

SHEEO Communities of Practice Convening, Washington, DC September 2018

Communicating with Data: Data Visualization Basics in Excel



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Custom Professional Learning, LLC



Handout for SHEEO workshop participants. Please do not copy or distribute.

Proud grad...



The College at
BROCKPORT
STATE UNIVERSITY OF NEW YORK

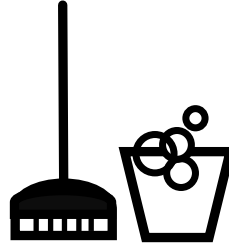
Learning Objectives



Articulate why visualization is important



Identify common chart/graph types & when to choose them



"Clean" charts/graphs to improve presentation



Enhance charts/graphs for effective presentation

Try this... How might you visualize these data points for a report?

1.) 75% of conference attendees were from the Northeast

2.) Conference attendance:

2014: 2572

2015: 2781

2016: 3145

2017: 2984

3.) Conference satisfaction:

Loved it!: 45%

Pretty good: 27%

Meh: 16%

Not so great: 7%

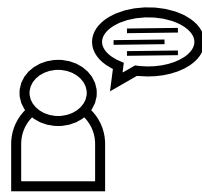
Totally stunk: 5%



Pause & reflect...



What do you notice about well-designed graphs?



WHY

WHY data visualization?

Good data visualization gets your audience's attention.



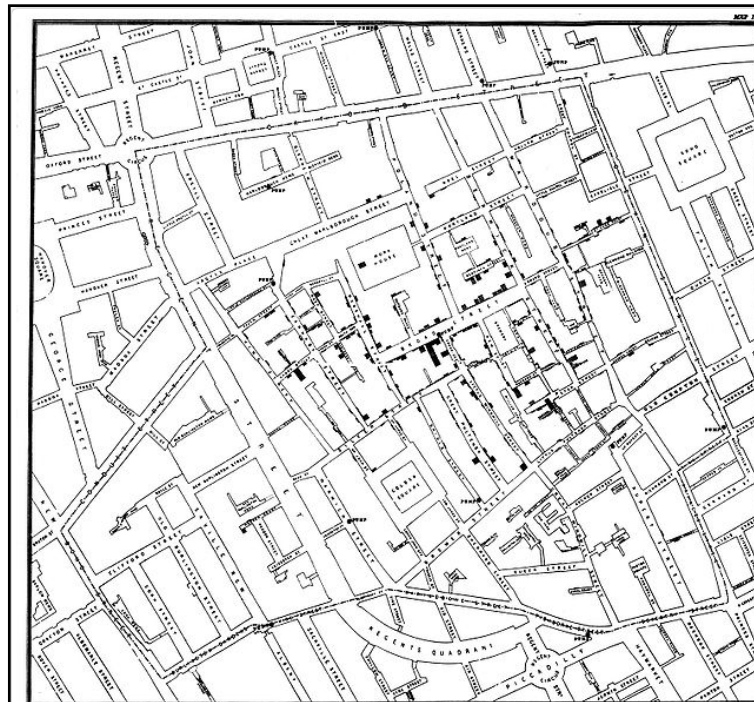
WHY data visualization?

Good data visualization tells a compelling story.

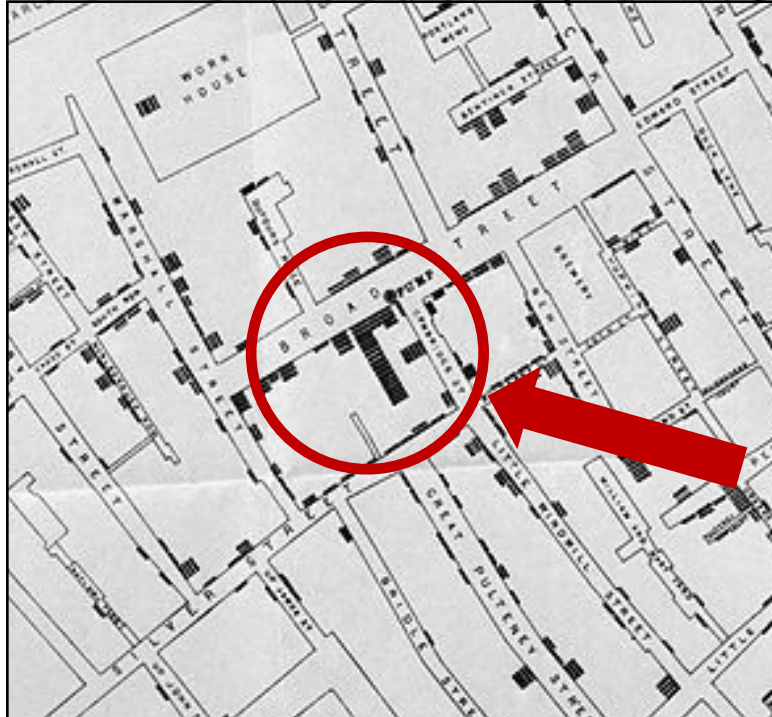


WHY data visualization?

Good data visualization helps
your audience remember.

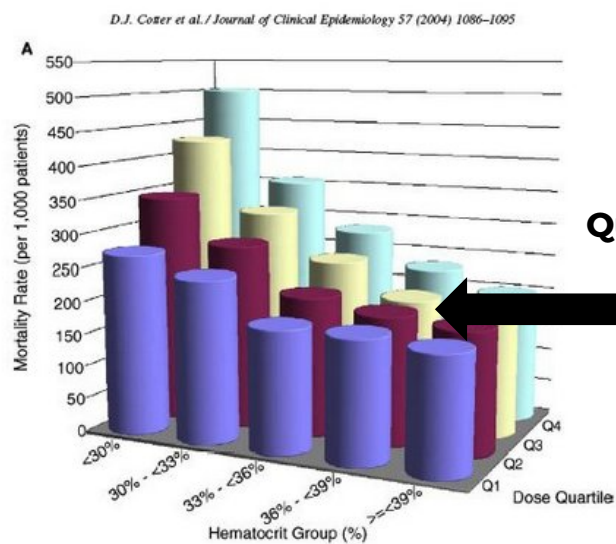


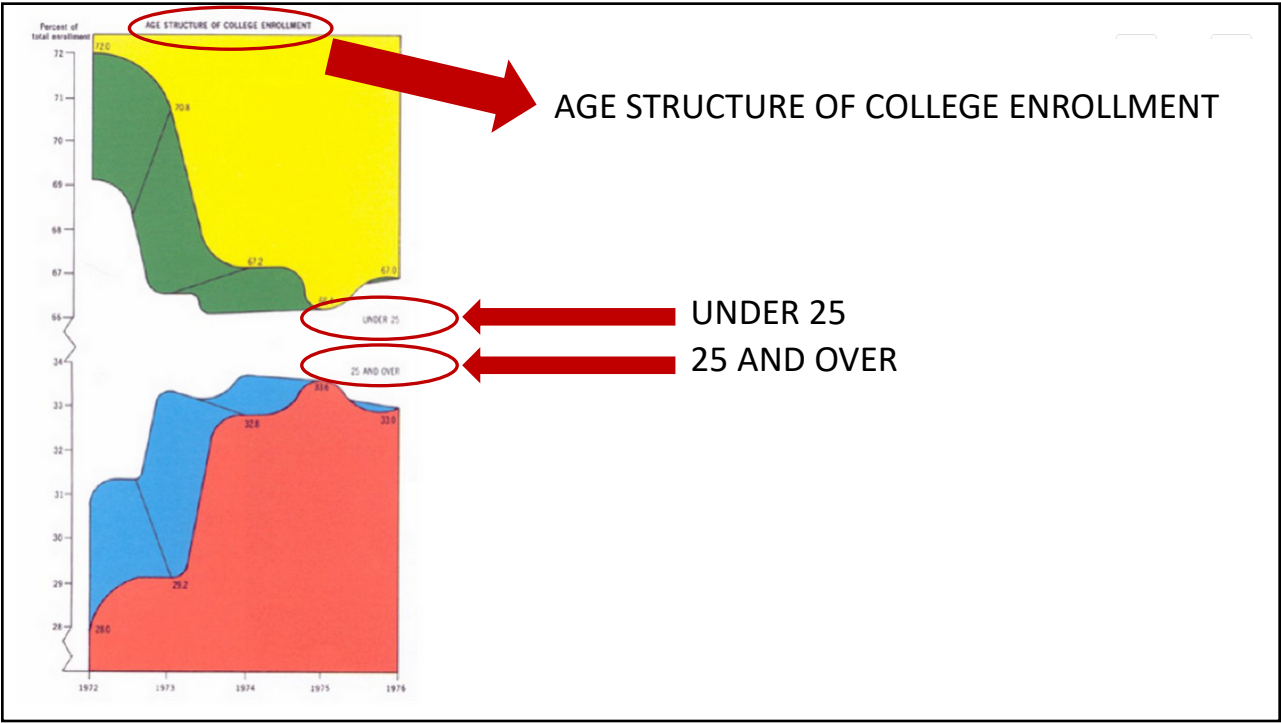
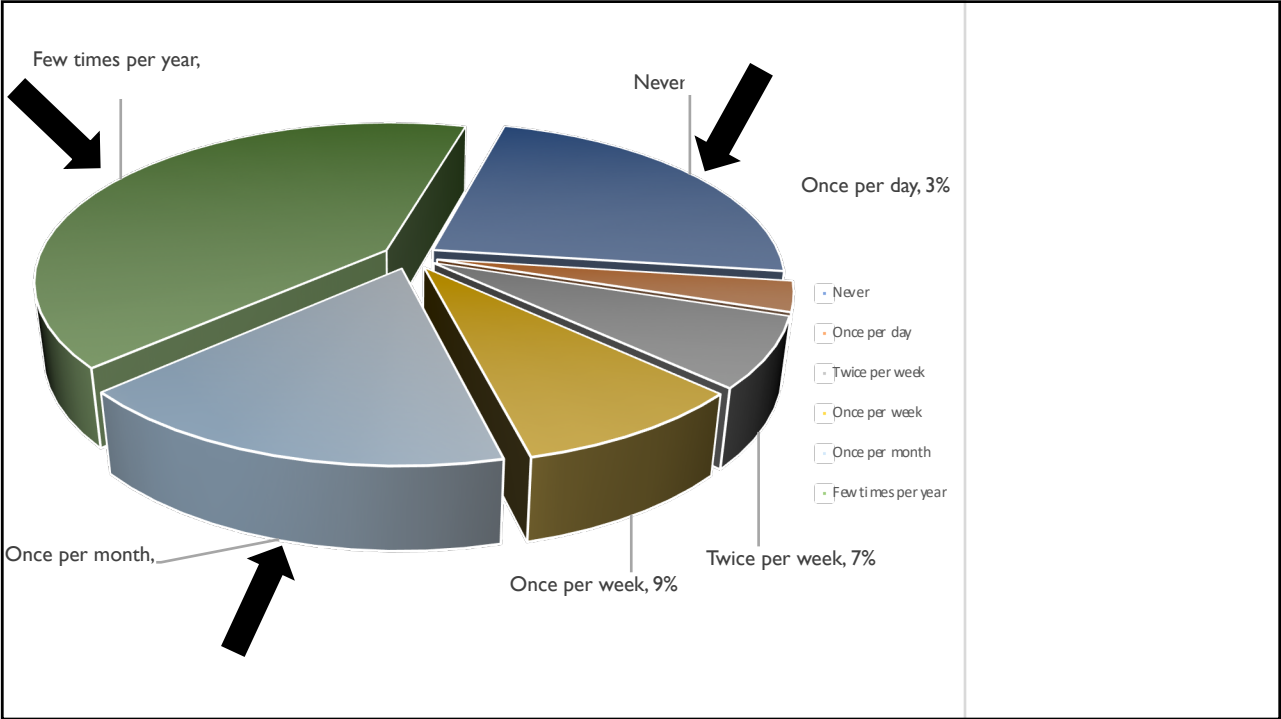
Dr. John Snow's Dot
Distribution Map of Broad
Street Cholera Cases



Dr. John Snow's Dot Distribution Map of Broad Street Cholera Cases

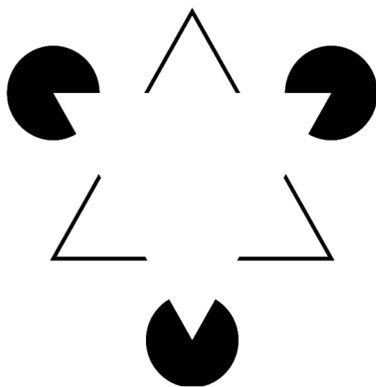
Wow. Multicolor 3-D cylinder bar charts are a really, really bad way to articulate relatively simple data.



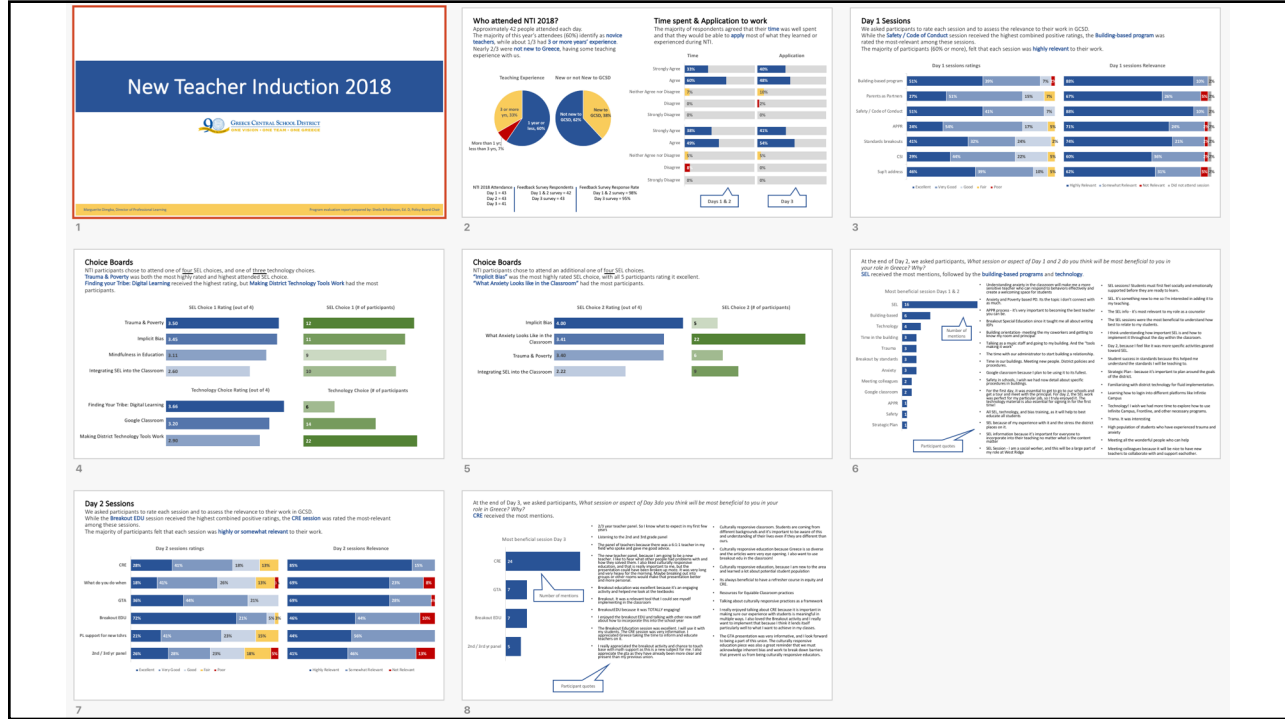




WHAT



How many triangles?



Common (and not so common) charts/graphs



While the number of Bachelor's Degrees conferred increased in all of these fields,
Business degrees saw a 213% increase from 1970-71 to 2012-13.
 (Number of degrees in thousands)

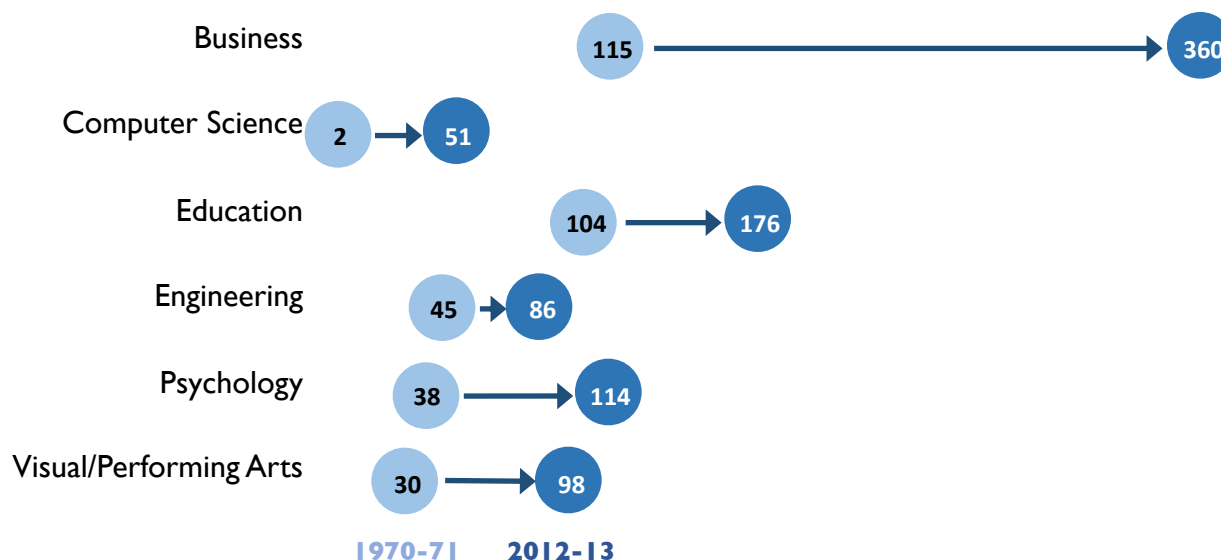


Table 322.10. Bachelor's degrees conferred by postsecondary institutions, by field of study: Selected years, 1970-71 through 2012-13

Field of study	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	2000-01	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Total	839,730	925,746	935,140	987,823	1,094,538	1,164,792	1,244,171	1,348,811	1,399,542	1,439,264	1,485,242	1,524,092	1,563,069	1,601,399	1,649,919	1,716,053	1,792,163	1,840,164
Agriculture and natural resources	12,672	19,402	21,886	16,823	13,124	21,425	23,370	23,348	22,835	23,002	23,053	23,133	24,113	24,982	26,343	28,630	30,972	33,593
Architecture and related services	5,570	9,146	9,455	9,119	9,781	8,352	8,480	9,056	8,838	9,237	9,515	9,717	9,805	10,119	10,051	9,831	9,727	9,757
Area, ethnic, cultural, gender, and group studies	2,579	3,577	2,887	3,021	4,776	5,633	6,160	6,634	7,181	7,569	7,879	8,194	8,772	8,620	8,955	9,228	8,851	8,851
Biological and biomedical sciences	35,705	54,154	43,078	38,395	39,482	61,014	60,576	61,294	62,624	65,915	70,607	76,832	79,829	82,828	86,391	89,984	95,850	100,319
Business	115,396	143,171	200,521	236,700	249,165	226,623	263,515	293,391	307,149	311,574	318,042	327,531	335,254	348,056	358,119	365,133	367,235	360,823
Communication, journalism, and related programs	10,324	20,045	29,428	41,666	51,650	47,320	58,013	67,895	70,968	72,715	73,955	74,783	76,382	77,984	81,280	83,231	83,771	84,817
Communications technologies	478	1,237	1,854	1,479	1,397	853	1,178	1,933	2,034	2,523	2,981	3,637	4,666	5,100	4,782	4,858	4,983	4,989
Computer and information sciences	2,388	5,652	15,121	42,337	25,159	24,506	44,142	57,433	59,488	54,111	47,480	42,170	38,476	37,992	39,593	43,066	47,406	50,962
Education	176,307	154,437	108,074	87,147	110,807	105,384	105,458	105,845	106,278	105,451	107,238	105,641	102,582	101,716	101,287	104,008	105,656	104,647
Engineering	45,034	38,733	63,642	77,391	62,446	62,168	58,209	62,567	63,410	64,707	66,841	66,874	68,431	68,911	72,657	76,356	81,371	85,980
Engineering technologies	5,148	7,943	11,713	19,731	17,303	15,829	14,660	14,664	14,669	14,837	14,565	14,980	15,177	15,493	16,078	16,741	17,283	17,004
English language and literature/letters	63,914	41,452	31,922	34,083	51,064	49,928	50,569	53,699	53,984	54,379	55,096	55,122	55,038	55,465	53,229	52,754	53,765	52,424
Family and consumer sciences/human sciences	11,167	17,409	18,370	13,847	13,920	14,353	16,421	17,929	19,172	20,074	20,775	21,400	21,870	21,906	21,832	22,438	23,441	23,934
Foreign languages, literatures, and linguistics	20,988	17,068	11,638	11,550	13,937	14,832	16,128	16,912	17,754	18,386	19,410	20,275	20,977	21,169	21,507	21,705	21,756	21,673
Health professions and related programs	25,223	53,885	63,665	65,309	59,875	86,087	75,933	71,261	73,934	80,685	91,973	101,810	111,478	120,420	129,623	143,463	163,675	181,144
Homeland security, law enforcement, and firefighting	2,045	12,507	13,707	12,704	16,806	24,810	25,211	26,200	28,175	30,723	35,319	39,206	40,235	41,788	43,613	47,600	54,091	60,269
Legal professions and studies	545	531	776	1,223	1,827	2,123	1,991	2,474	2,841	3,161	3,302	3,596	3,771	3,822	3,886	4,429	4,595	4,425
Liberal arts and sciences, general studies, and humanities	7,481	18,855	21,643	21,336	30,526	33,997	37,962	40,480	42,106	43,751	44,898	44,255	46,940	47,095	46,963	46,717	46,961	46,761
Library science	1,013	843	375	155	90	58	52	99	72	76	76	82	68	78	85	96	95	102
Mathematics and statistics	24,801	15,984	11,078	16,122	14,393	12,713	11,171	12,505	13,327	14,351	14,770	14,954	15,192	15,507	16,029	17,182	18,841	20,453
Military technologies and applied sciences	357	952	42	255	183	7	21	6	10	40	33	168	39	55	56	64	86	105
Multi/interdisciplinary studies	6,324	13,709	12,986	13,754	17,774	26,885	26,478	27,449	28,047	28,939	30,583	32,111	34,174	35,376	37,717	42,473	45,717	47,654
Parks, recreation, leisure, and fitness studies	1,621	5,182	5,729	4,623	4,315	12,974	17,948	21,432	22,164	22,888	25,490	27,430	29,331	31,683	33,332	35,934	38,998	42,714
Philosophy and religious studies	8,149	8,447	6,776	6,396	7,423	7,541	8,717	10,344	11,152	11,584	11,985	11,969	12,257	12,448	12,503	12,830	12,645	12,793
Physical sciences and science technologies	21,410	21,458	23,936	21,711	16,334	19,716	18,025	18,038	18,131	19,104	20,522	21,291	22,179	22,691	23,381	24,705	26,664	28,050
Precision production	0	0	0	2	2	12	31	42	61	64	55	23	33	29	29	43	37	36
Psychology	38,187	50,278	41,068	40,628	58,655	73,416	73,645	78,650	82,098	85,614	88,134	90,039	92,587	94,273	97,215	100,906	109,099	114,450
Public administration and social services	5,466	15,440	16,707	11,887	14,350	19,849	19,447	19,900	20,552	21,769	21,986	23,147	23,493	23,852	25,421	26,799	29,695	31,950
Social sciences and history	155,324	126,296	100,513	93,840	125,107	126,479	128,036	143,256	150,357	156,892	161,485	164,183	167,363	168,517	172,782	177,169	178,534	177,778
Theology and religious vocations	3,720	5,490	5,808	5,510	4,799	5,292	6,945	7,962	8,126	9,284	8,548	8,696	8,992	8,940	8,719	9,073	9,304	9,385
Transportation and materials moving	0	225	263	1,838	2,622	3,561	3,748	4,631	4,824	4,904	5,349	5,657	5,203	5,189	4,998	4,941	4,876	4,526
Visual and performing arts	30,394	42,138	40,479	37,241	42,186	49,296	61,148	71,482	77,181	80,955	83,297	85,186	87,703	89,143	91,798	93,939	95,806	97,796
Not classified by field of study	0	0	0	0	13,258	1,756	783	0	0	0	0	0	377	0	0	0	0	0

Source: http://nces.ed.gov/programs/digest/d14/tables/dt14_322.10.asp

Top 10 skills

in 2020

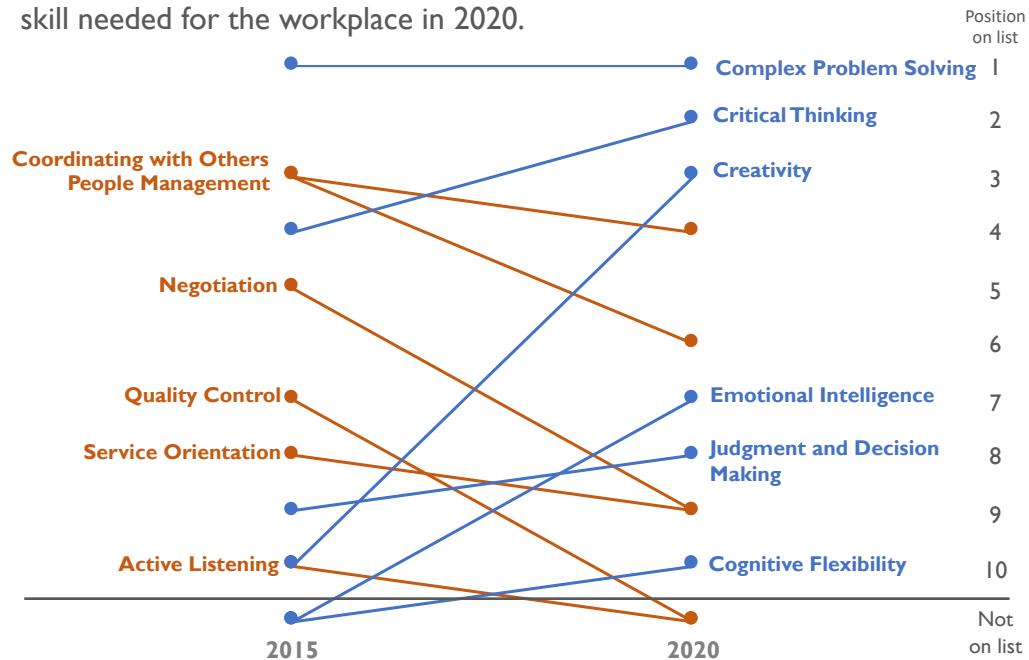
1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

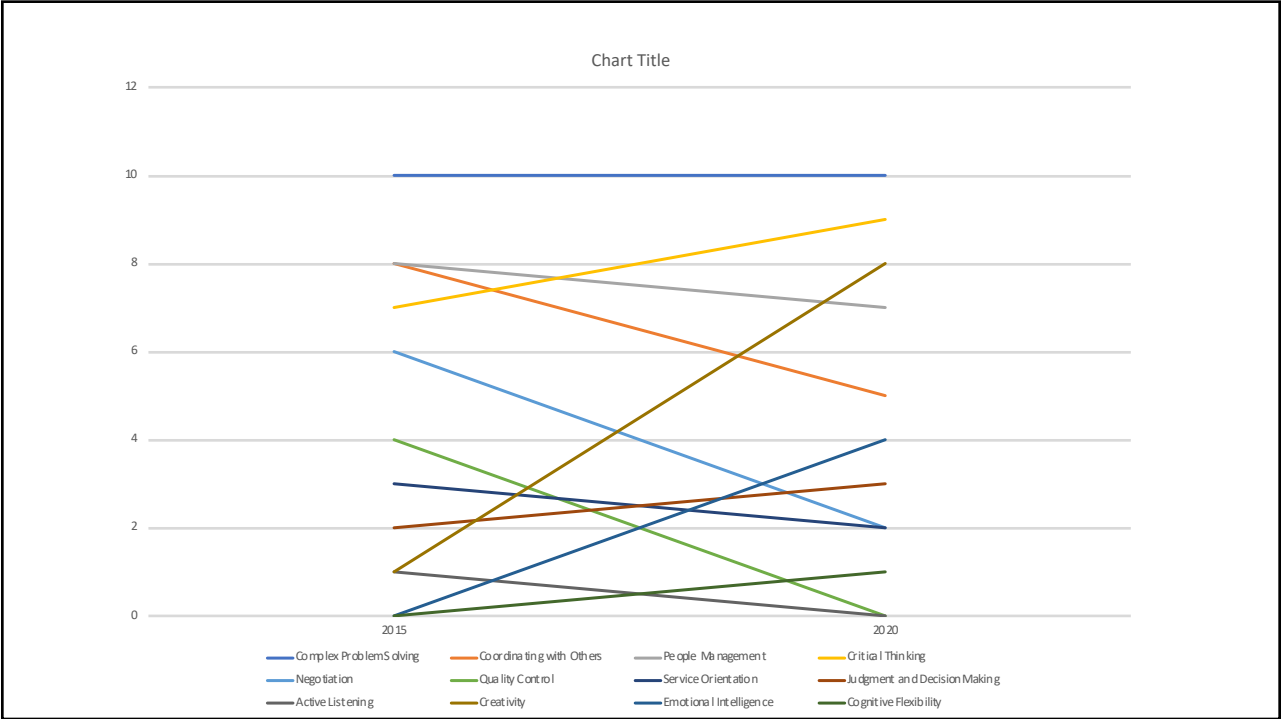
in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

Source: <https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/>

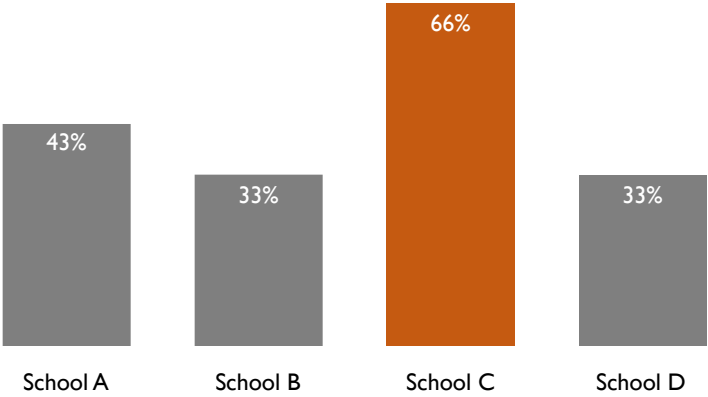
Complex Problem Solving will continue to be the top job skill needed for the workplace in 2020.





Column Chart/Graph

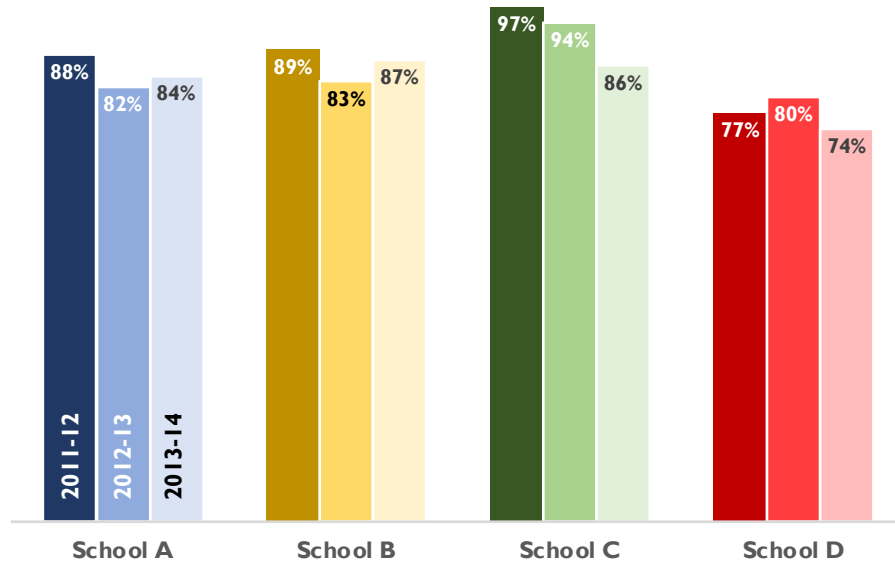
New Algebra curriculum may be having an impact on **School C** students.
Nearly 2/3 of students scored 80% or above on the 2018 assessment.



Clustered Column Chart/Graph

Each school struggles with percent of 11th graders on track to graduate.

School C has seen the most significant decline in recent years.



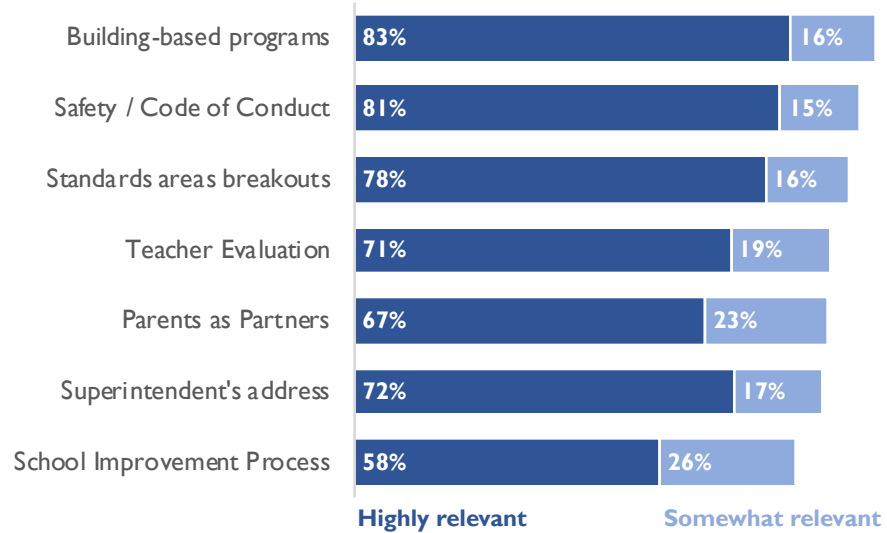
Bar Chart/Graph

Social Emotional Learning was most often identified by participants as the most beneficial session.



Stacked Bar Chart/Graph

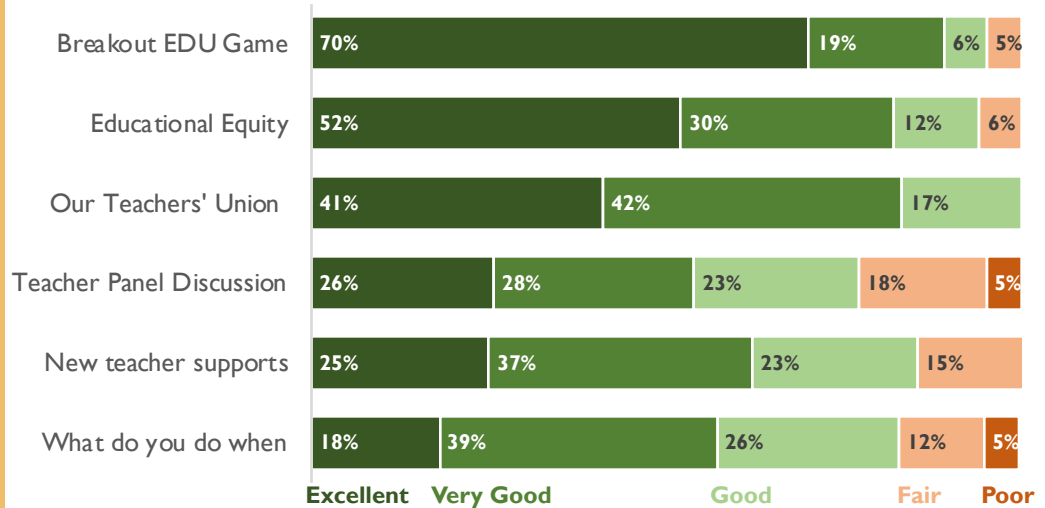
Participants found our **Building-based programs** most relevant to their work.



100% Stacked Bar Chart/Graph

Participants rated **Breakout EDU Game** highest among the Day 3 sessions.

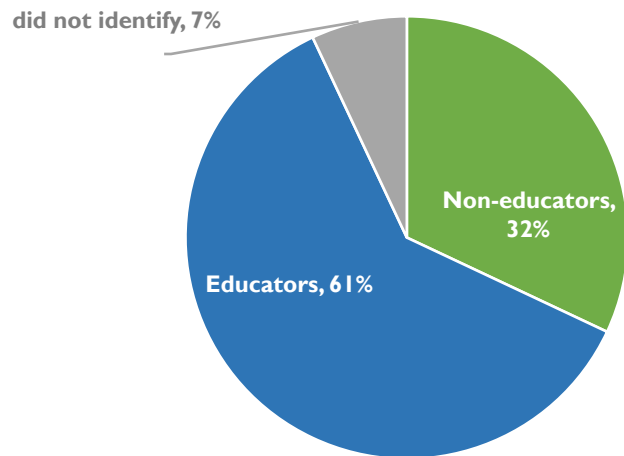
The **Teacher Panel Discussion, New Teacher Supports, and What do you do when** sessions had mixed reviews.



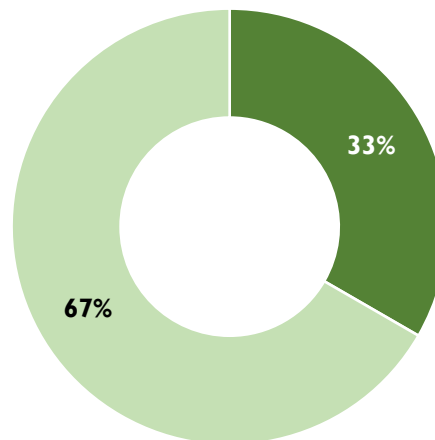
**Pie
Chart/Graph**

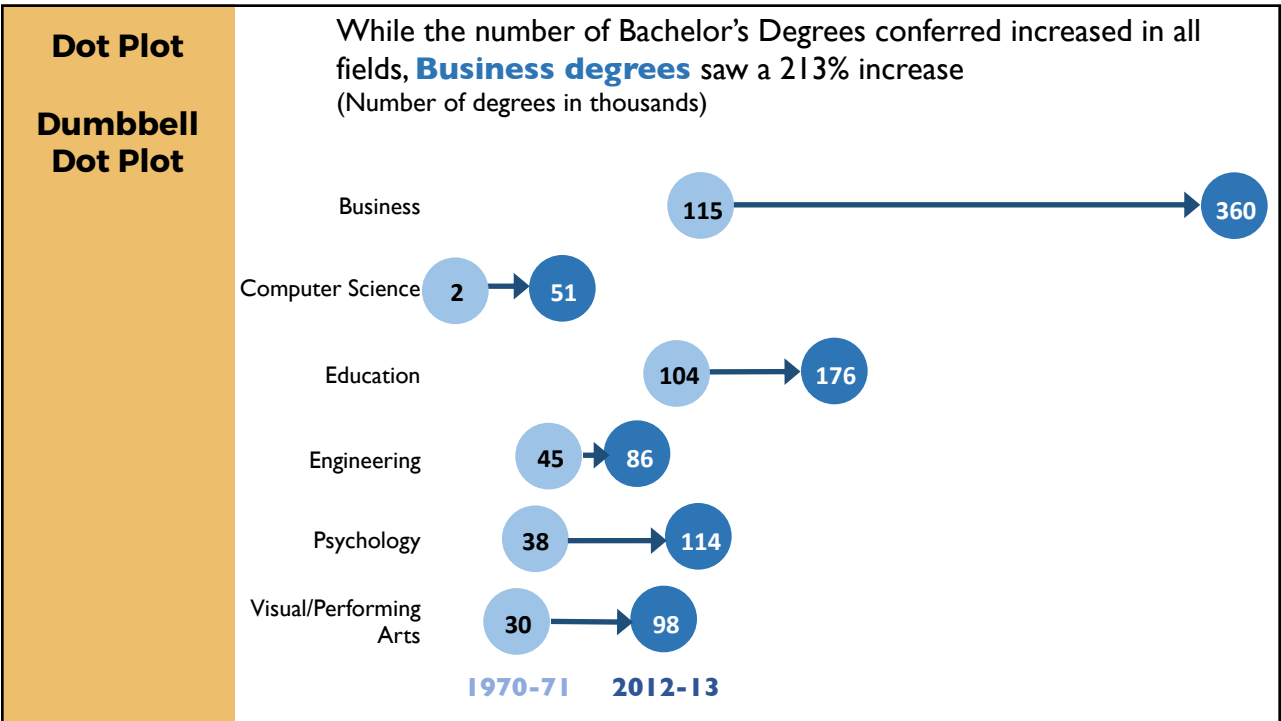
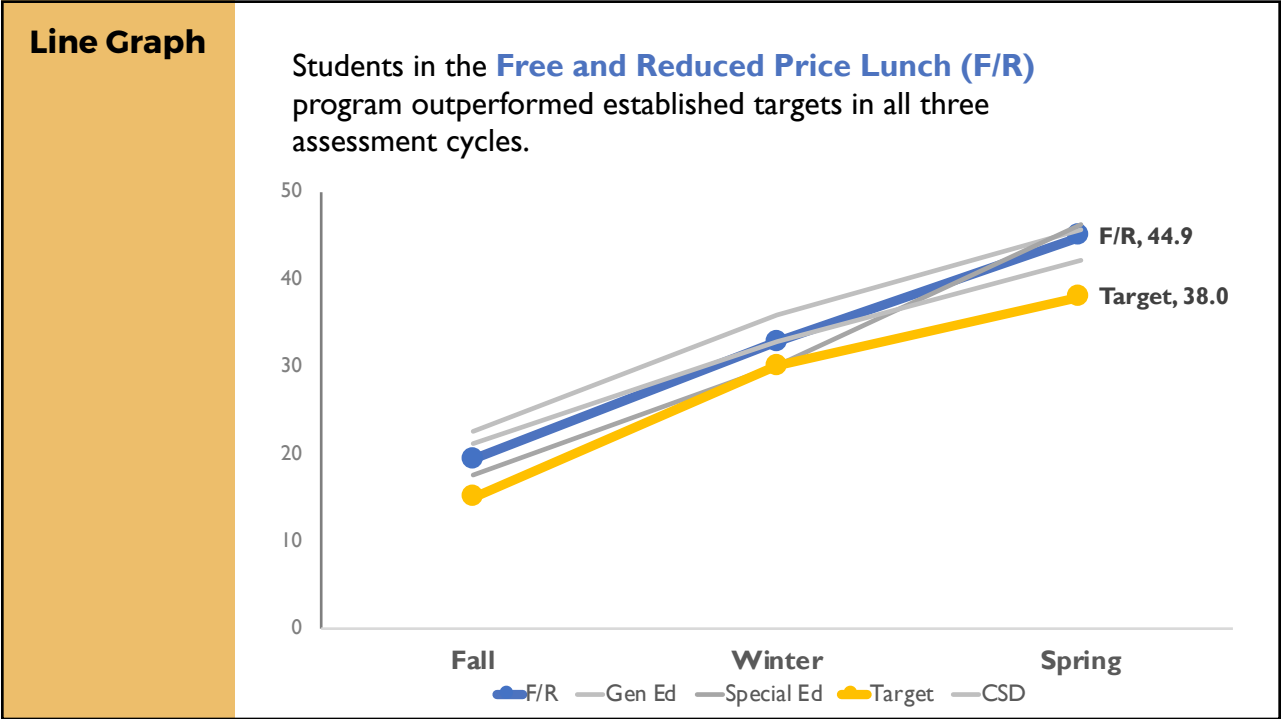
Nearly one-third of conference attendees were **non-educators**.

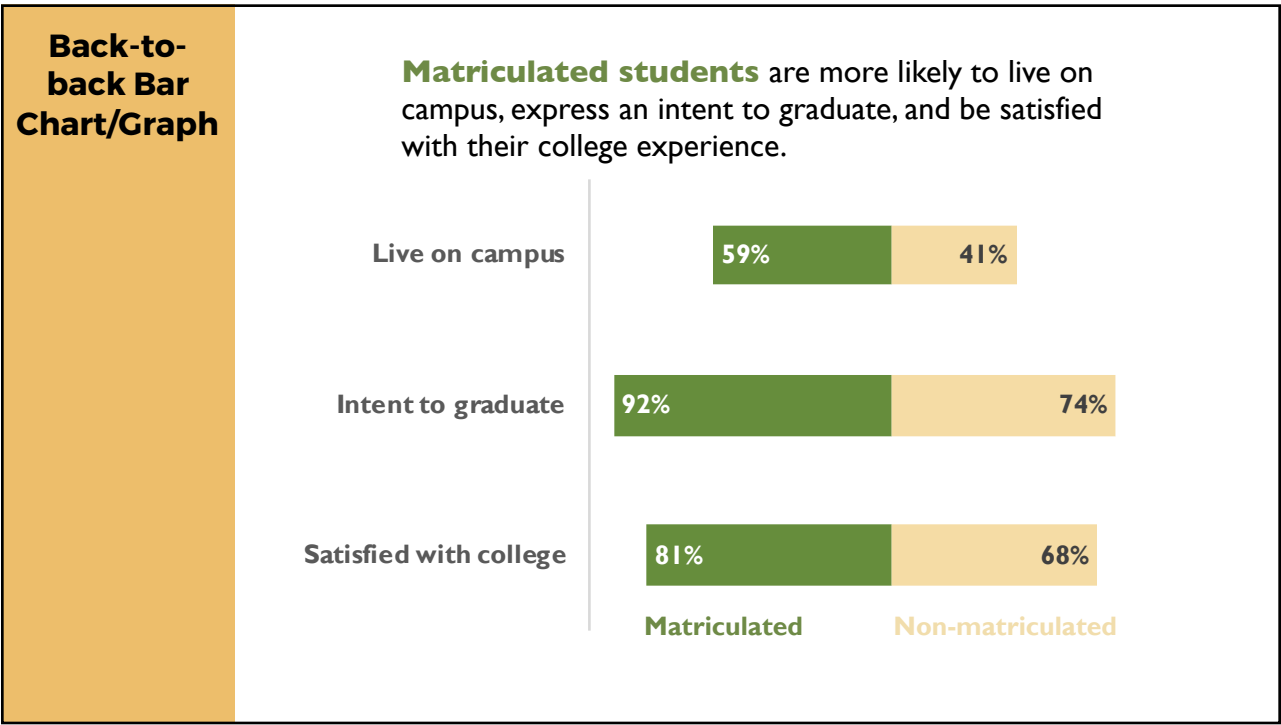
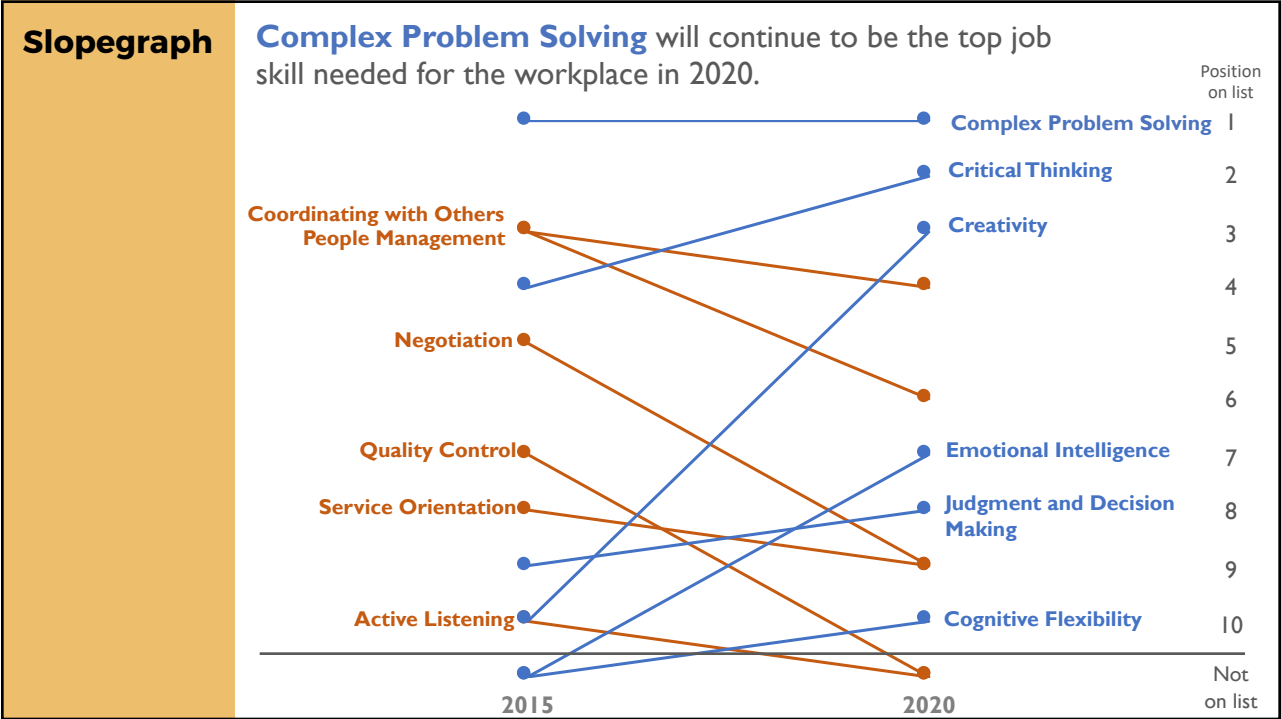
We need to increase efforts to solicit conference proposals for sessions relevant for both groups.

**Donut
Chart/Graph**

Nearly one-third of participants are **new to our school**.

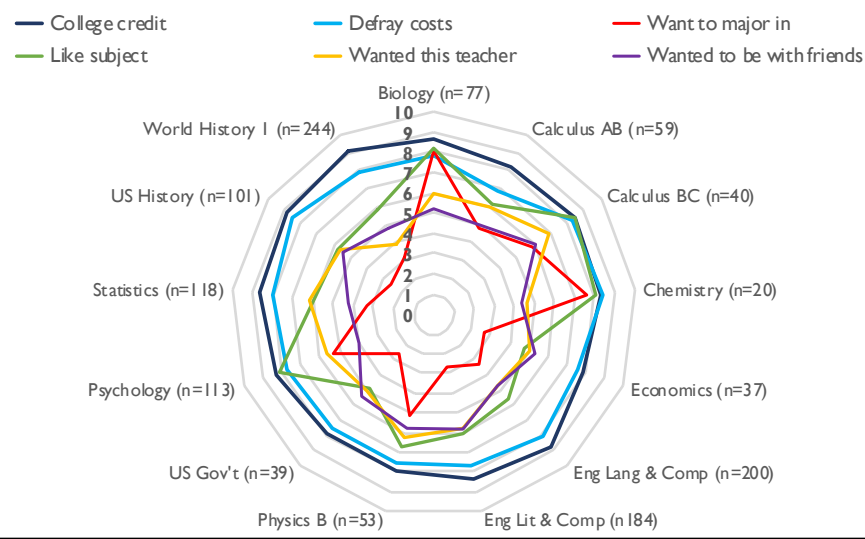






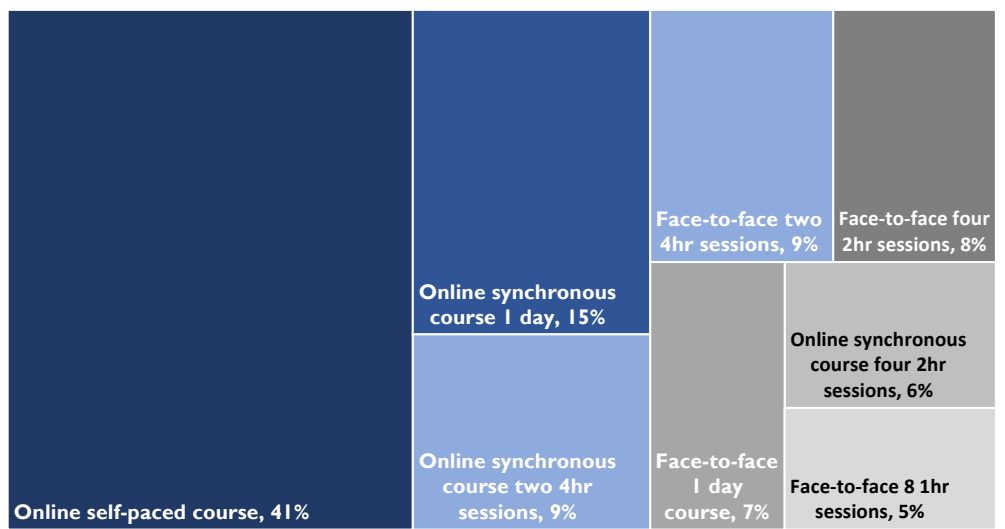
Radar Graph

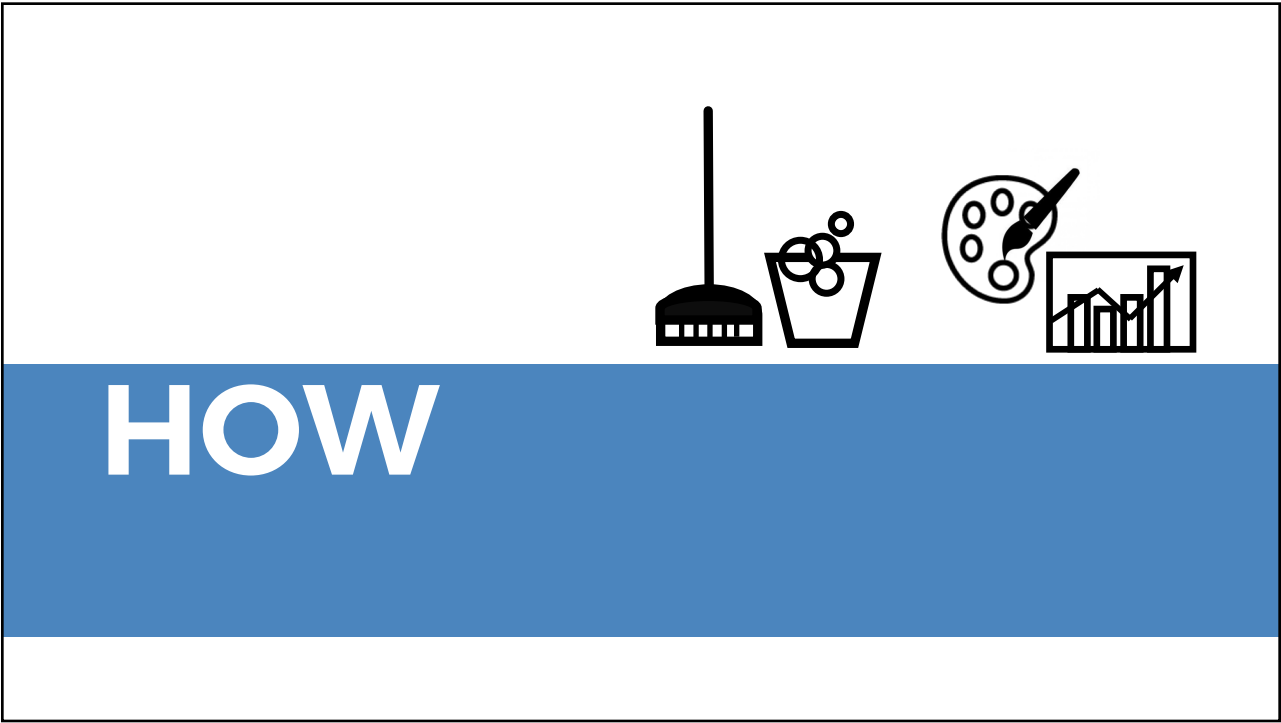
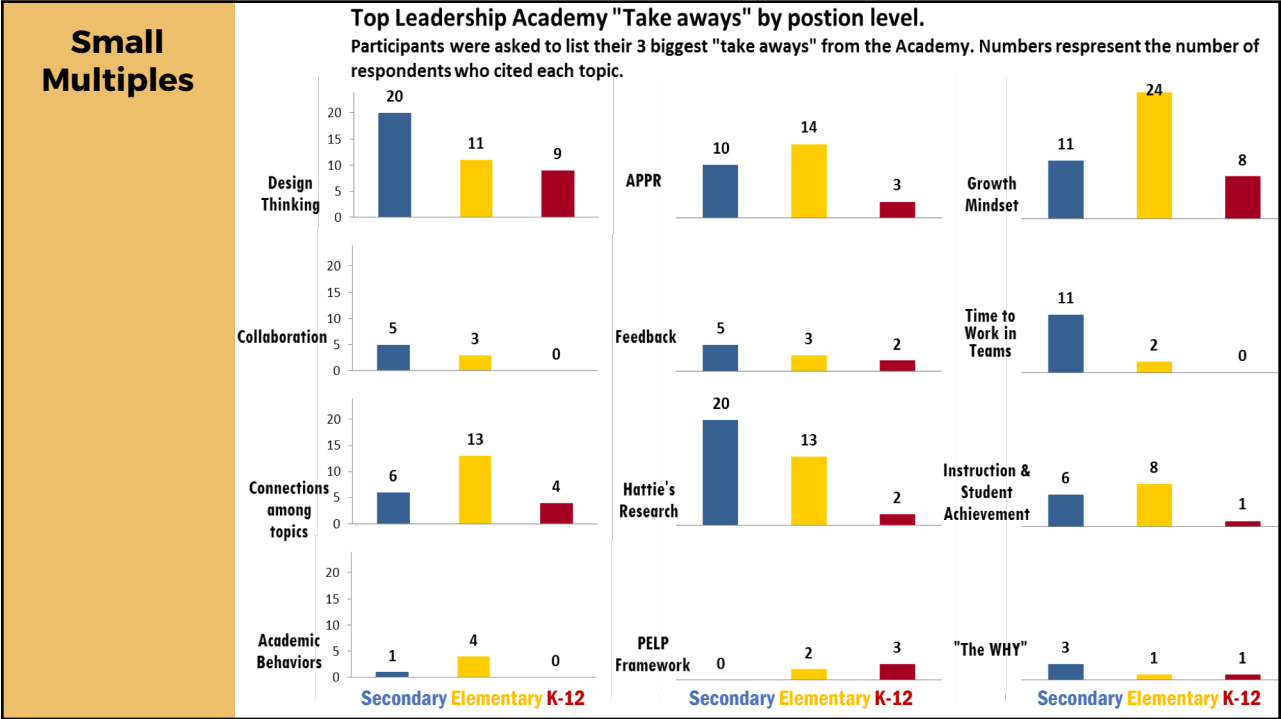
Earning **college credit** is a very important reason students enroll in Advanced Placement courses.
 Wanting a college **major in the subject** was very important to students in Biology, but less so for students in US Government, or World History.

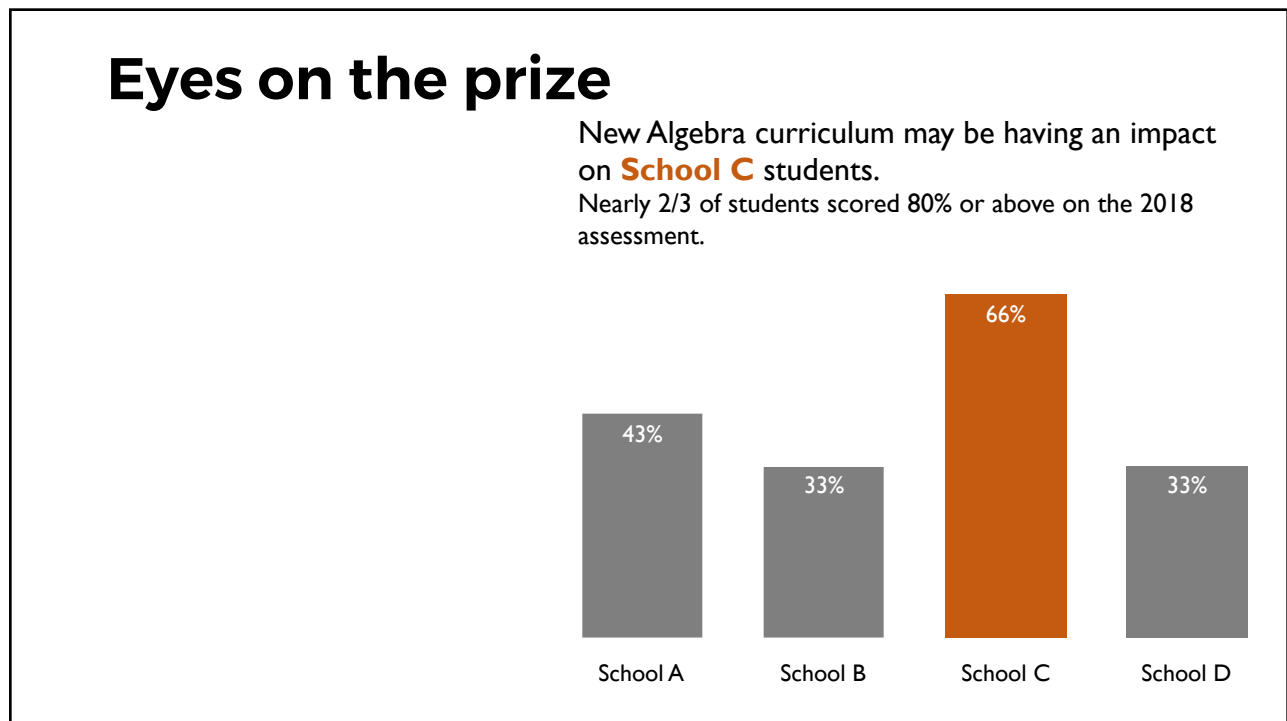
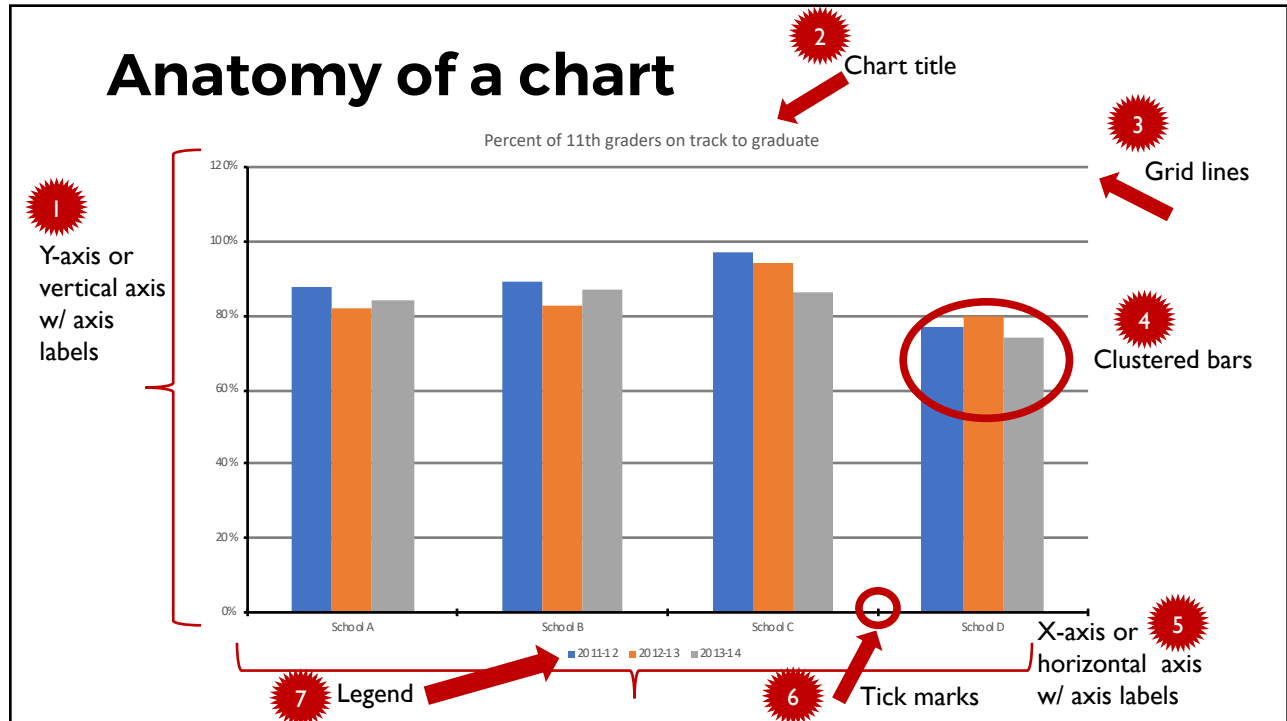


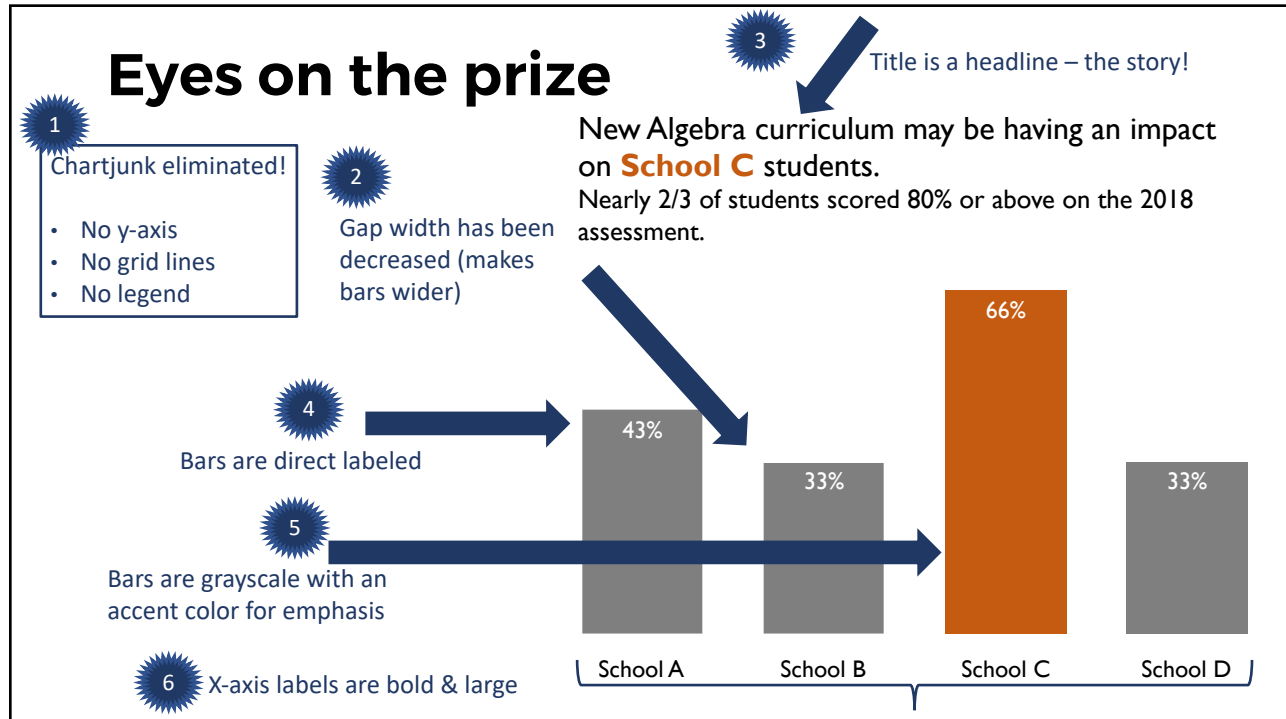
Treemap

Our students strongly prefer **online self-paced** courses.
 We will also offer a **1 day online synchronous course**, an **online course with two 4-hour sessions**, and a **face-to-face course with two 4-hr sessions** to meet additional needs.

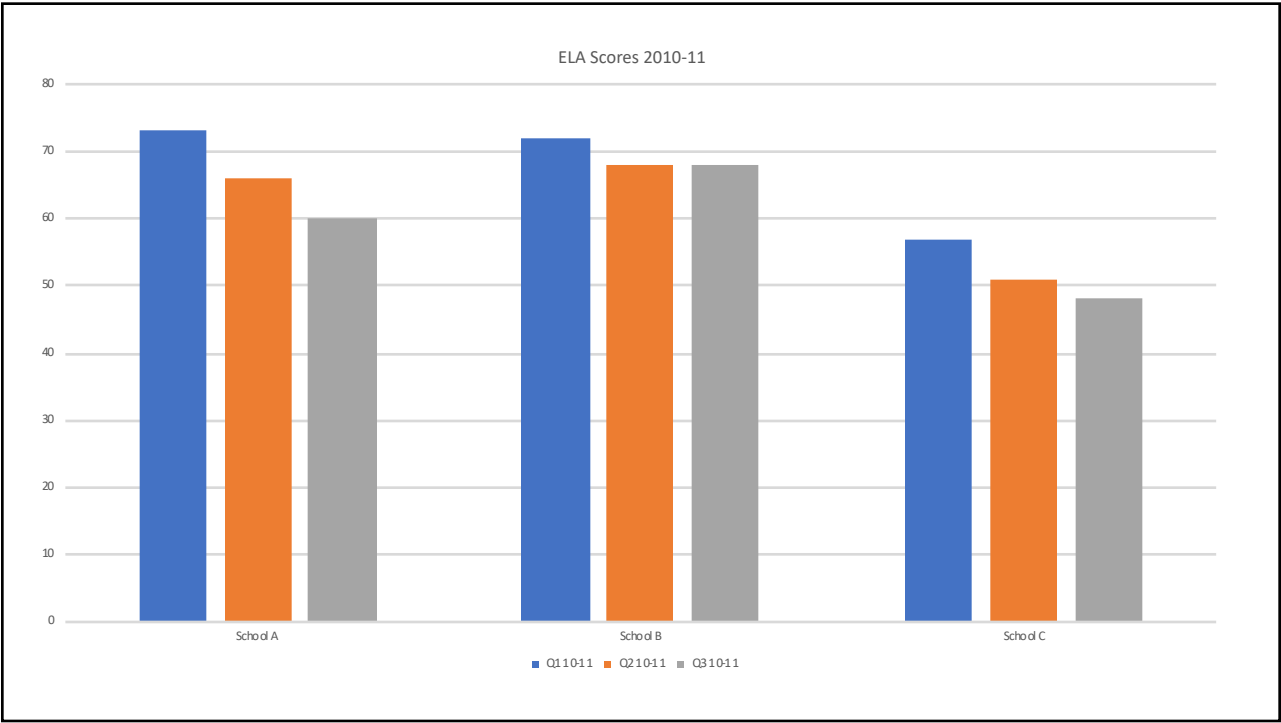
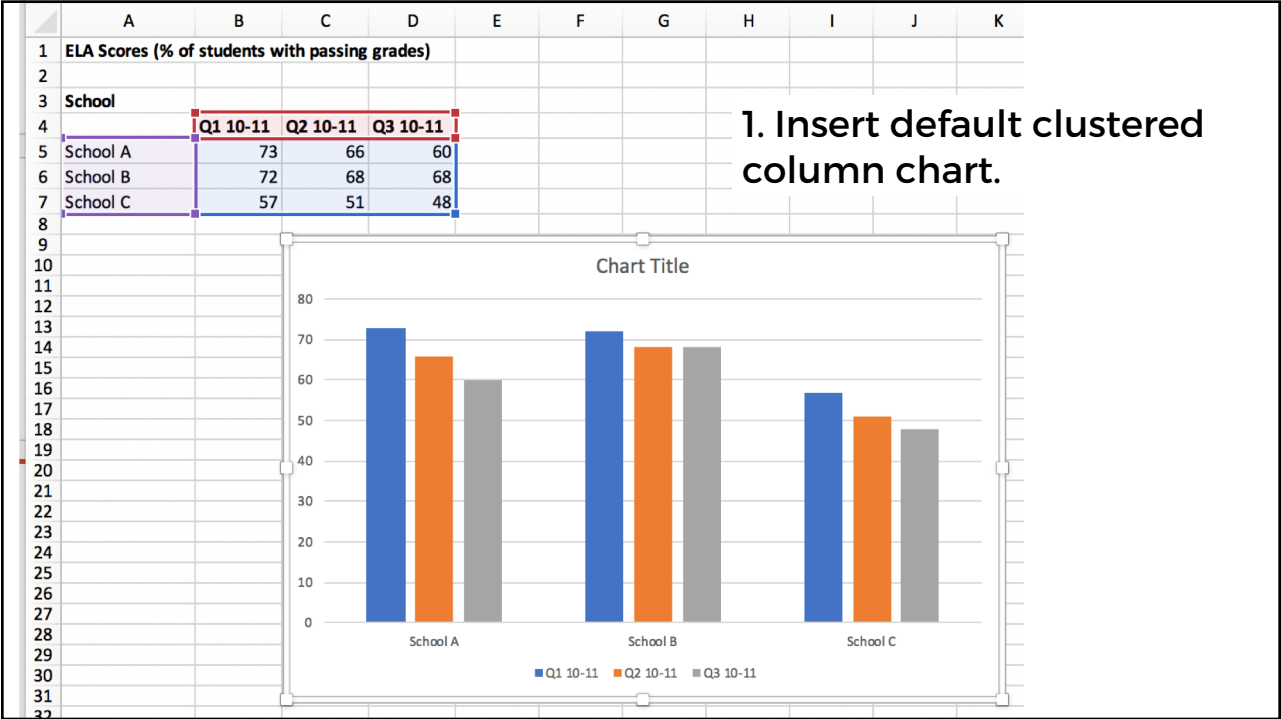








A look at the process...



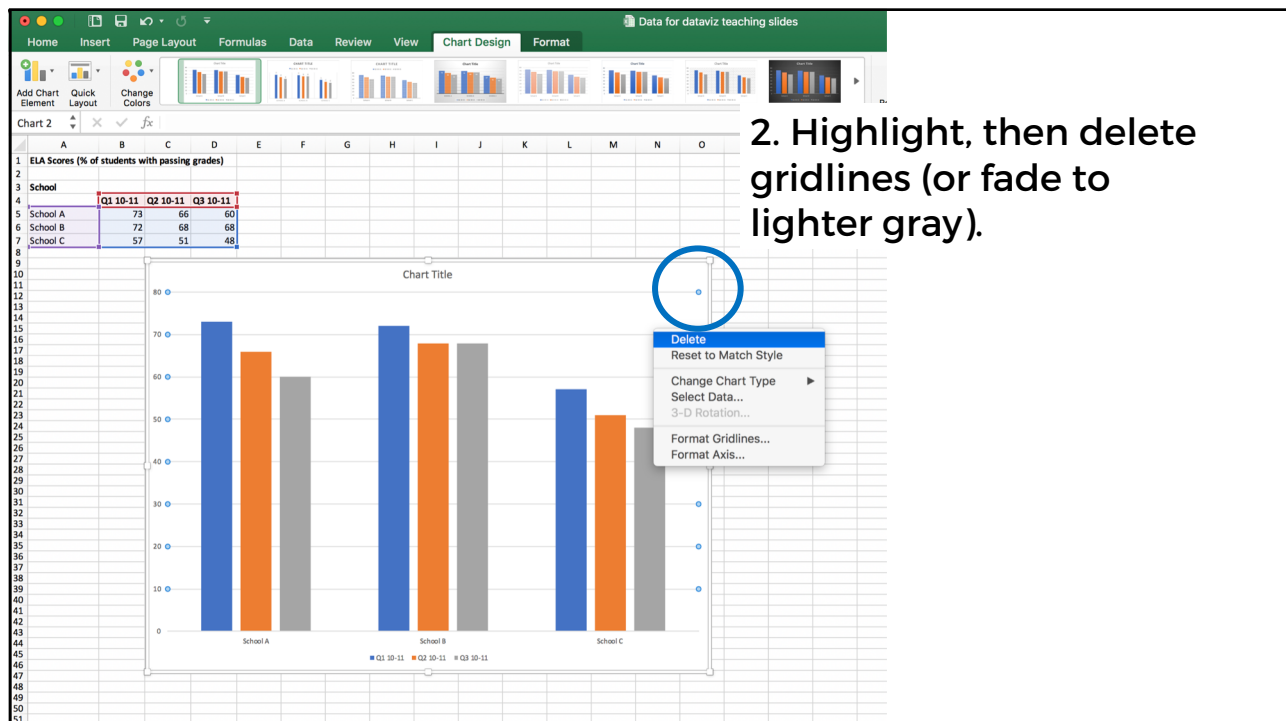
General process...

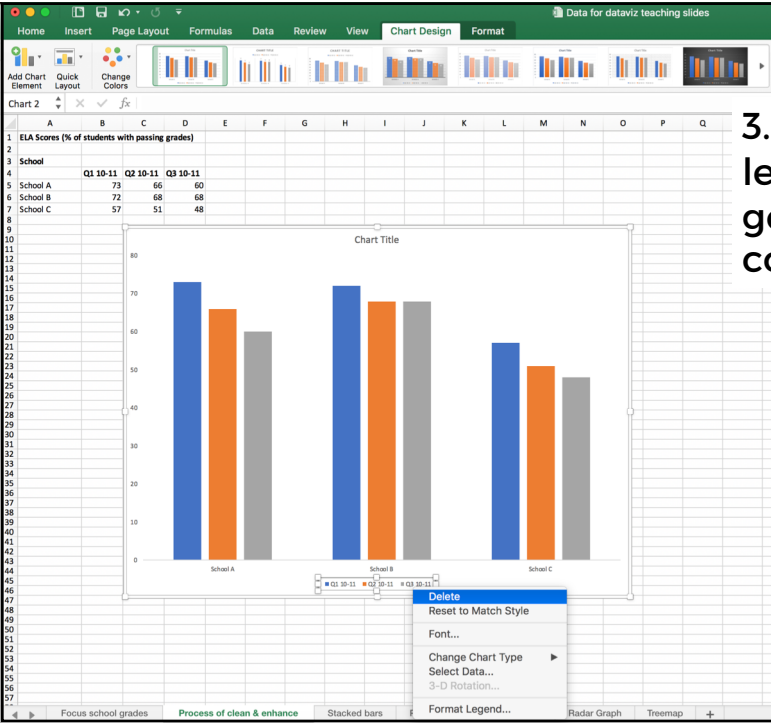
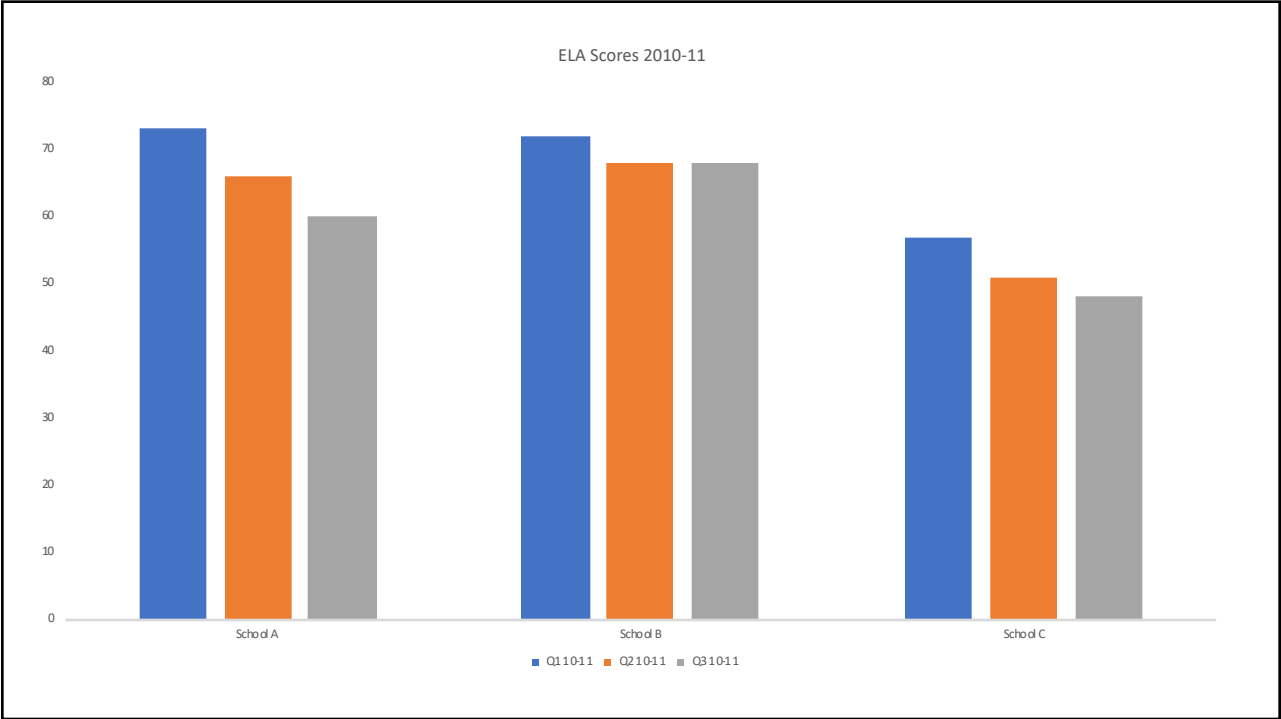


LEFT click to select a chart element, data series, or data point.

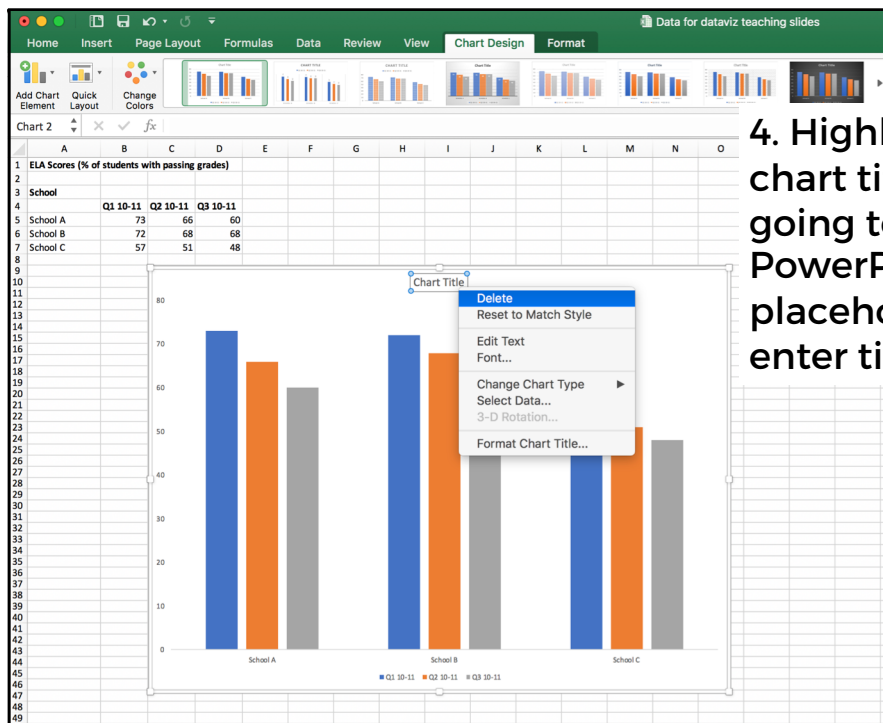
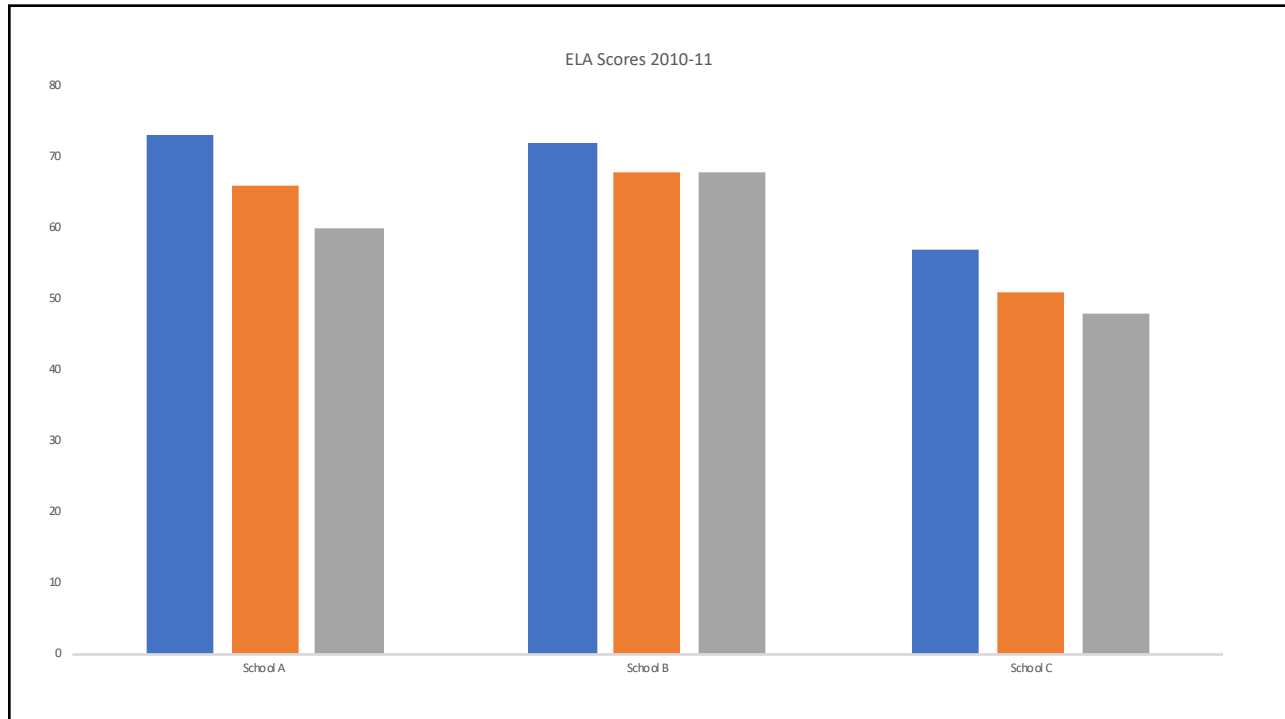


RIGHT click to get the formatting menu and select options.

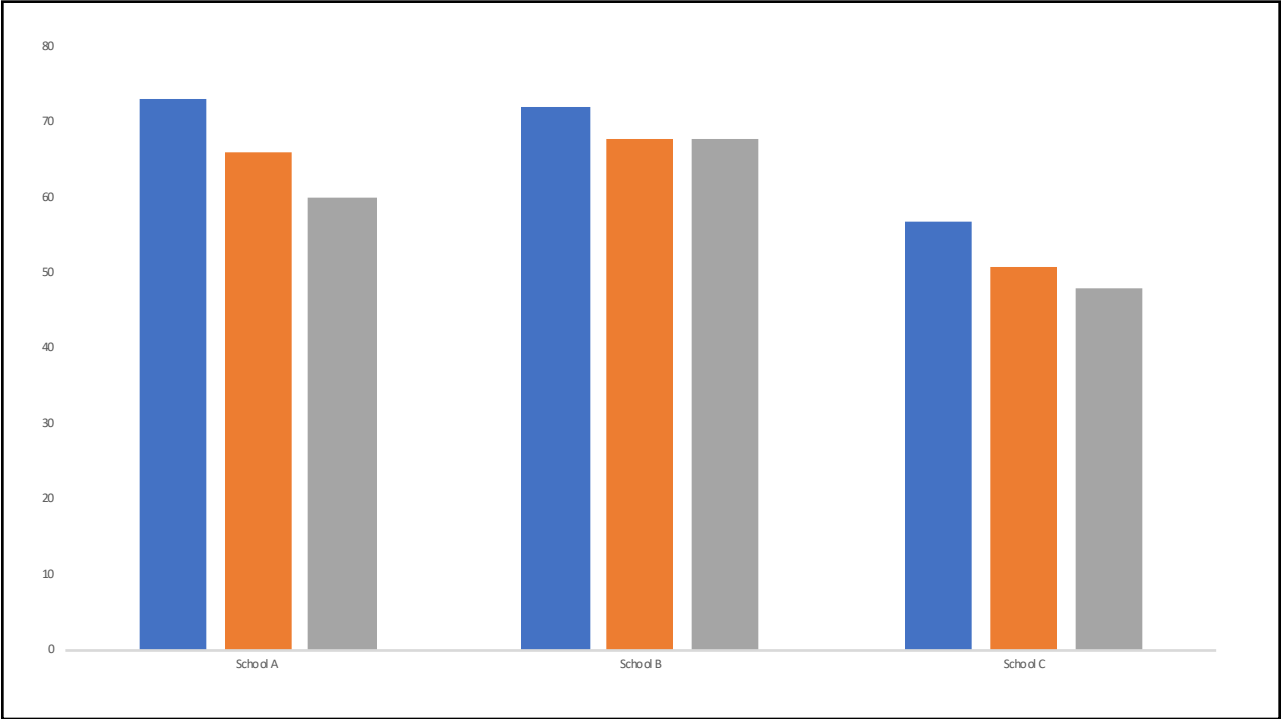




3. Highlight, then delete legend (because we're going to direct label the columns).



4. Highlight, then delete chart title (because we're going to create a title in PowerPoint) or leave placeholder there and enter title later.



Maximum 80.0

5. Highlight, then format y-axis (if needed), then delete.

Format Axis

Axis Options

Text Options

Axis Options

Bounds

Minimum 0.0

Maximum 80.0

Units

Major 10.0

Minor 2.0

Horizontal axis crosses

Automatic

Axis value 0.0

Maximum axis value

Display units None

Show display units label on chart

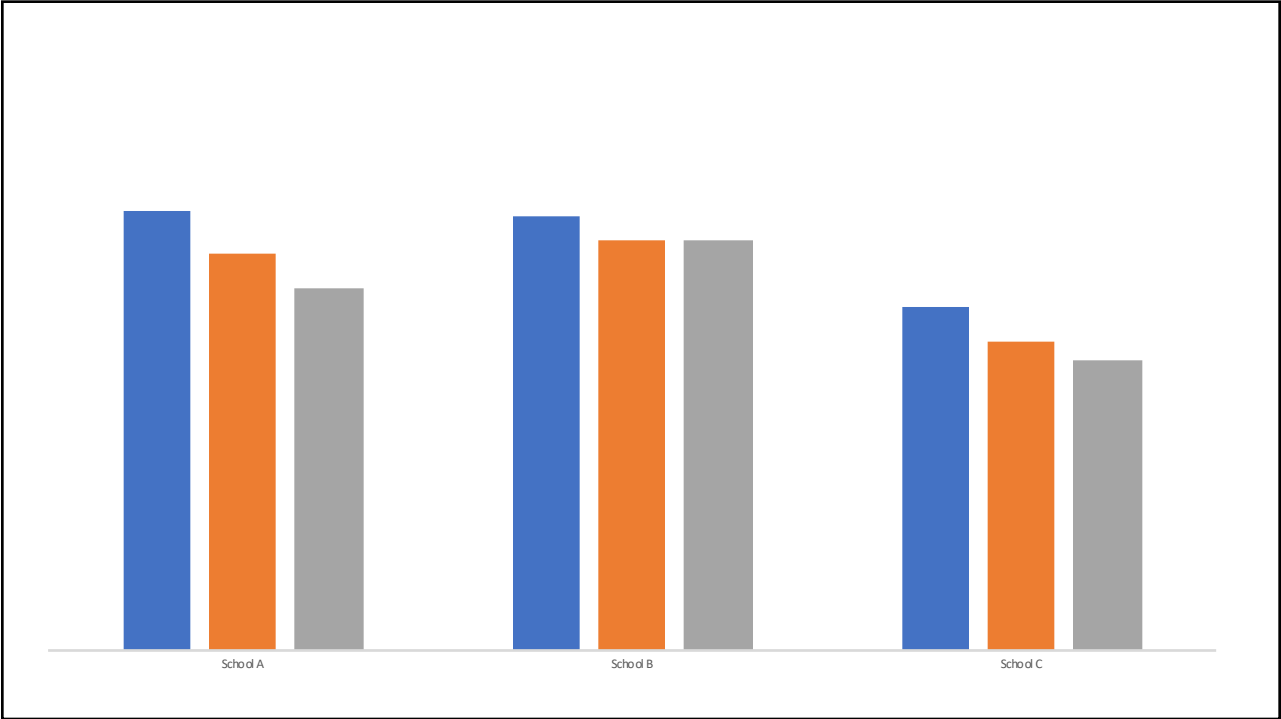
Logarithmic scale Base 10

Values in reverse order

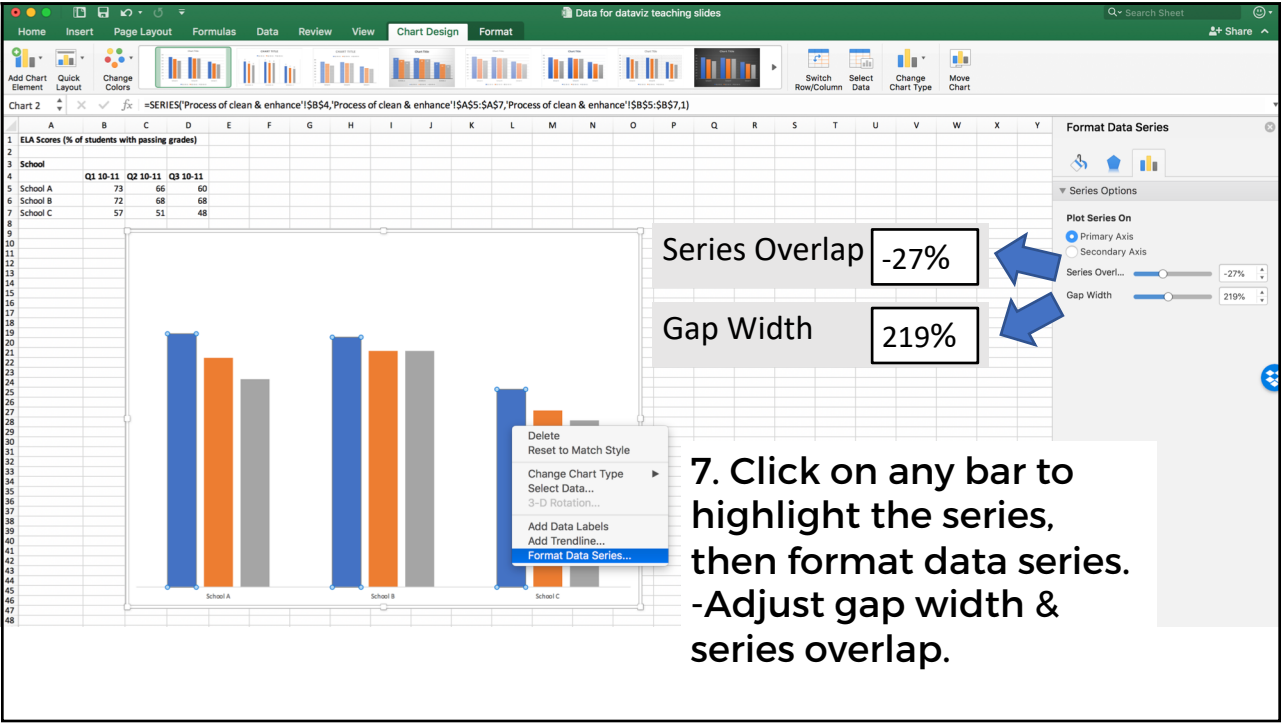
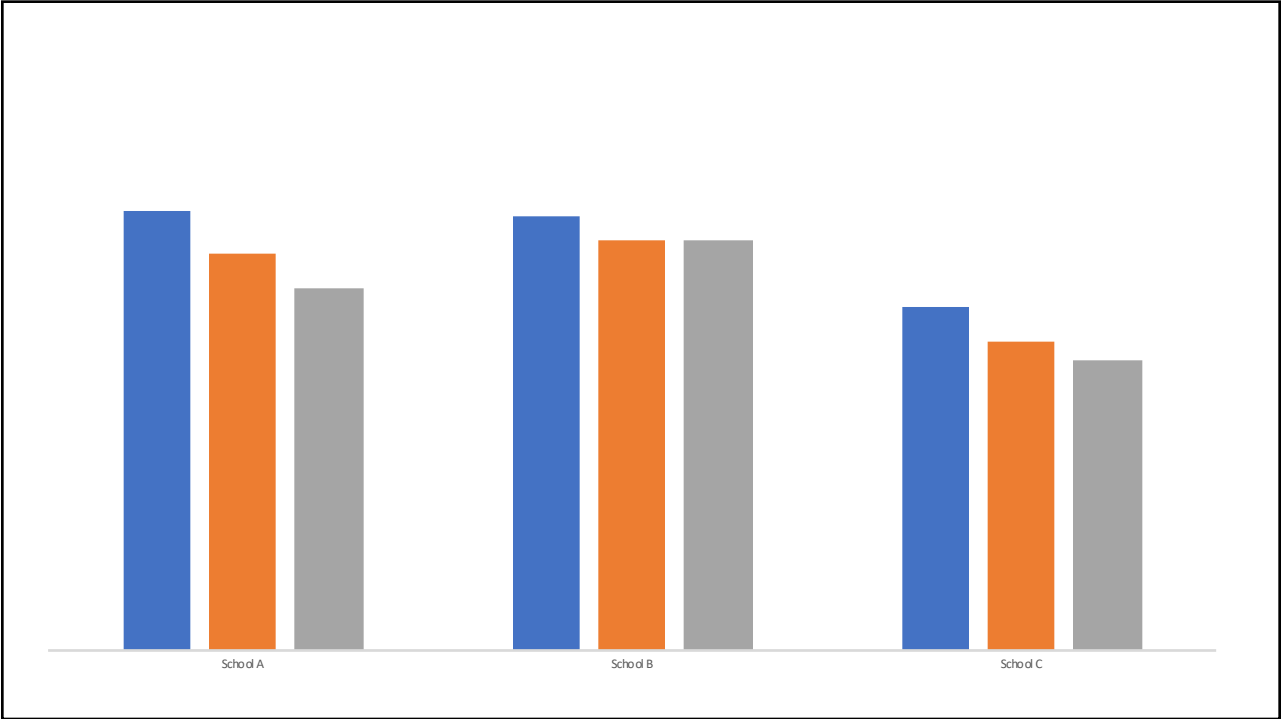
Tick Marks

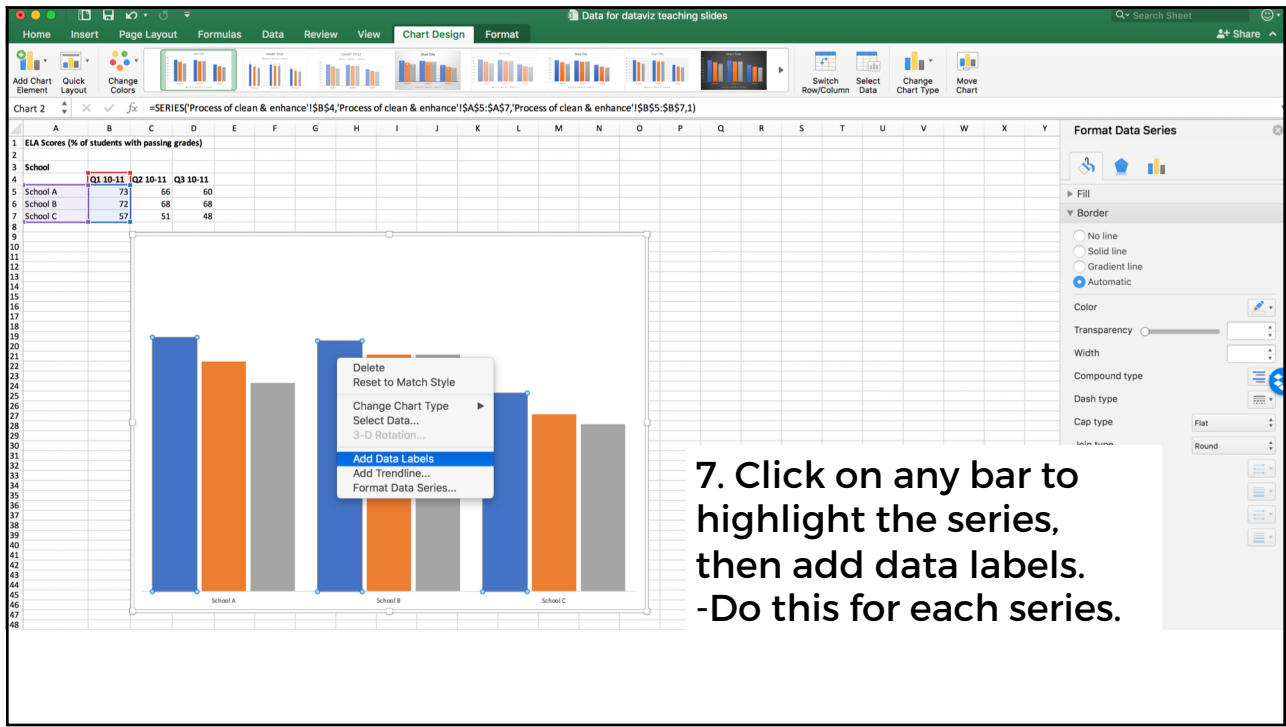
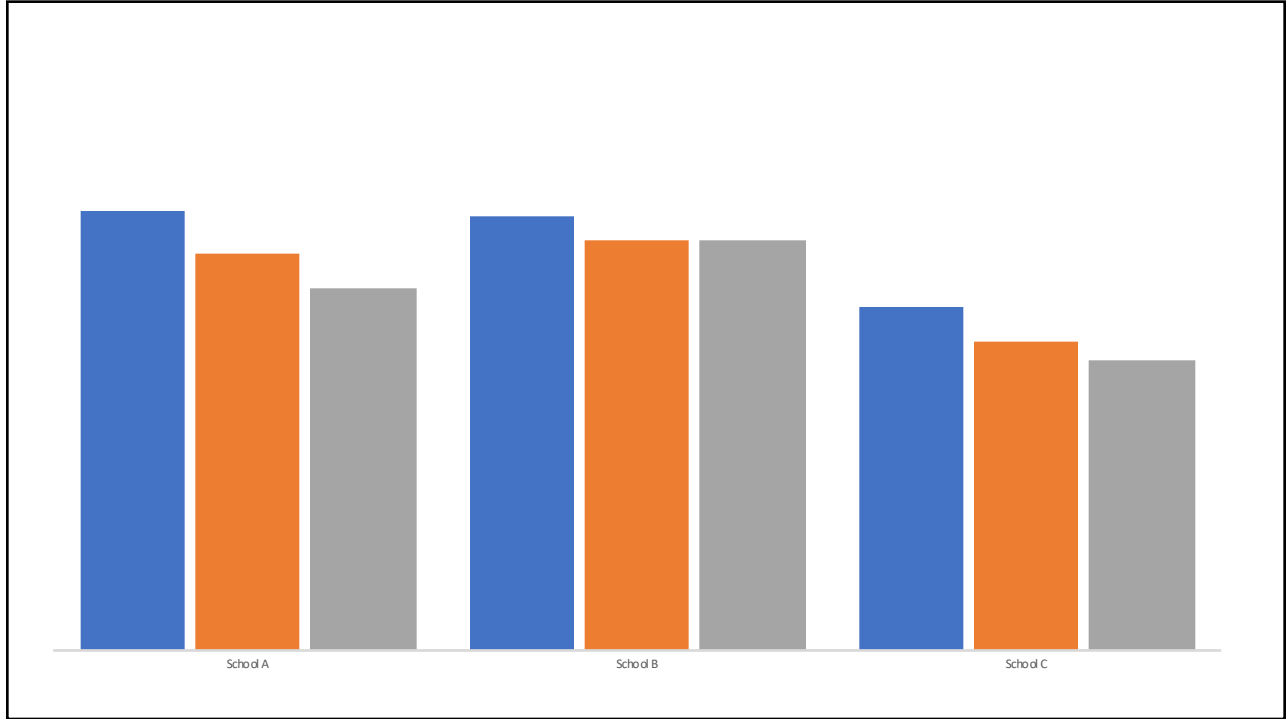
Labels

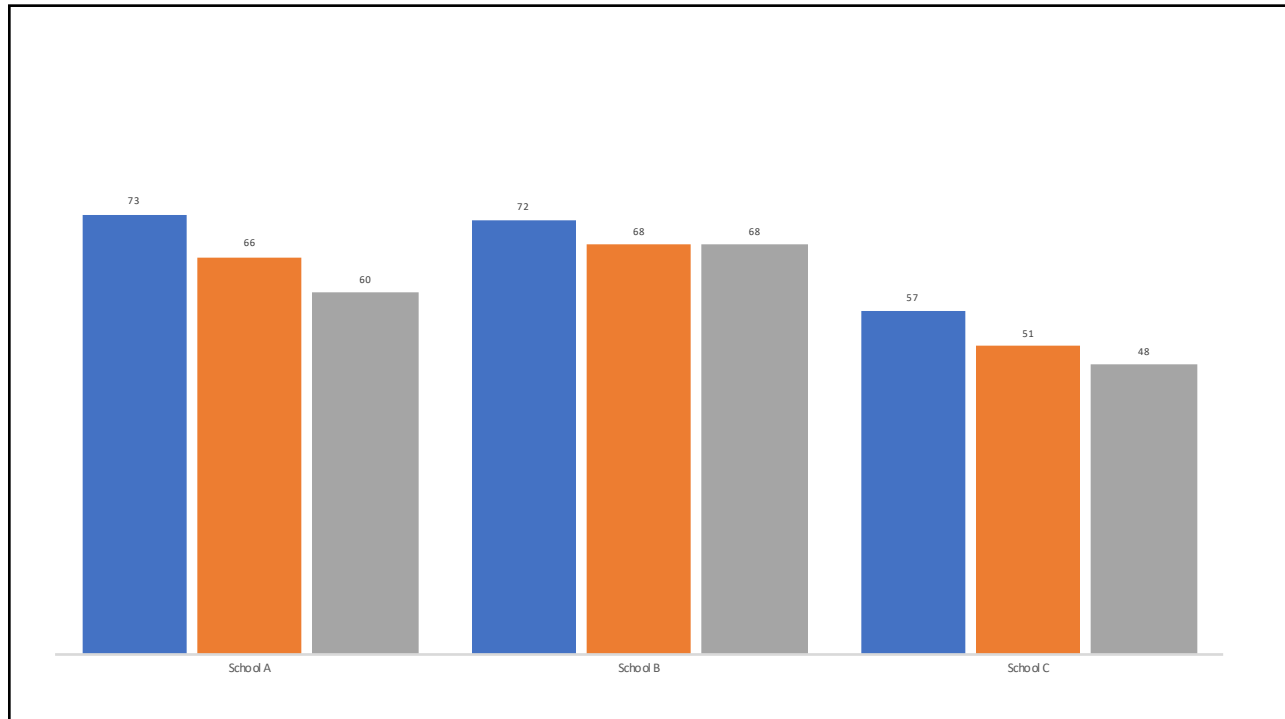
Number



Ready to enhance...

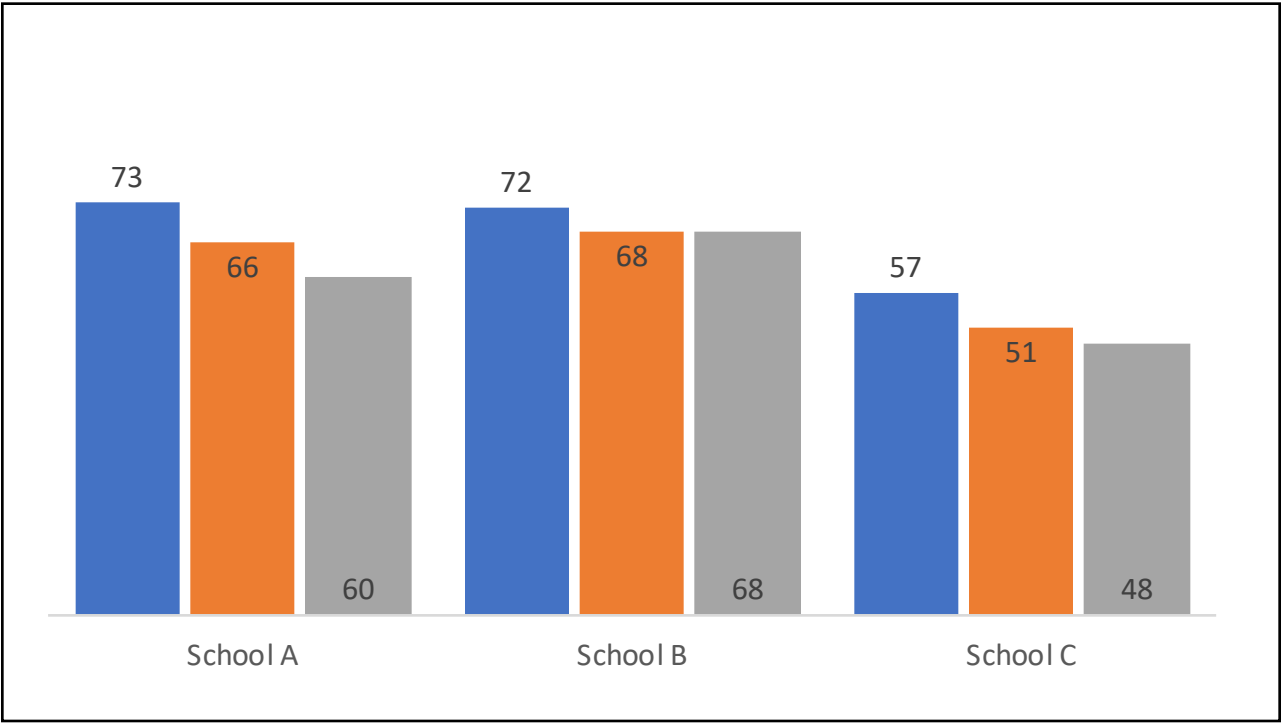
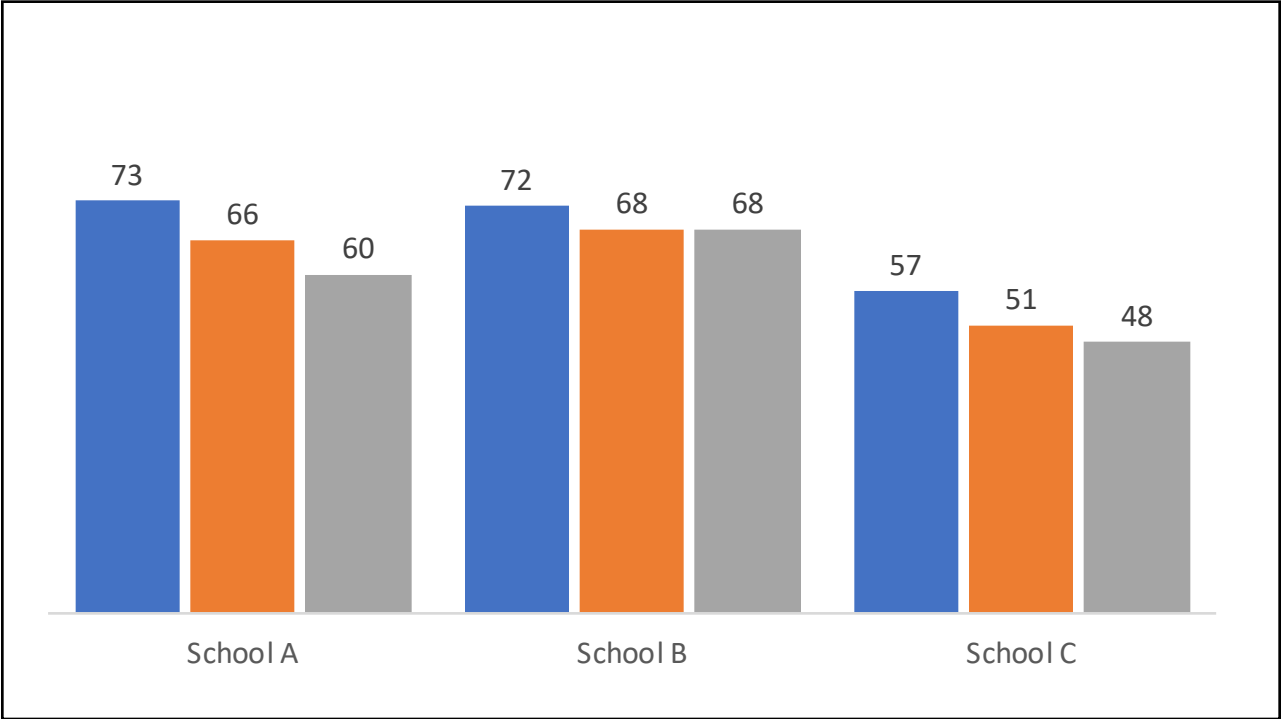


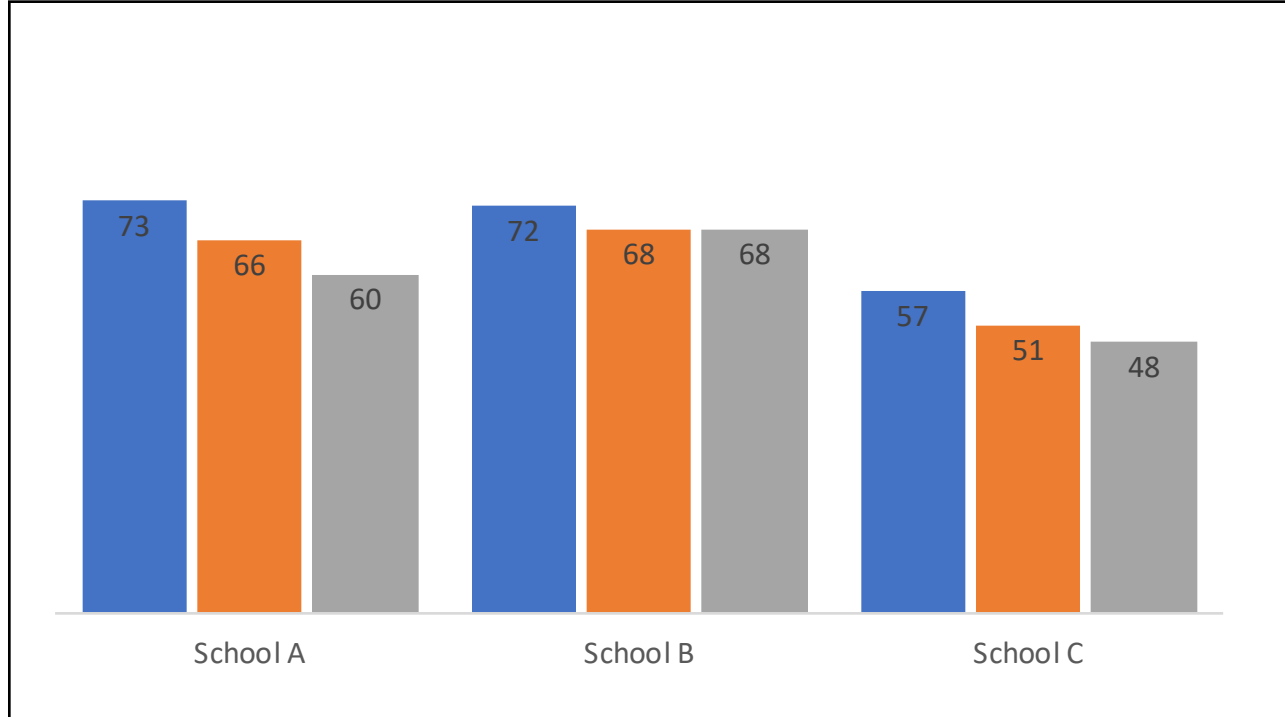




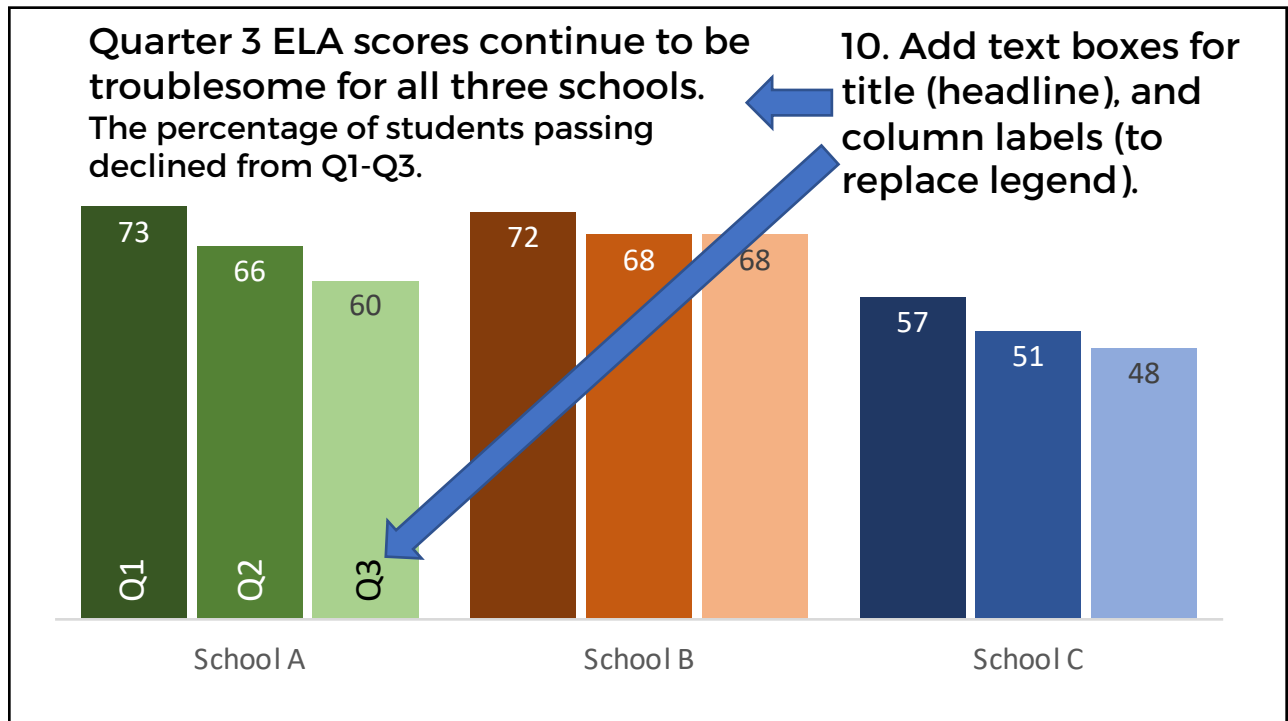
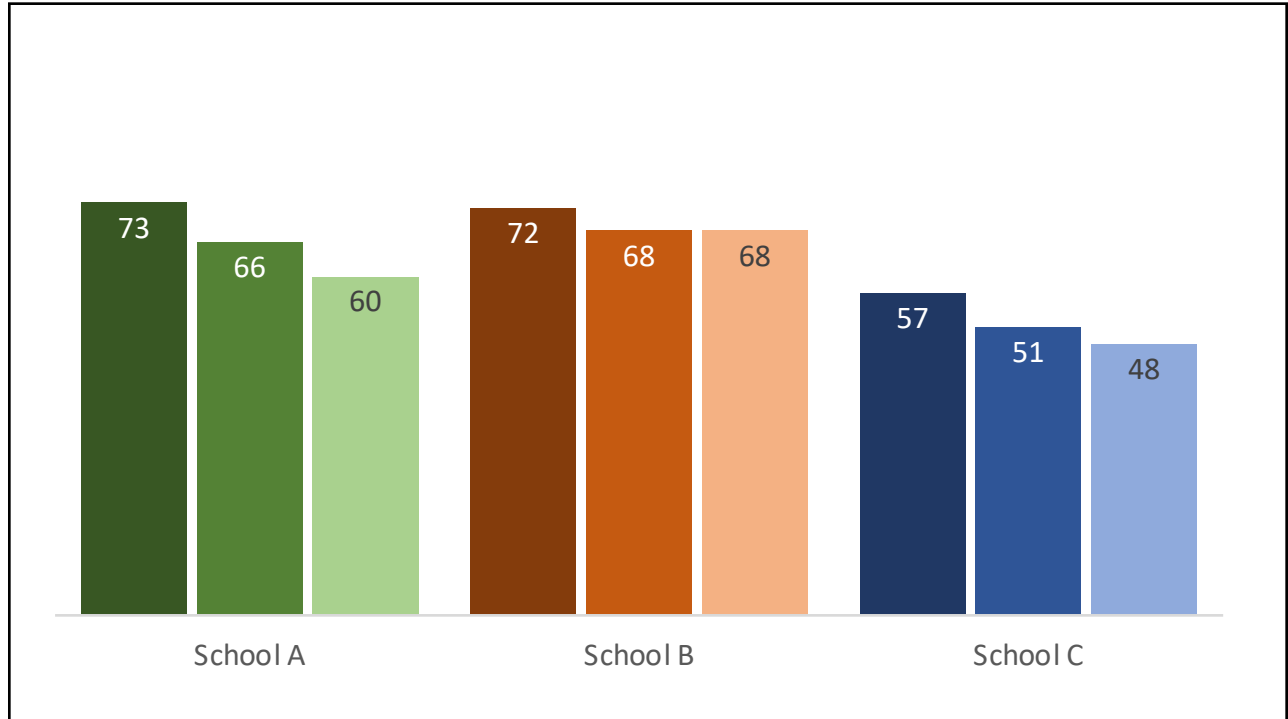
8. Click on any data label to highlight the series, then format data labels.

-Do this for each series.

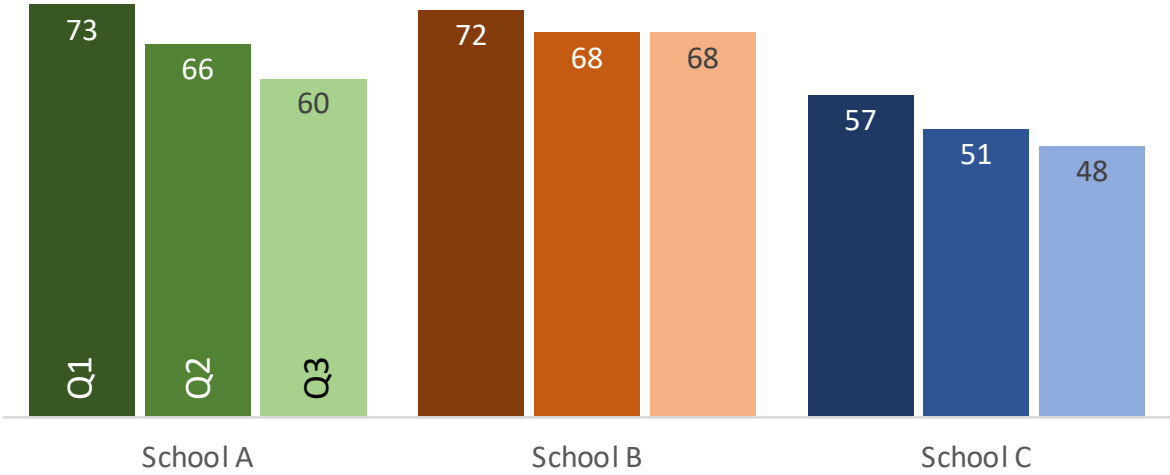




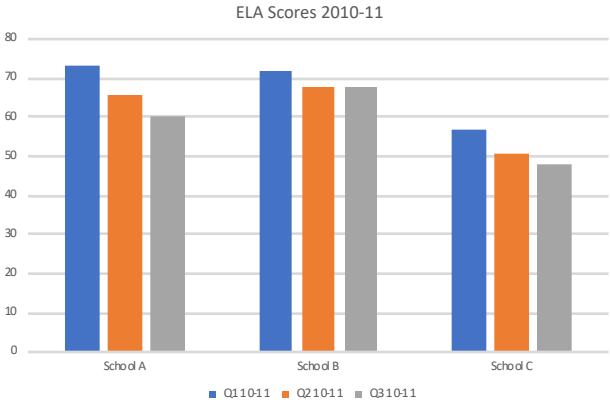
9. Click on any column to highlight the series, then format data series.
 -Do this for each series.
 -Click the pail to get fill and line color options.
 Adjust colors.



Quarter 3 ELA scores continue to be troublesome for all three schools.
The percentage of students passing declined from Q1-Q3.

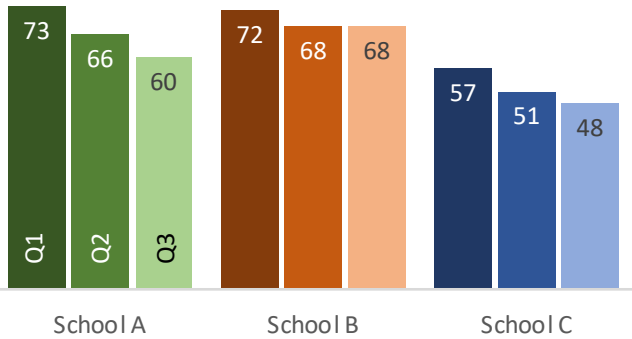


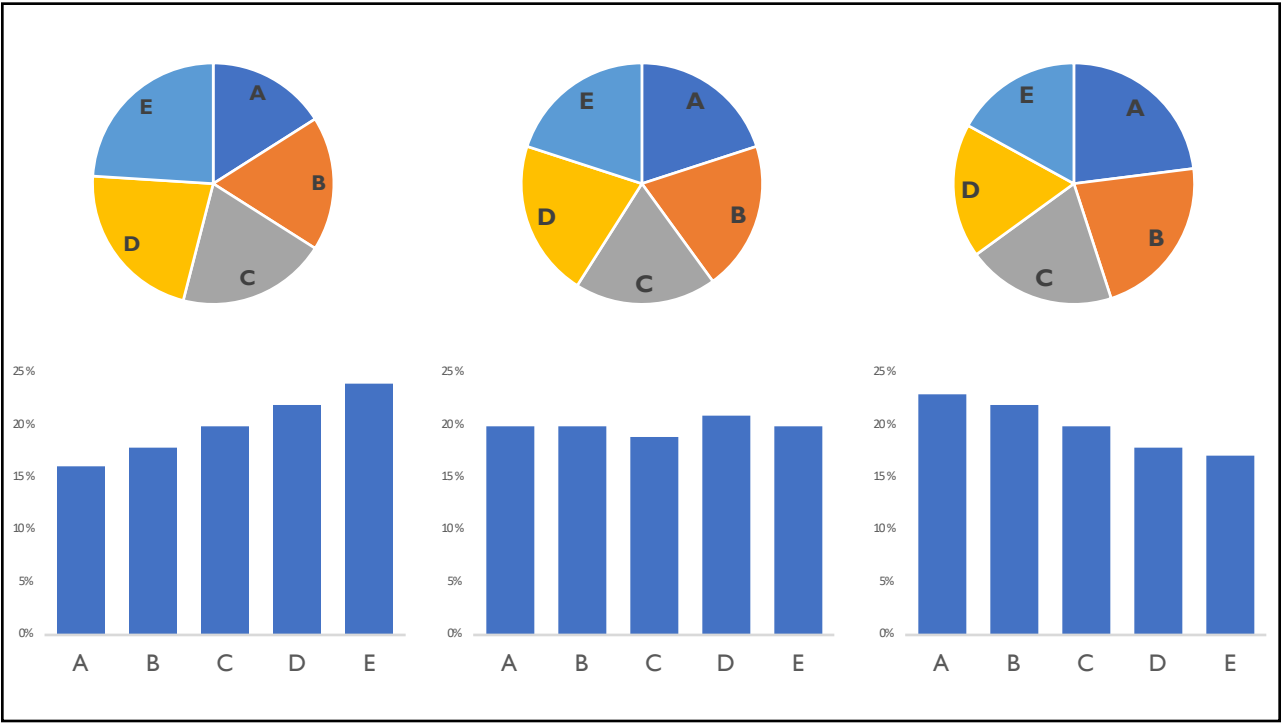
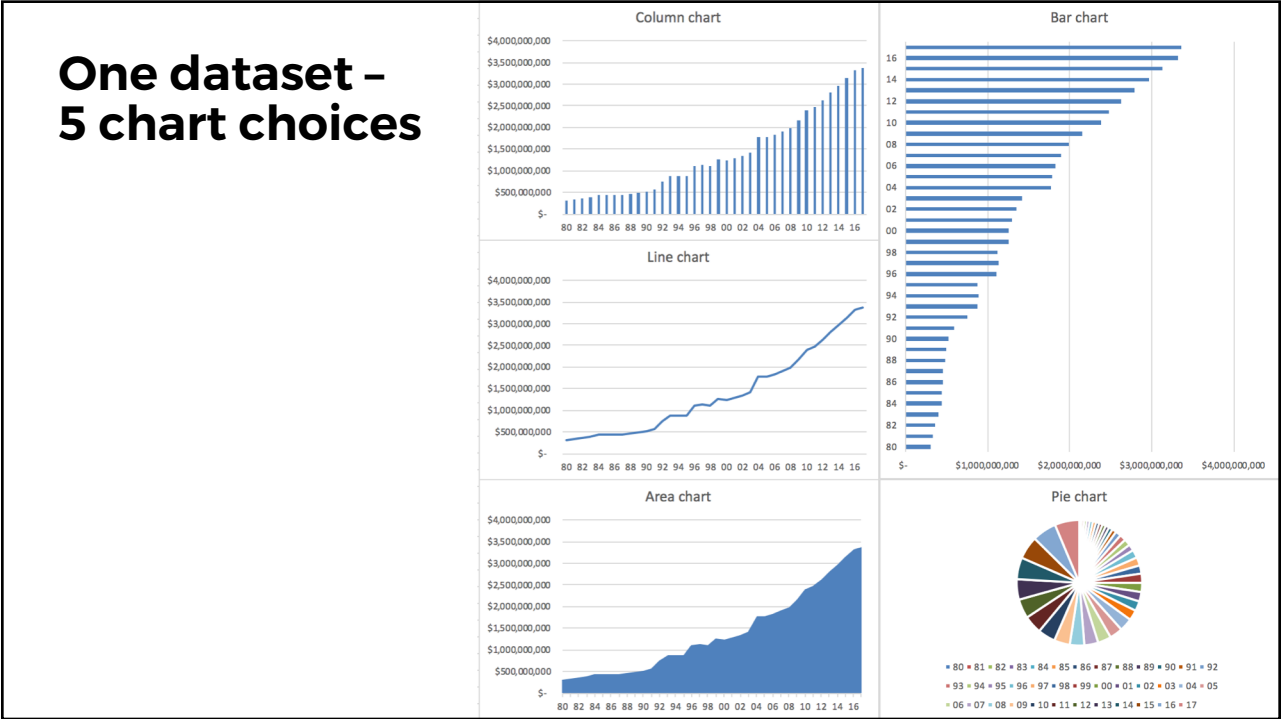
BEFORE

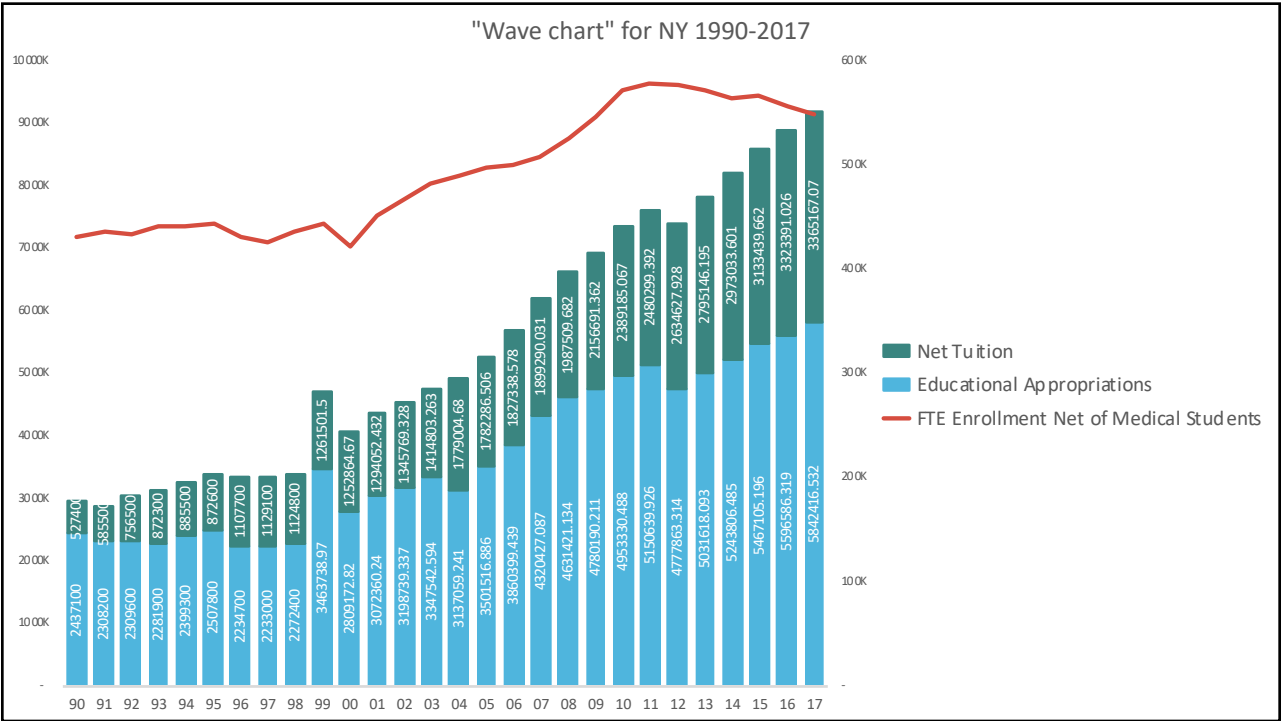
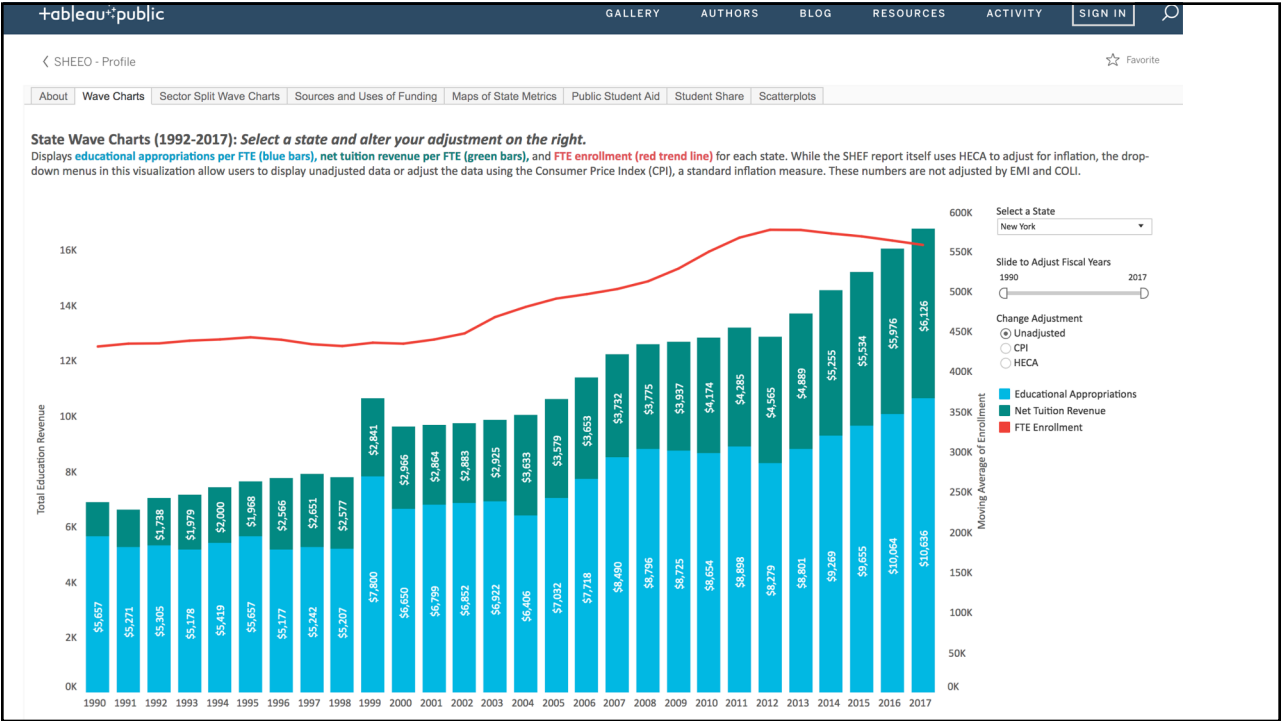


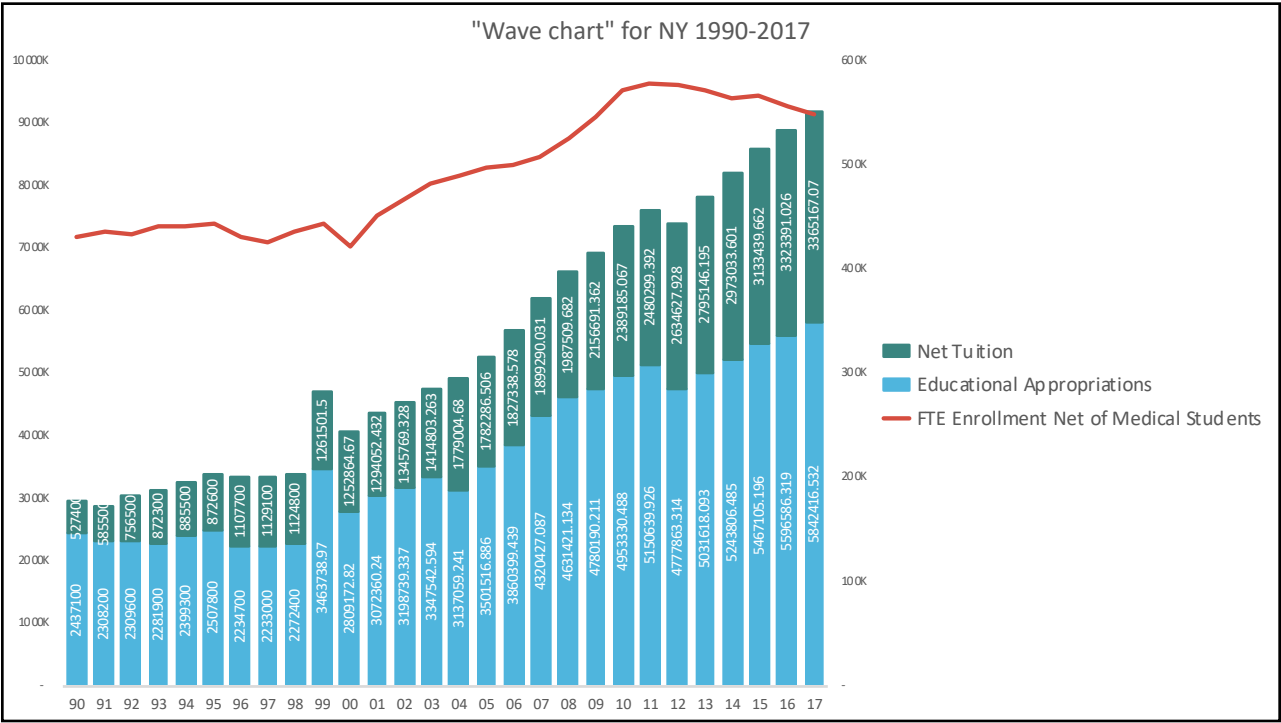
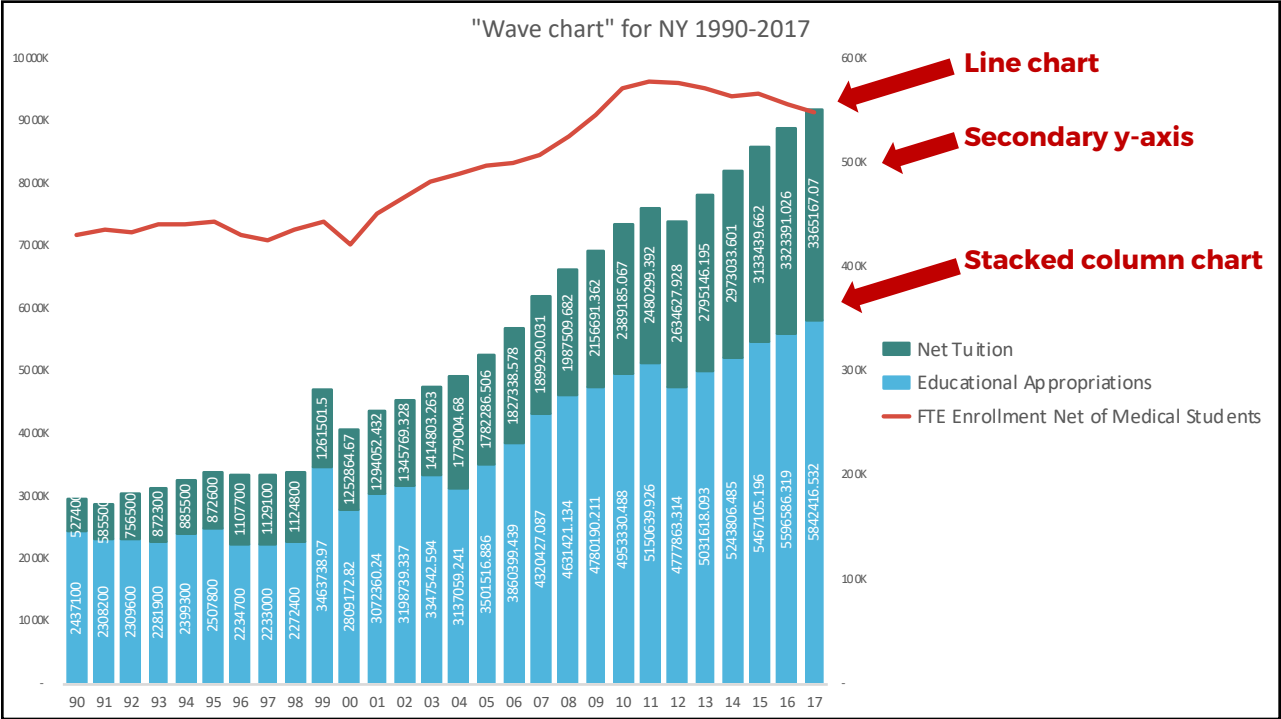
AFTER

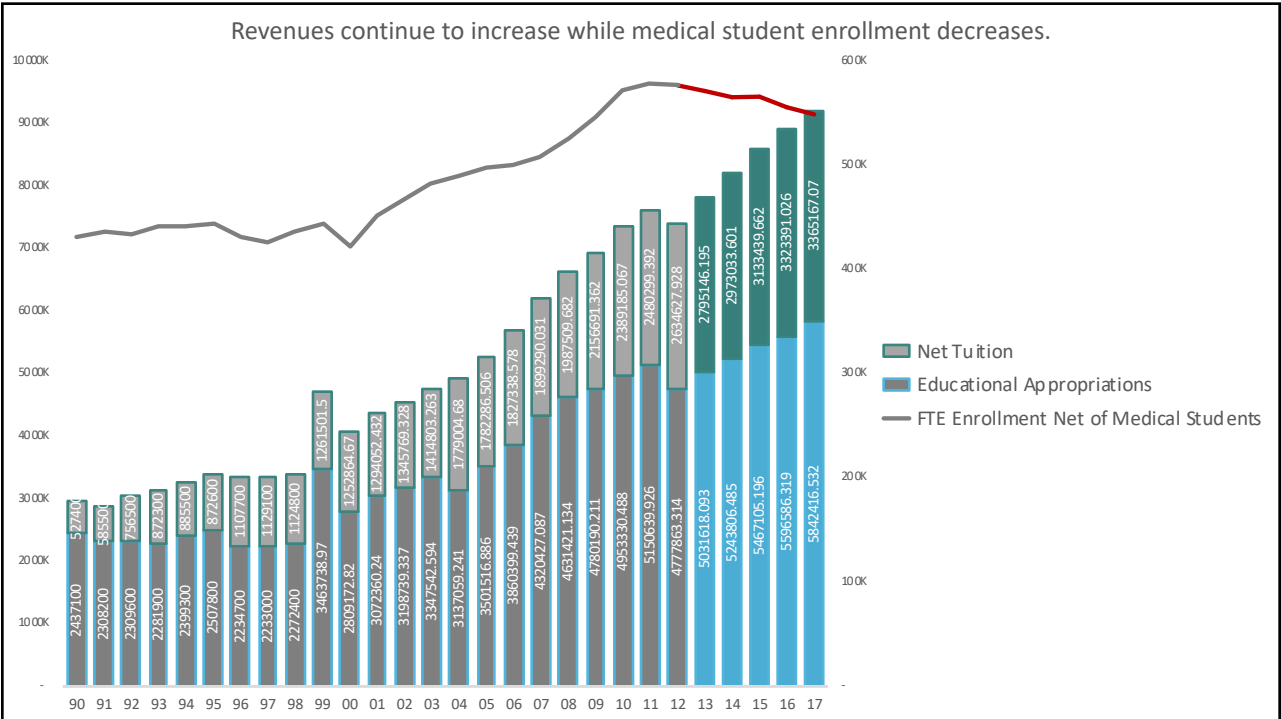
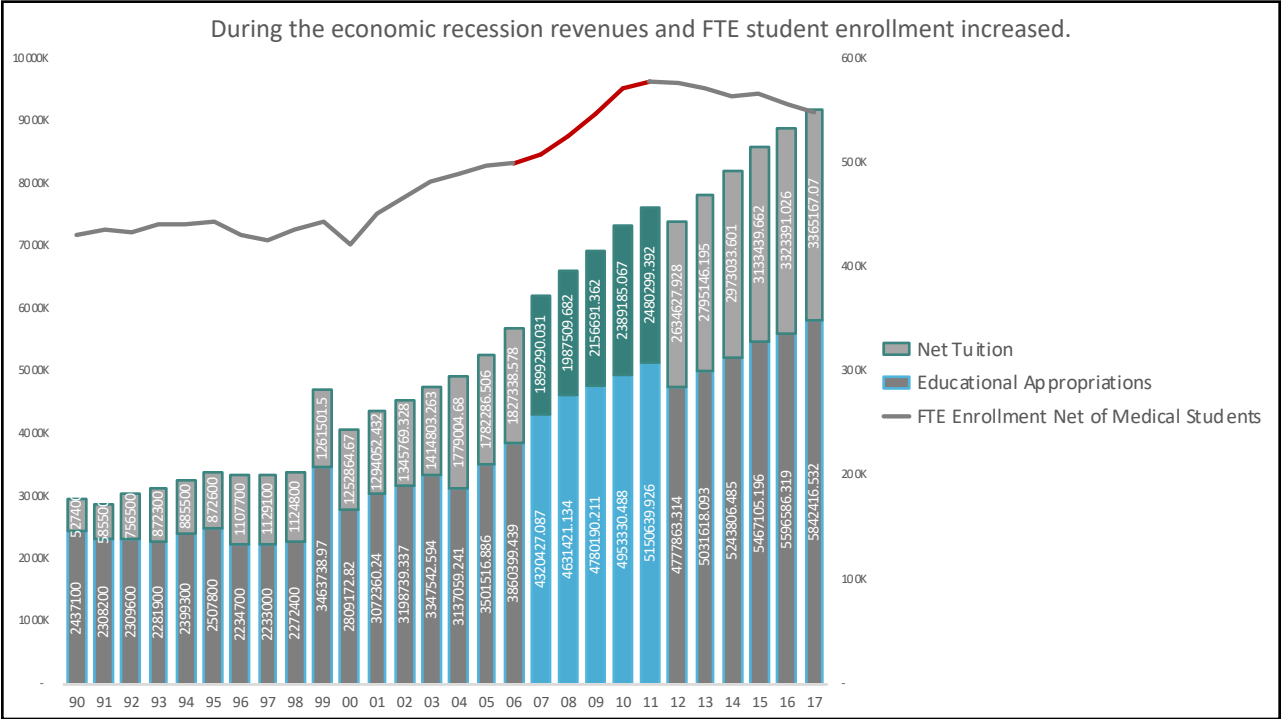
Quarter 3 ELA scores continue to be troublesome for all three schools.
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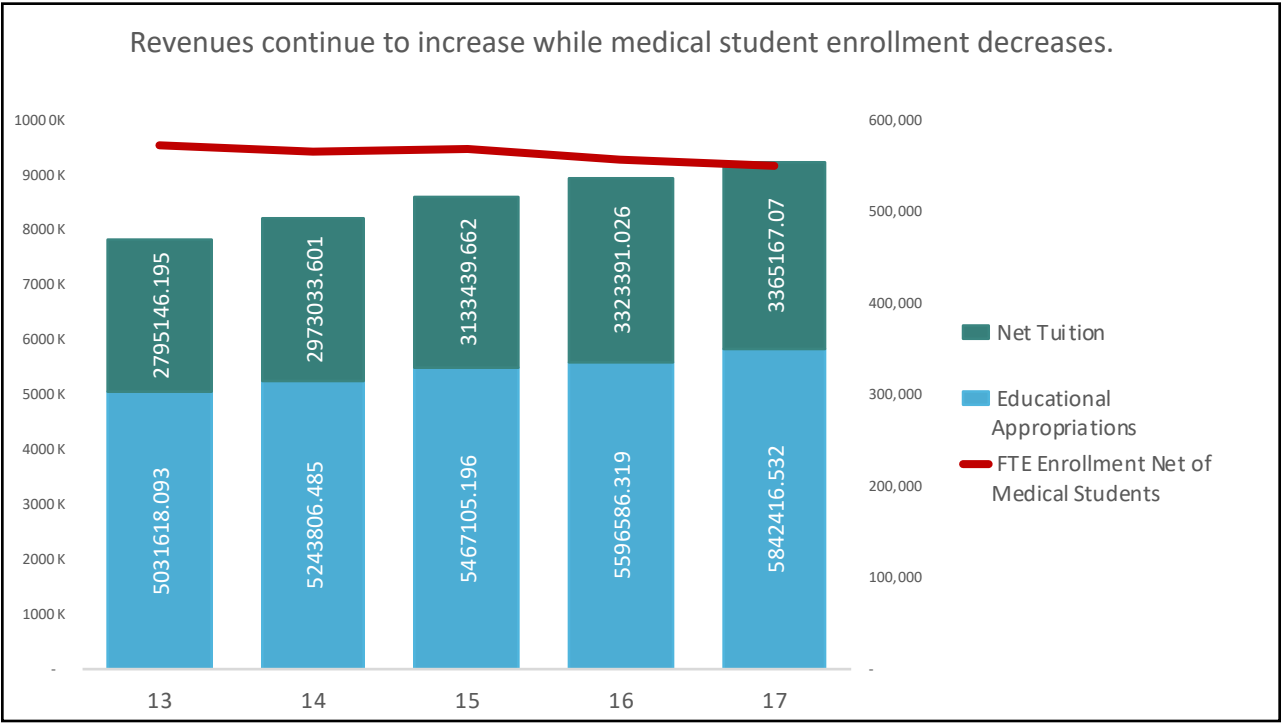
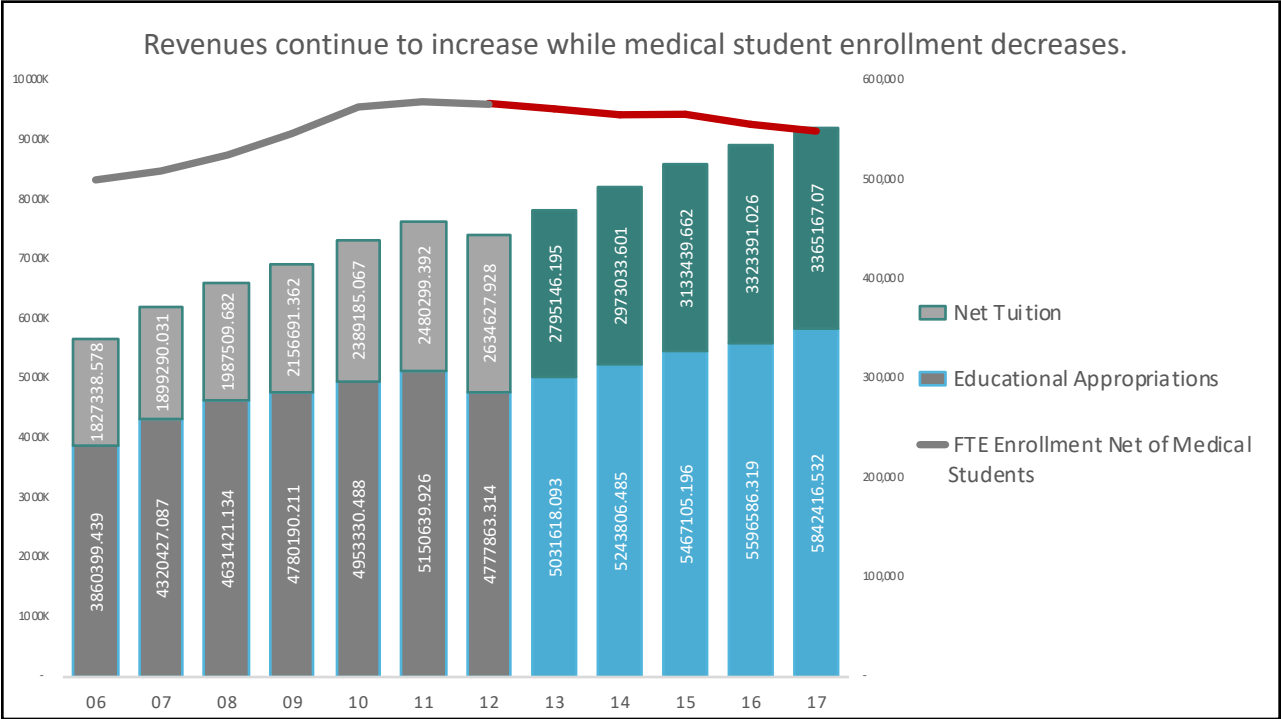


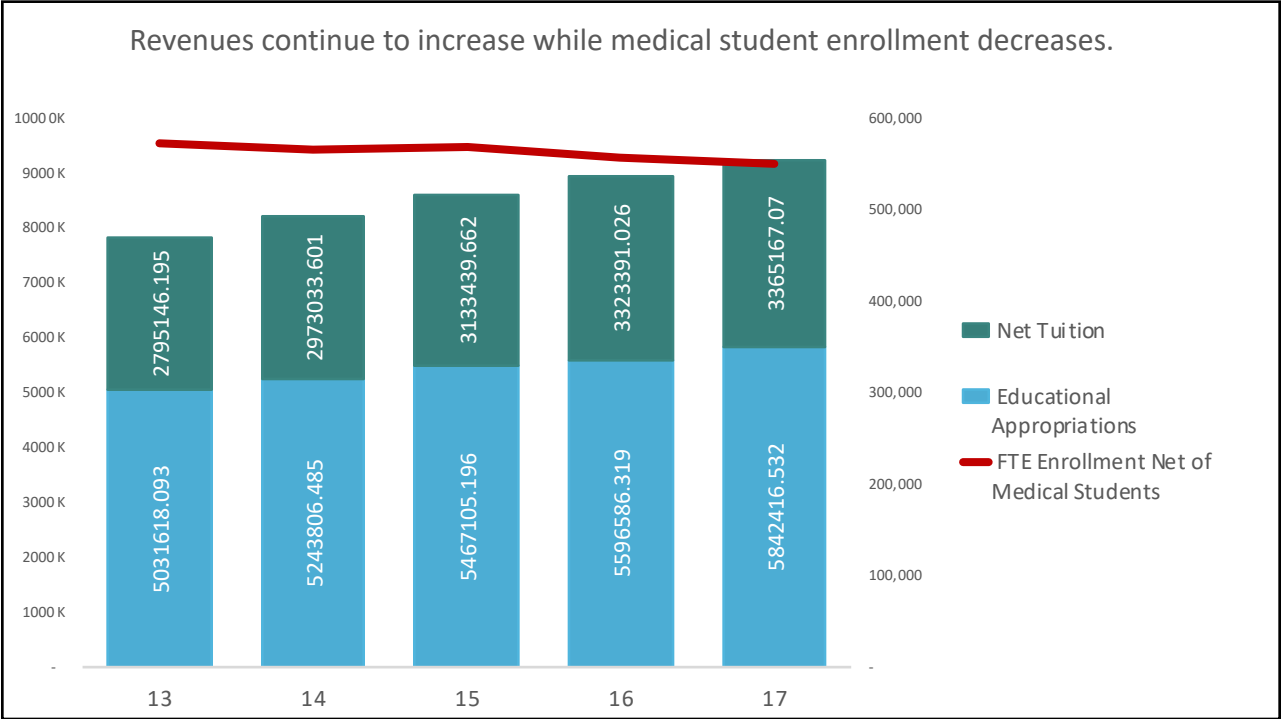






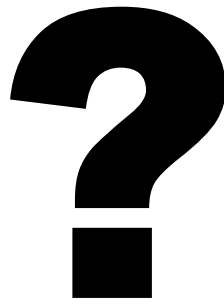






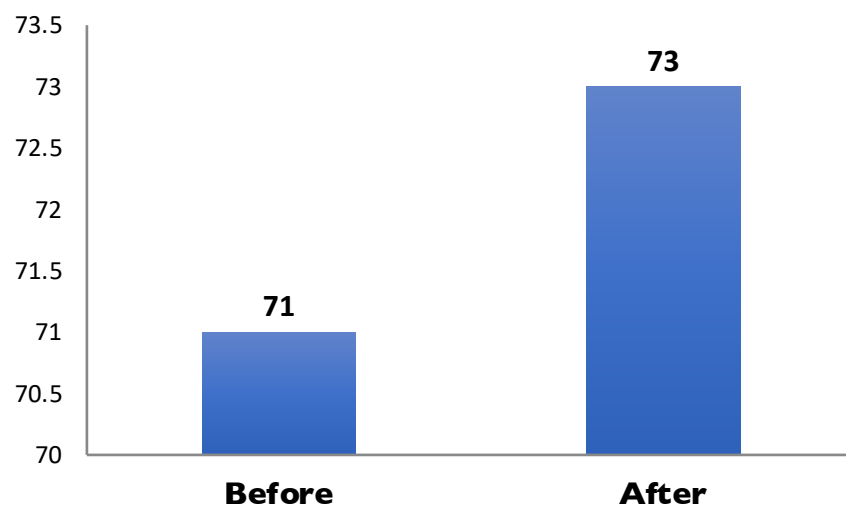
TIPS

Begin with purpose

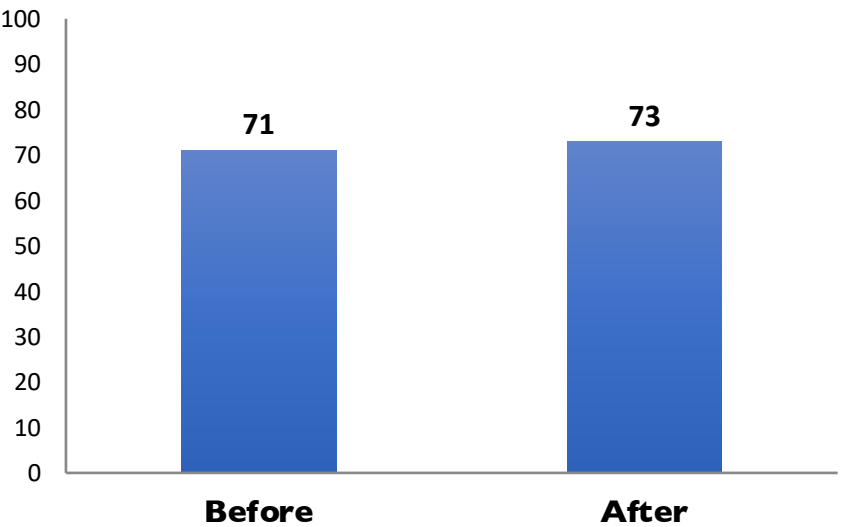


Strive for accuracy

Woo-hoo! Our program really works!!!

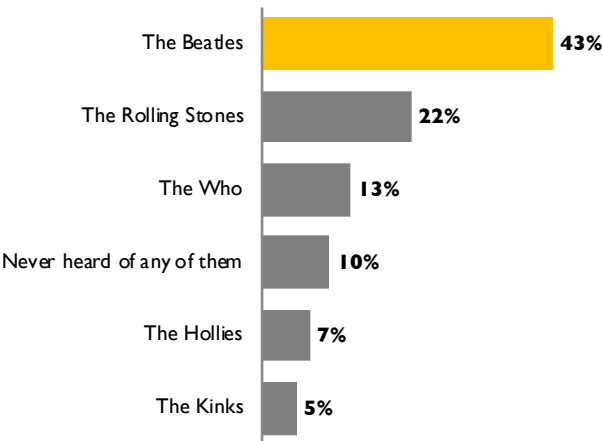


Strive for accuracy

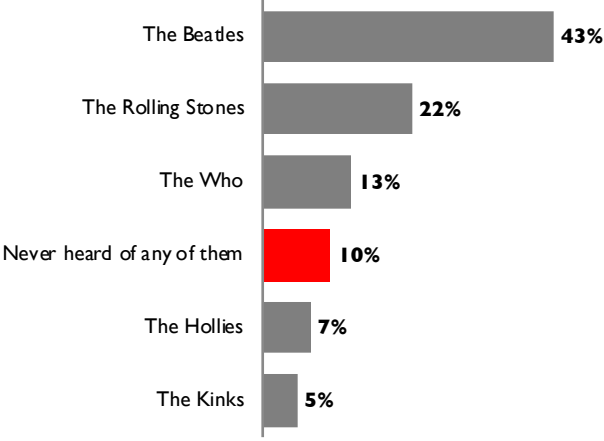


Draw their attention

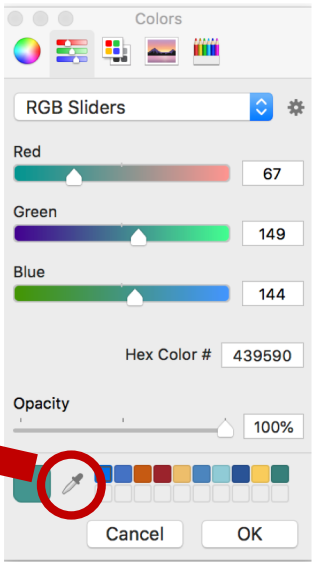
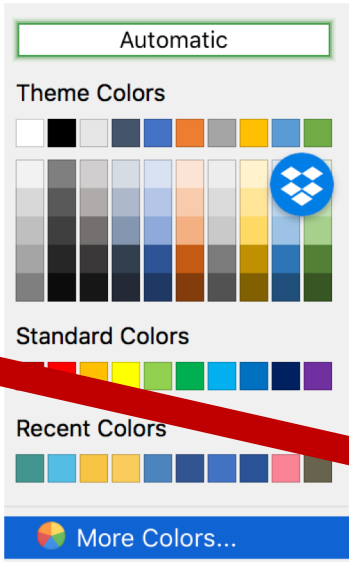
Nearly twice as many teenagers chose The Beatles as their favorite British Invasion band, than chose the Rolling Stones.



One out of ten teenagers had not heard of any of these popular British Invasion bands.

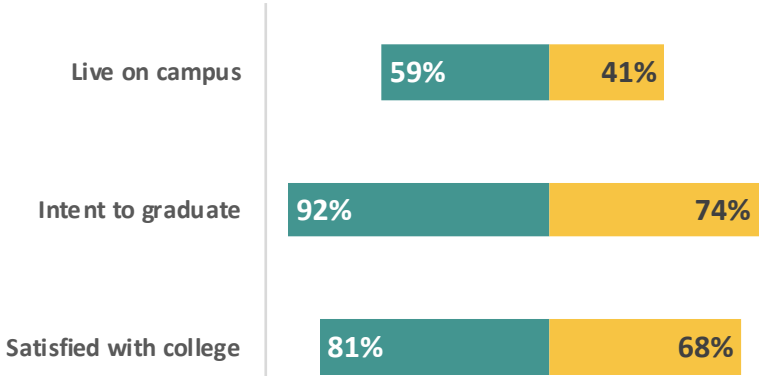


Be intentional with color

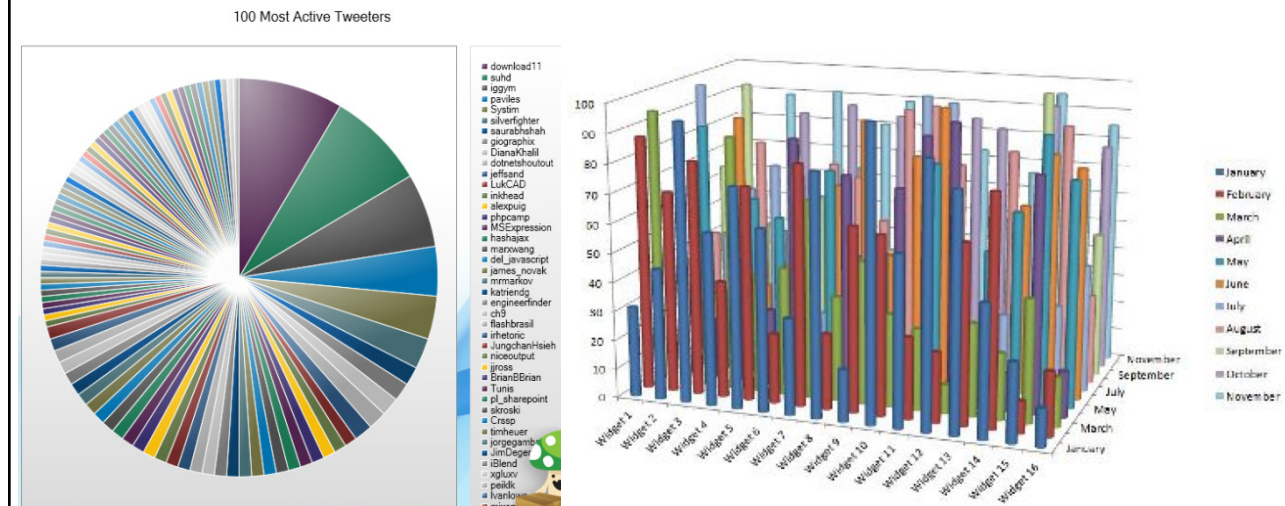


Go elegant, yet understated

Matriculated students are more likely to live on campus, express an intent to graduate, and be satisfied with their college experience.



Just because you can, doesn't mean you should!



Now try again... What would you do differently?

1.) 75% of conference attendees were from the Northeast

2.) Conference attendance:

2014: 2572

2015: 2781

2016: 3145

2017: 2984

3.) Conference satisfaction:

Loved it!: 45%

Pretty good: 27%

Meh: 16%

Not so great: 7%

Totally stunk: 5%






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