3 = C+ 4 = B- 5 = B 6 = B+ 7 = A- 8 = A 9 = A+ 99 = Grades not used
4. To date, in which of the following math classes have you earned a grade of "C" or better? (Select all that apply.)			
a.	halg13	Algebra II	
b.	hprecalc13	Pre-Calculus/Trigonometry	0 = Not selected 1 = Selected
c.	hcalc13	Calculus	
d.	hstats13	Probability or Statistics	
5. If you completed the SAT and/or ACT, enter your scores below (as best you remember):			
a.	hsatrw17	SAT: Reading & Writing (possible range= 200-800)	write-in response
b.	hsatm17	SAT: Math (possible range= 200-800)	write-in response
c.	hsatmch16	Are these SAT scores from March 2016 or later?	0 = No 1 = Yes
d.	hact	ACT: Composite (possible range= 1-36)	write-in response

Source: BCSSE Codebook

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I'll talk about bcsse decode table in our sql server and how it will help us to change the format of data by using joins.

Situation

ID	halg13	hgrades17
1	0	2
2	1	6
3	1	8
4	0	7
5	1	9

Historical_bcsse Table in SQL

→ Column values are codes

ID	halg13	hgrades17
1	not selected	C
2	selected	B+
3	selected	A
4	not selected	A-
5	selected	A+

Bcsse 2020 Excel File

→ Column values are descriptions for respective codes

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Here I am using STAR methodology (I,e situation – task – action - results) to simplify the process of changing data format from descriptions in the columns to their respective codes in the columns. These screenshots are just for explaining purpose. In situation slide, I'll explain what's the difference in data format between the historical table and the excel file.

Task

ID	halg13	hgrades17
1	not selected	C
2	selected	B+
3	selected	A
4	not selected	A-
5	selected	A+

How Data is

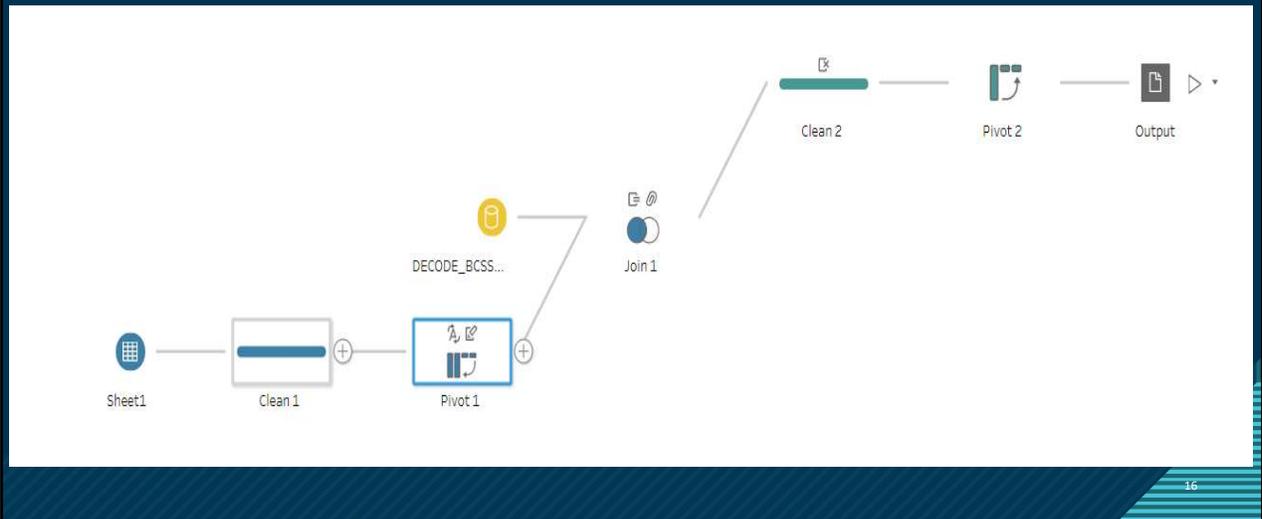


ID	halg13	hgrades17
1	0	2
2	1	6
3	1	8
4	0	7
5	1	9

How I want data to be

Task: now, what my task is? Which is to change data in excel file from descriptive to coded format

Action: (Part 1) Using Tableau prep



Action: I am gonna talk about the flow that I created in Tableau prep and point out the three important steps that I am doing here, which are 1) Pivot 1, 2) Join 1, 3) Pivot 2 and I am going to elaborate each of these steps in my later slides

Step 1: (Pivot 1) Unpivoting (Columns to Rows)

ID	halg13	hgrades17
1	not selected	C
2	selected	B+
3	selected	A
4	not selected	A-
5	selected	A+



ID	Column Names	Column Values
1	halg13	not selected
1	hgrades17	C
2	halg13	selected
2	hgrades17	B+
3	halg13	selected
3	hgrades17	A
4	halg13	not selected
4	hgrades17	A-
5	halg13	selected
5	hgrades17	A+

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1) Pivot 1: in pivot 1 I am changing data from wide to long format which is changing from people-friendly to machine friendly format.

Step 2: (Join 1) joining with bcse decode table to get the codes

The screenshot shows the 'Applied Join Clauses' section of the Power BI Query Editor. It is configured for a left join between 'Pivot 1' and 'DECODE_BCSSE_25FEB...'. The join key is 'column_names', which is set to 'VARIABLE' in the pivot and 'DESCRIPTION' in the decode table. The 'Join Type' is set to 'left'. A 'Summary of Join Results' section is visible at the bottom, showing 'Included' and 'Excluded' counts.

ID	Column Names	Column Values	Code
1	halg13	not selected	0
1	hgrades17	C	2
2	halg13	selected	1
2	hgrades17	B+	6
3	halg13	selected	1
3	hgrades17	A	8
4	halg13	not selected	0
4	hgrades17	A-	7
5	halg13	selected	1
5	hgrades17	A+	9

2) Join 1: Here I am joining the data from pivot 1 (that is the data in long format) with bcse decode table which will help me to get the codes. I am using left join here so that we do not lose anything from the excel file.

Step 3: (Pivot 2) Rows to Columns

ID	Column Names	Code
1	halg13	0
1	hgrades17	2
2	halg13	1
2	hgrades17	6
3	halg13	1
3	hgrades17	8
4	halg13	0
4	hgrades17	7
5	halg13	1
5	hgrades17	9



ID	hgrades17	halg13
1	2	0
2	6	1
3	8	1
4	7	0
5	9	1

3) Pivot 2: after step 2 we will have codes. Now here, we are pivoting the data (that is changing data back to wide format). After this step, we will have codes in our columns, but the columns will be re-arranged randomly. Next thing to do is arranging the columns in the same order as historical bcse table in SQL.

Action: Mapping (Part 2)

```
import pandas as pd
import xlrd
import openpyxl } Importing required Libraries

historical_bcsse = pd.read_excel('historical_bcsse.xlsx', dtype=str)
bcsse_2020 = pd.read_csv('bcsse_2020.csv', dtype=str)
bcsse_2020=bcsse_2020.fillna(' ')
del historical_bcsse['bcsse']
bcsse_2020.columns = bcsse_2020.columns.str.upper()
historical_bcsse.columns = historical_bcsse.columns.str.upper()
historical_bcsse = historical_bcsse[0:0]
for i in bcsse_2020.columns:
    if i not in historical_bcsse.columns:
        del bcsse_2020[i]

column_arrangement = [x for x in historical_bcsse.columns]
bcsse_2020 = bcsse_2020[column_arrangement]
bcsse_2020.to_excel('final_ready_to_append.xlsx', index=False) } Arranging Columns according to Historical_bcsse
} Outputting an Excel file
```

This program is going to help me rearrange the columns in the same order as historical_bcsse table. I wrote the comments to highlight some important parts of the program.

Results

Input: Excel file (output of tableau prep)

ID	hgrades17	halg13
1	2	0
2	6	1
3	8	1
4	7	0
5	9	1



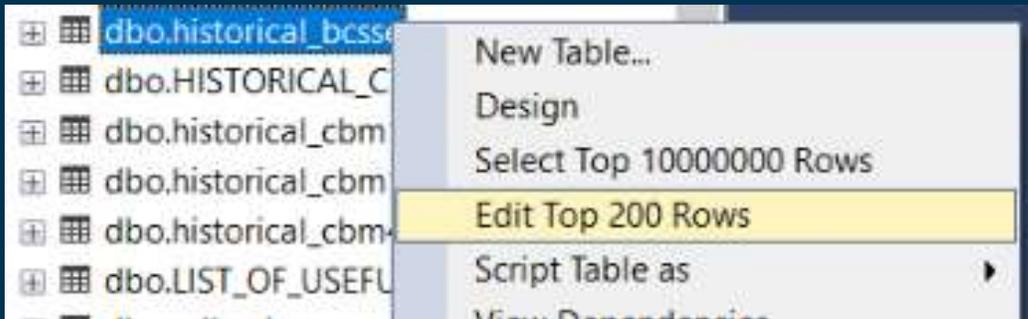
Python Script

Output: Excel file (output of python program)

ID	halg13	hgrades17
1	0	2
2	1	6
3	1	8
4	0	7
5	1	9

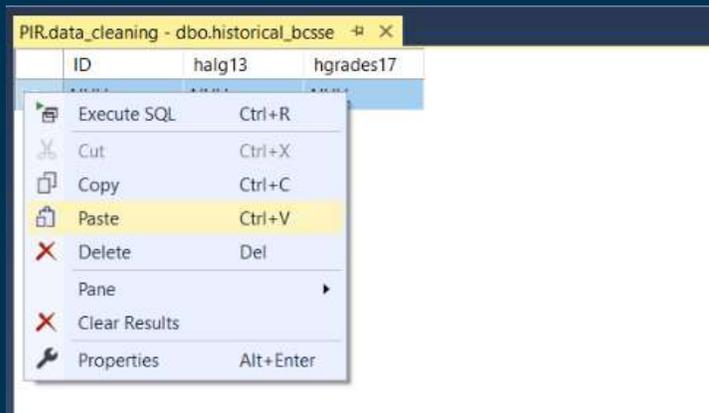
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I'll explain the input and output from the python program. How it will help us re-arranging columns in order. In the real bcsse file there will be around 200 columns and if we manually arrange them in excel it will take us roughly around 3 – 4 hrs. But using python we can do this in few seconds. Recently for 2020 bcsse file, python program took around 8 secs for execution.



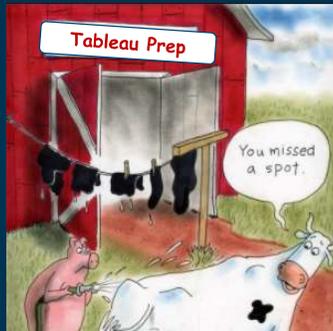
Step 2: Open SSMS, right click on the table in which you want to append data to (in our example, the table is Historical_bcsse), left click on **Edit Top 200 Rows** option.

Step 3: Go to the bottom and right click on the left most cell with a * in the last row and hit **Paste**



Data Preparation

Tableau Prep a better way to wash your data set animal.



- Takes 1/3 of the time to prepare the data using Tableau Prep.
- Enable incremental Refresh

Using Tableau Prep to shape the data



People friendly

A	B	C	D	E	F
Respondent	Question1	Question2	Question3	Question4	Question5
Izzy Islander	1	3	4	1	2
Michael Scott	5	2	5	4	4

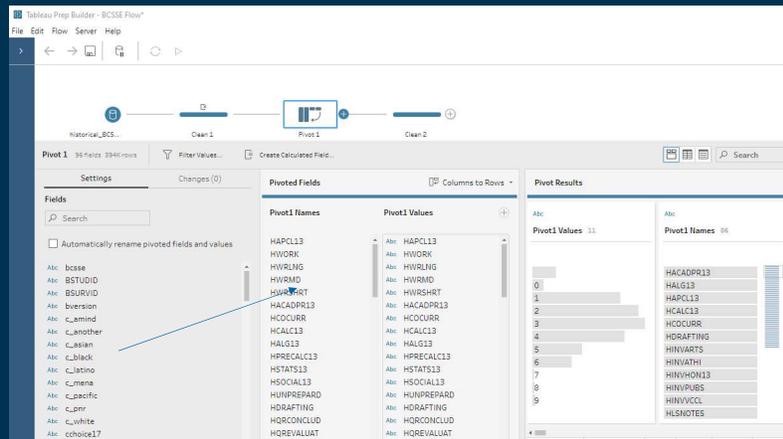


Machine Friendly

Respondent	Question	Answer
Izzy Islander	1	1
Izzy Islander	2	3
Izzy Islander	3	4
Izzy Islander	4	1
Izzy Islander	5	2
Michael Scott	1	5
Michael Scott	2	2
Michael Scott	3	5
Michael Scott	4	4
Michael Scott	5	4

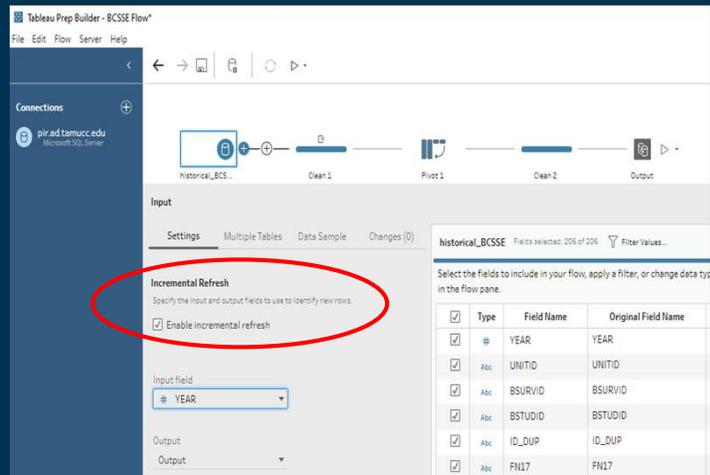
Tableau Prep Flow

- Drag over tables
- Drag desired fields over to the pivoted values column.
- Almost every question visualized is pivoted
- Add an output step



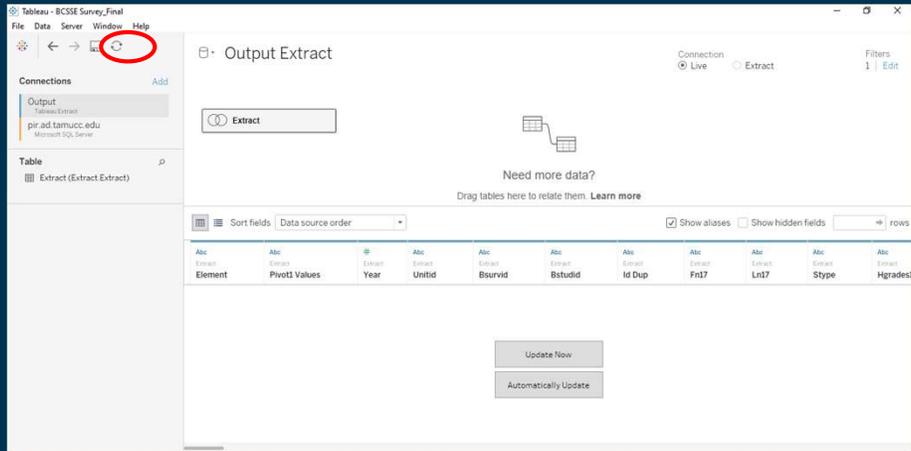
Incremental Refresh

- Creates efficiencies
- Then click the settings
- Data must include numerical number, ours is the survey year
- Click the Enable incremental refresh button



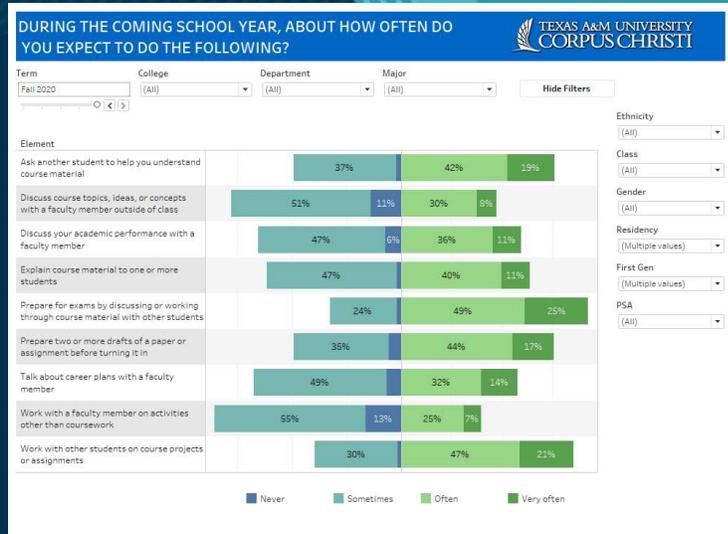
Note: to recognize the new data Tableau needs a numerical column, since this survey is done yearly it works well.

Refresh the data source



DEMO

Diverging Bar Chart for Sentiment



Create Calculations:

Negative

```
IF [Q15]='1' THEN -1  
ELSEIF [Q15]='2' THEN -1  
ELSE 0  
END
```

Negative %

Output Extract

```
SUM([Negative])/SUM({ EXCLUDE [Q15]: SUM([number of records])})
```

Positive

```
IF [Q15]>'2' then 1  
ELSE 0 END
```

Positive %

Output Extract

```
SUM([Positive])/SUM({ EXCLUDE [Q15]: SUM([number of records])})
```

number of records

Output Extract

```
1
```

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The screenshot displays a dashboard software interface. At the top, there is a menu bar with options: File, Data, Worksheet, Dashboard, Story, Analysis, Map, Format, Server, Window, and Help. Below the menu is a toolbar with various icons for navigation and editing. On the left side, there is a navigation pane with the following sections:

- Dashboard:** Layout (dropdown), Default, Phone, Device Preview.
- Size:** Desktop Browser (1000...).
- Sheets:** Q15 Ex (2), Q15, Q15 Ex, Sheet 3.
- Objects:** Horizontal, Vertical, Text, Image, Web Page, Blank, Navigation, Download, Extension. There are also buttons for 'Tiled' and 'Floating', and a checkbox for 'Show dashboard title'.

The main content area features the Texas A&M University Corpus Christi logo on the left. To the right of the logo is the following text:

OVERVIEW:

The following dashboards encompass our BCSSE Survey results beginning from 2018. To explore this data and gain additional insight, it was combined with the certified 20th day Census data for the undergraduate first time in college students (FTIC). Since this data is combined there will be differences between these dashboards and the numbers reported back from Indiana University for the BCSSE survey.

It is also important to mention that not all respondents fully completed the survey, however each visual is created by counting the number of responses per student. In some instances questions were designed so students could select multiple answers. Our hope is that this insight will be beneficial to administrators and all who are within the students' circle of care.

Data Sources: Banner, CBM001 Certified files and BCSSE survey data.

**The overall totals include students who participate in the Program for System Admission (PSA). More information about this program can be found at <http://admissions.tamuc.edu/PSA/>.

At the bottom of the interface, there is a tabbed navigation bar with tabs for: Data Source, INTRODUCTION, BCSSE 7, Q15 Ex (2), Q15, Q15 Ex, Sheet 3. The 'BCSSE 7' tab is currently selected.

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<https://pir.tamucc.edu/>

<http://tabsoft.co/3k3Nzlr>



Thank You

