



It's Not About Pie When It Comes To The Facts...

David Onder & Alison Joseph

SAIR 2012

- **9608** students
- **Master's Comprehensive**
- **Mountain location**
- **Residential and Distance**



Eye on the pies

Which is the largest in Year 1 - Green, Blue, or Purple?
Which have increased from Year 1 to Year 2?

Year 1



Year 2



Purpose

Conveying information to stakeholders

- What is important?
- What answers are sought?
- What can we learn from this table or graph?
- Is the information easy to decipher?



Inspiration

Edward Tufte

Stephen Few

Juice Analytics

Others



Guiding principles

- **Consistency**

- color
- text
- layout

**All that glitters is
NOT gold!**

- **Maximize Data-Ink ratio (Gestalt principles)**

- **Reduce Chartjunk**

- Chart type
- Use of color



Quantitative perception

Very Precise

Not Very Precise

Length

Width

2-D Position

Size

Intensity

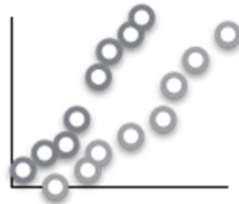
Blur



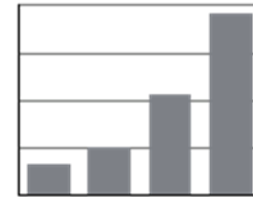
"most quantitative data analysis can be performed quite well ... using only four types of objects"

Few, 2004, p. 46

Points



Bars



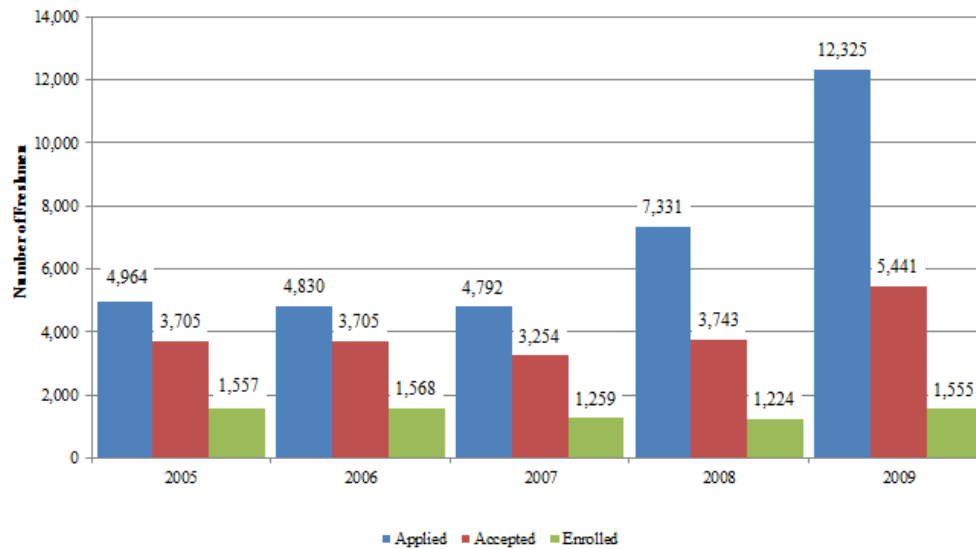
Lines



Boxes

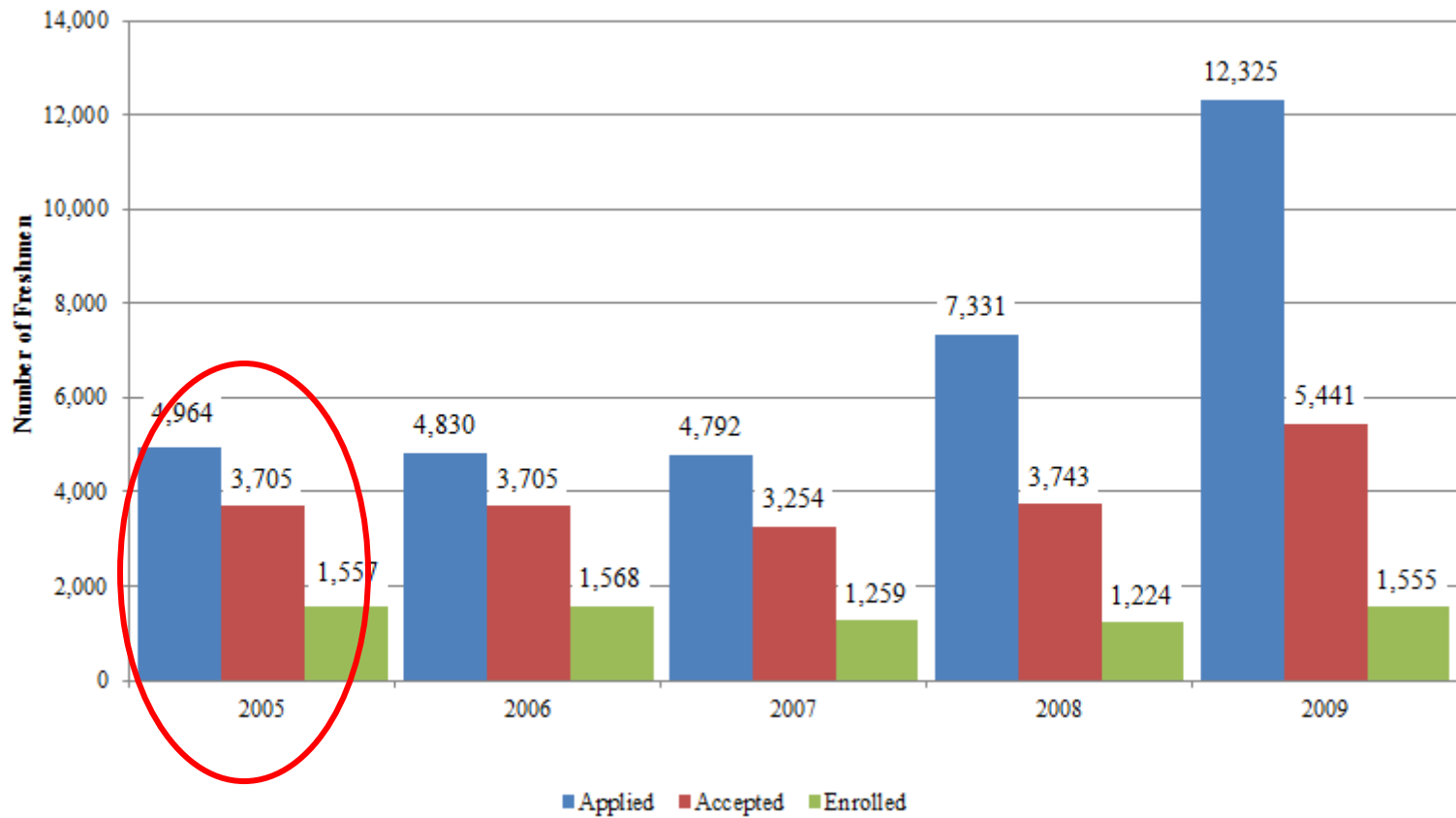


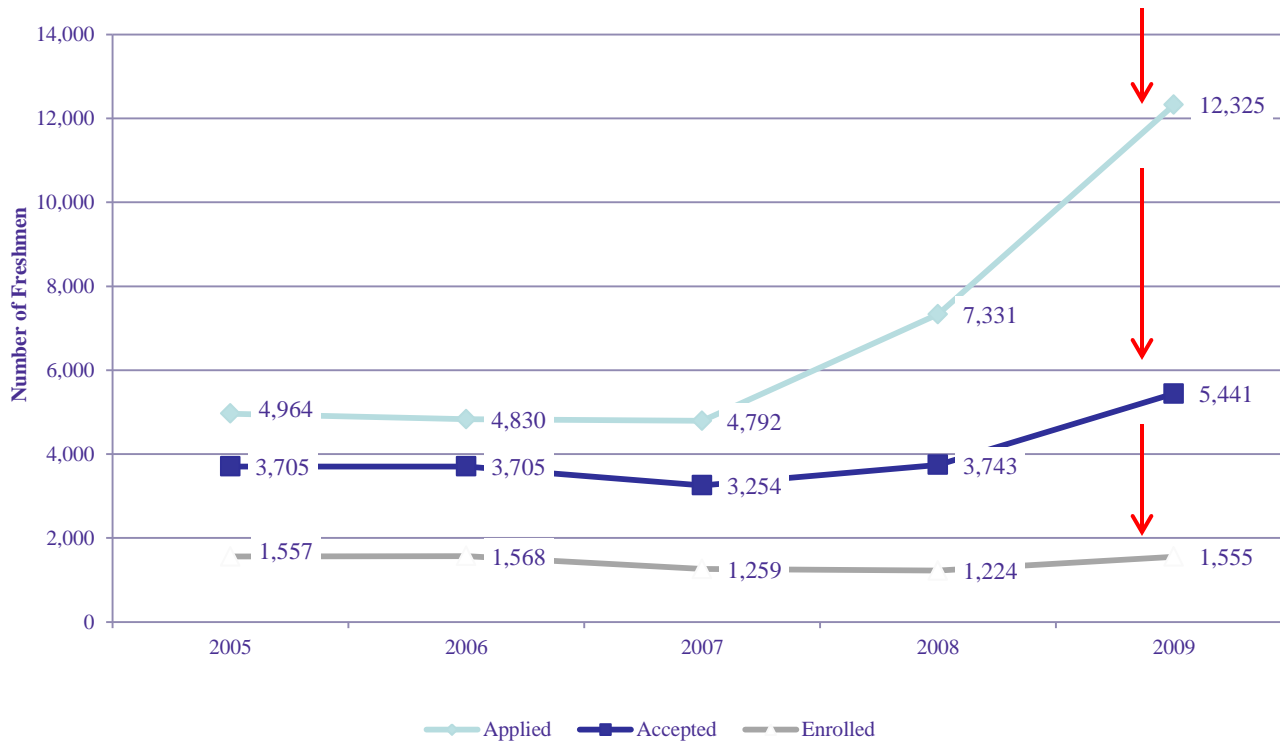
Freshman Applicants, Acceptances & Enrollees

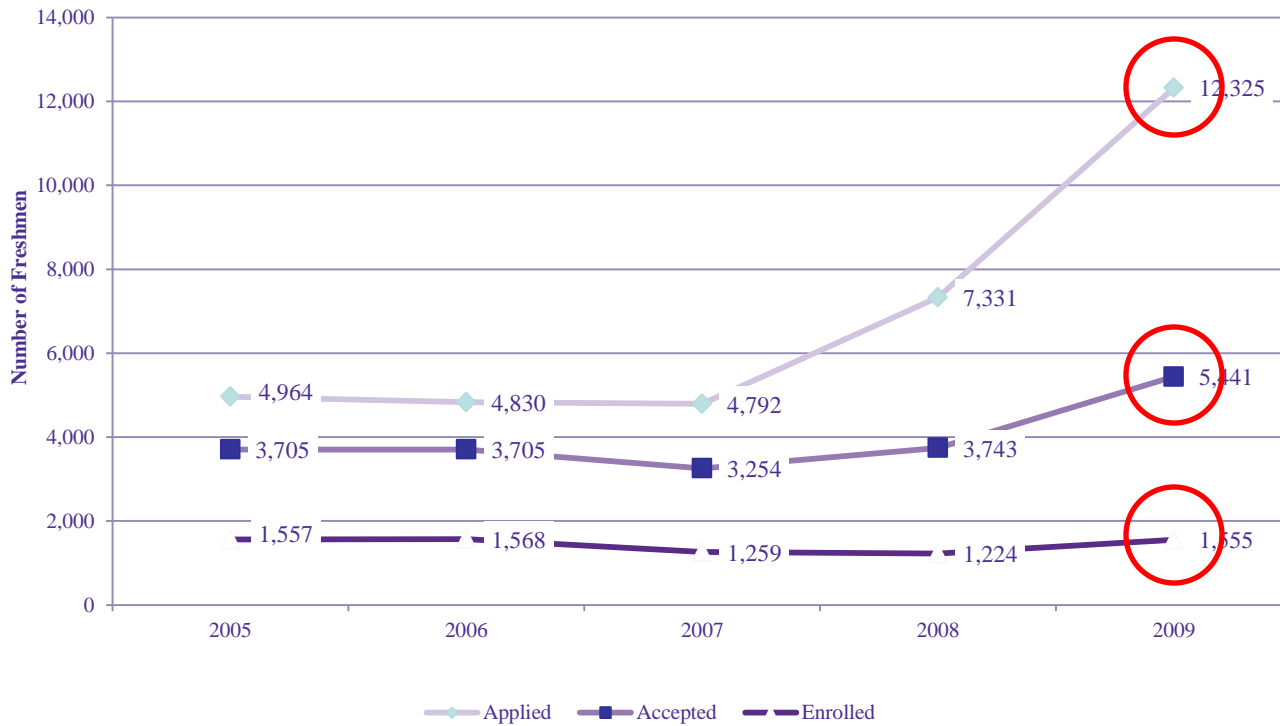


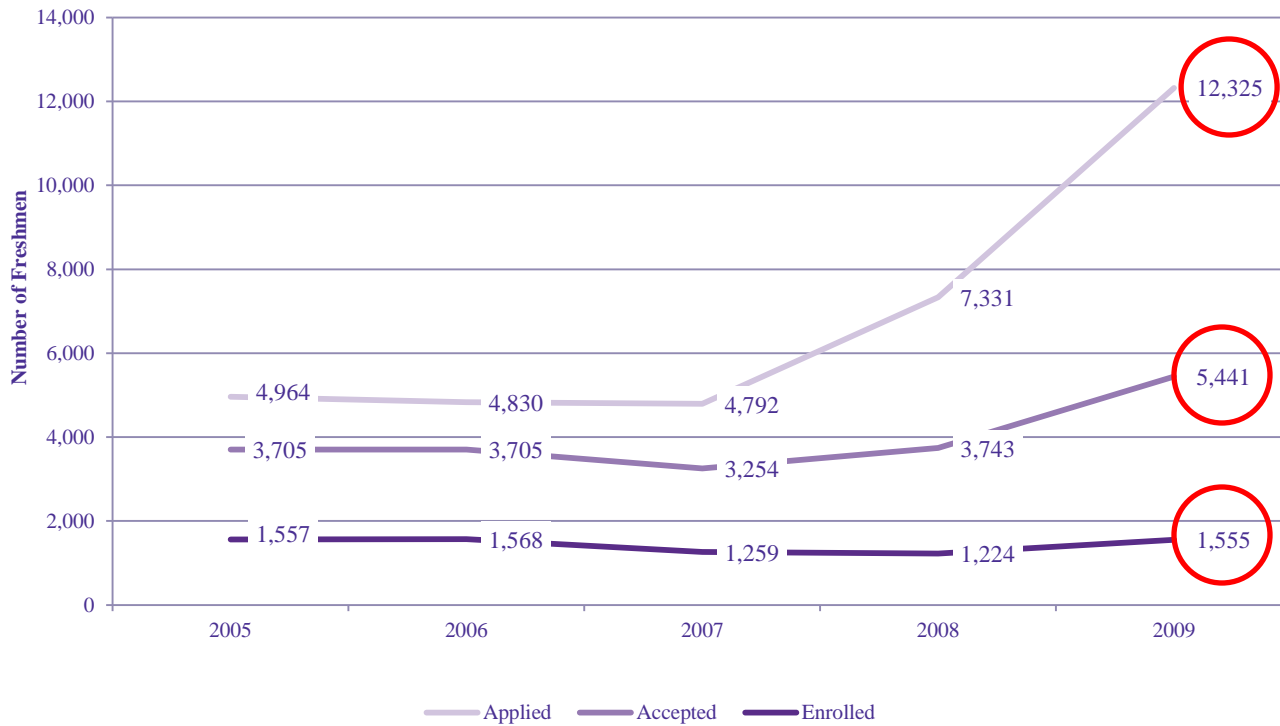
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	In-State	Out-of-State	In-State	Out-of-State	In-State	Out-of-State	In-State	Out-of-State	In-State	Out-of-State
Applied	4,152	812	4,051	779	3,995	797	6,052	1,279	9,502	2,823
Male	1,998	354	1,966	377	1,938	326	2,875	578	4,136	1,151
Female	2,154	458	2,085	402	2,057	471	3,177	701	5,366	1,672
Accepted	3,123	582	3,167	538	2,752	502	3,214	529	4,561	880
Male	1,454	236	1,501	255	1,302	207	1,520	226	2,020	341
Female	1,669	346	1,666	283	1,450	295	1,694	303	2,541	539
% of Applicants Accepted	75	72	78	69	69	63	53	41	58	31
Enrolled	1,438	119	1,459	109	1,150	109	1,128	96	1,422	133
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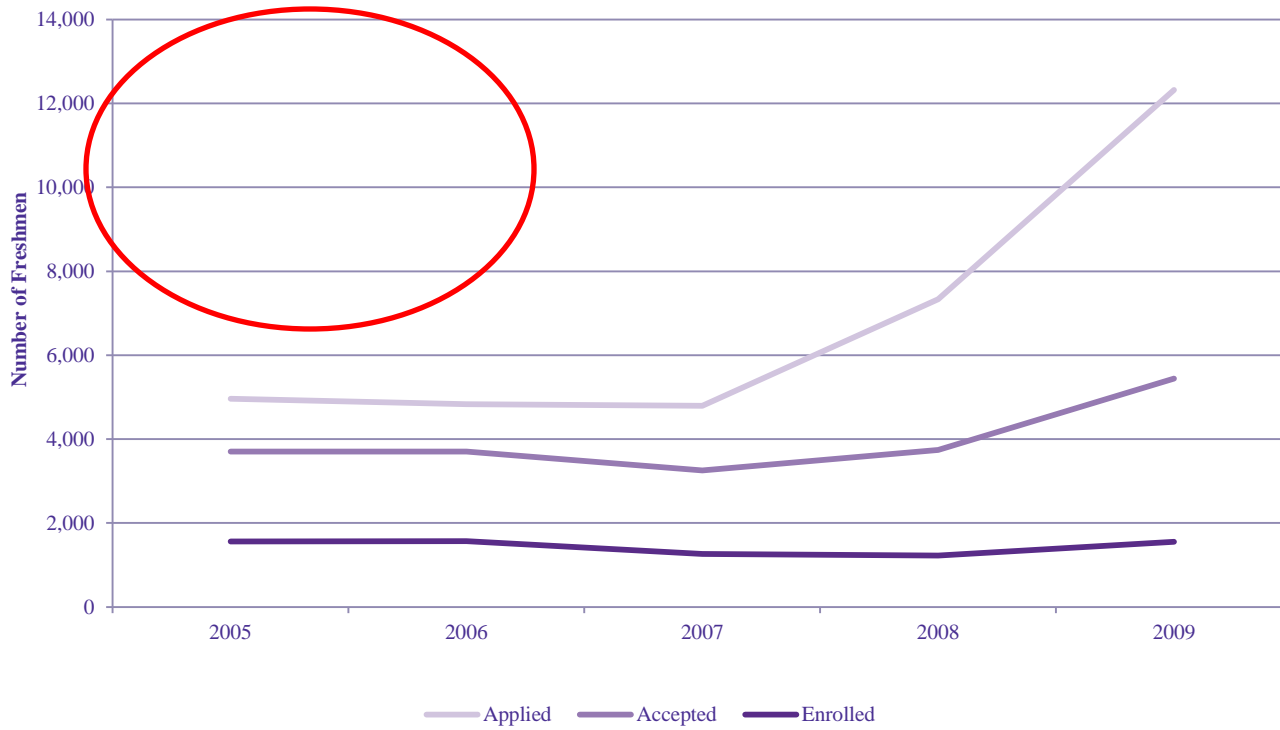


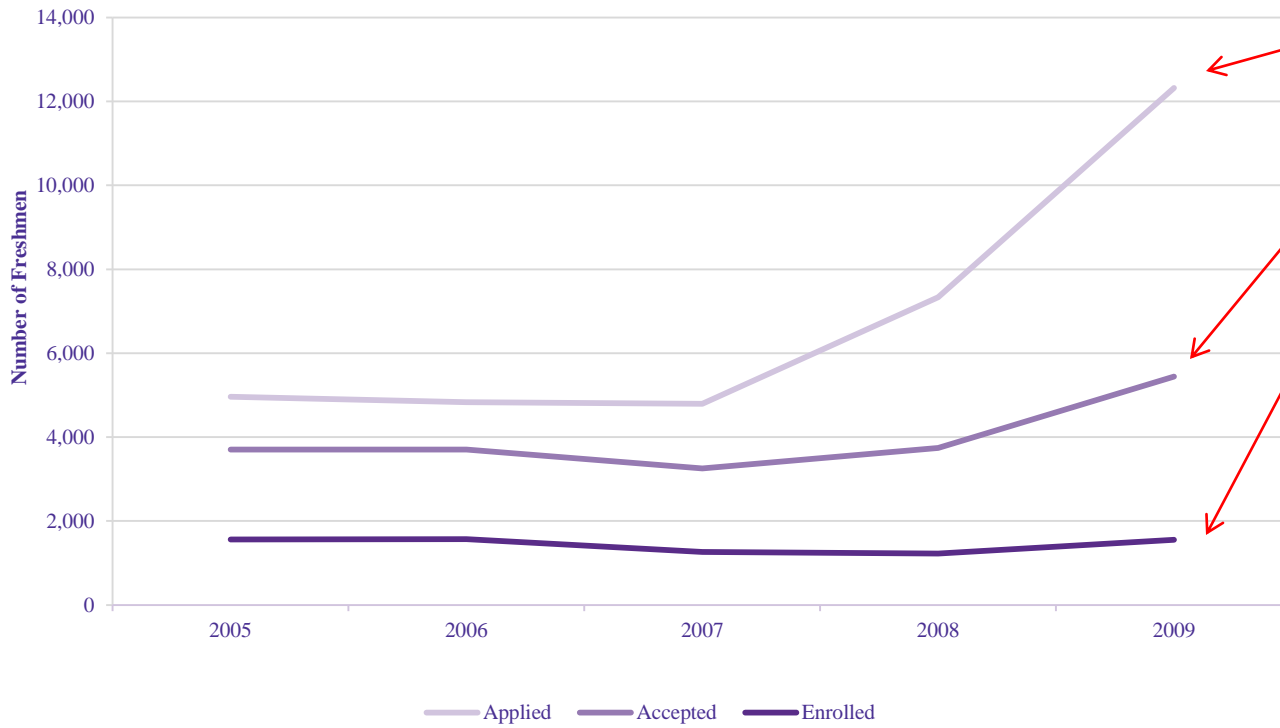


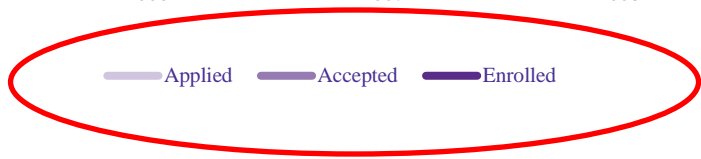
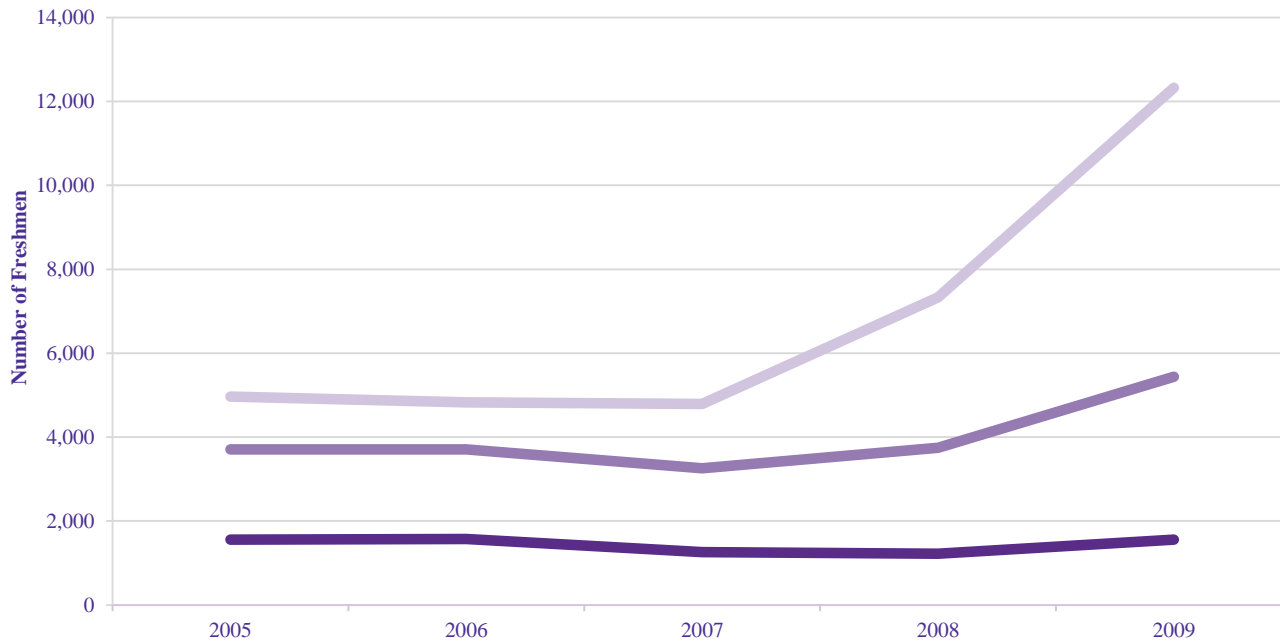


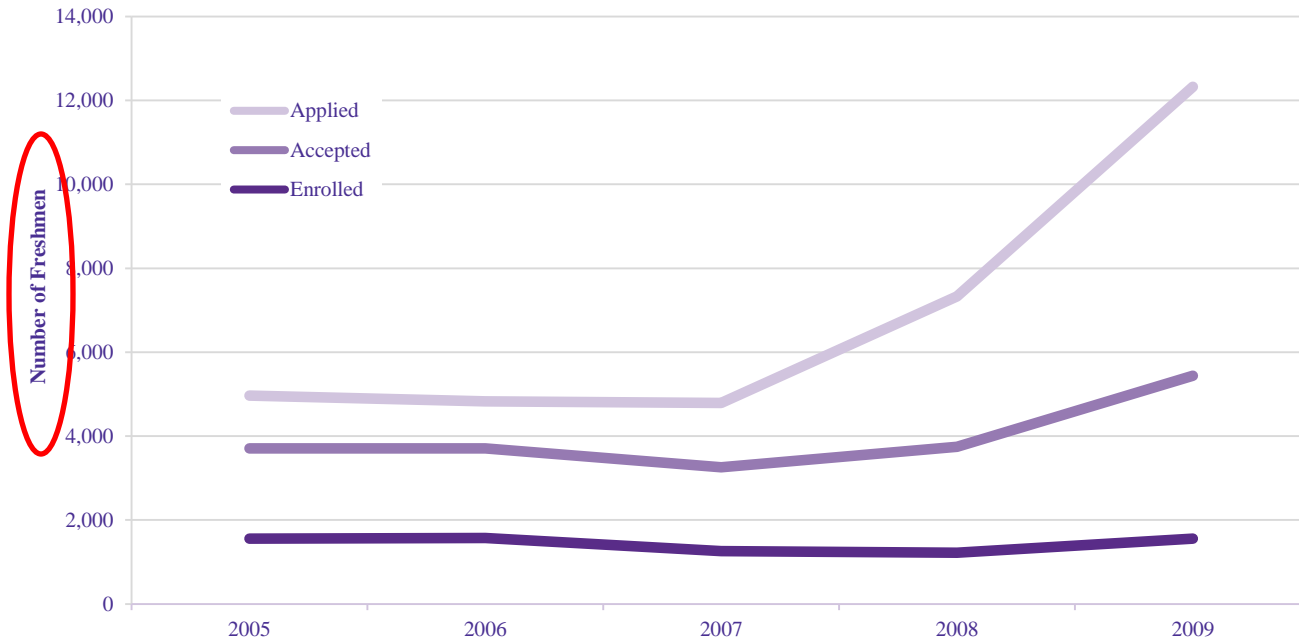


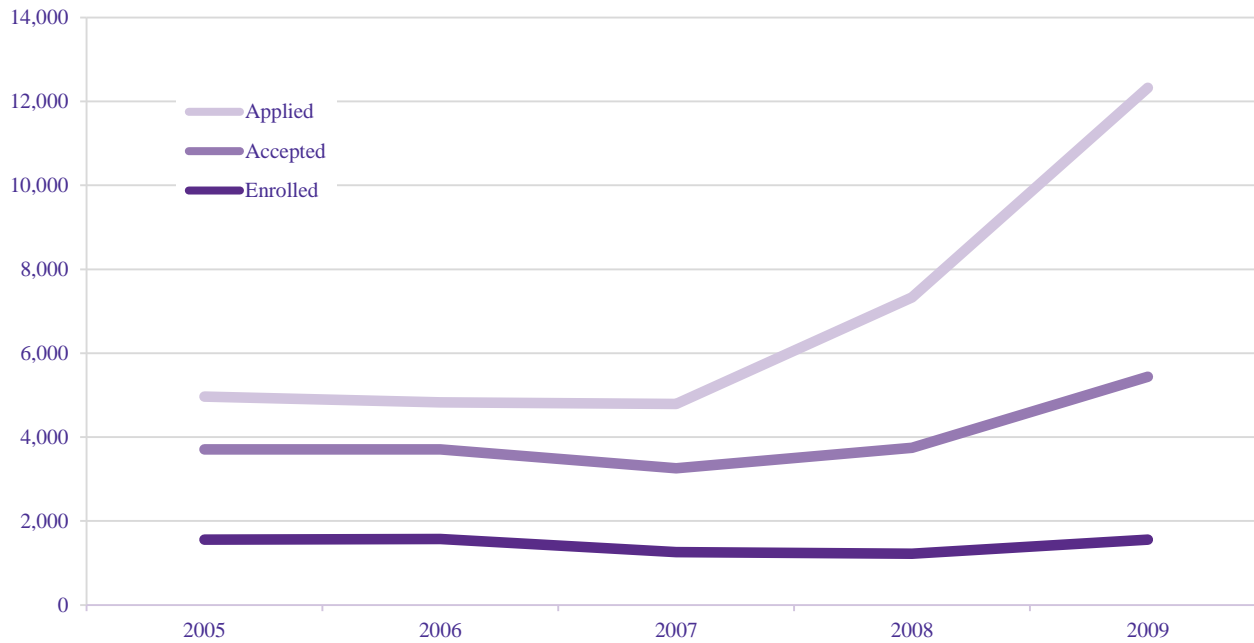




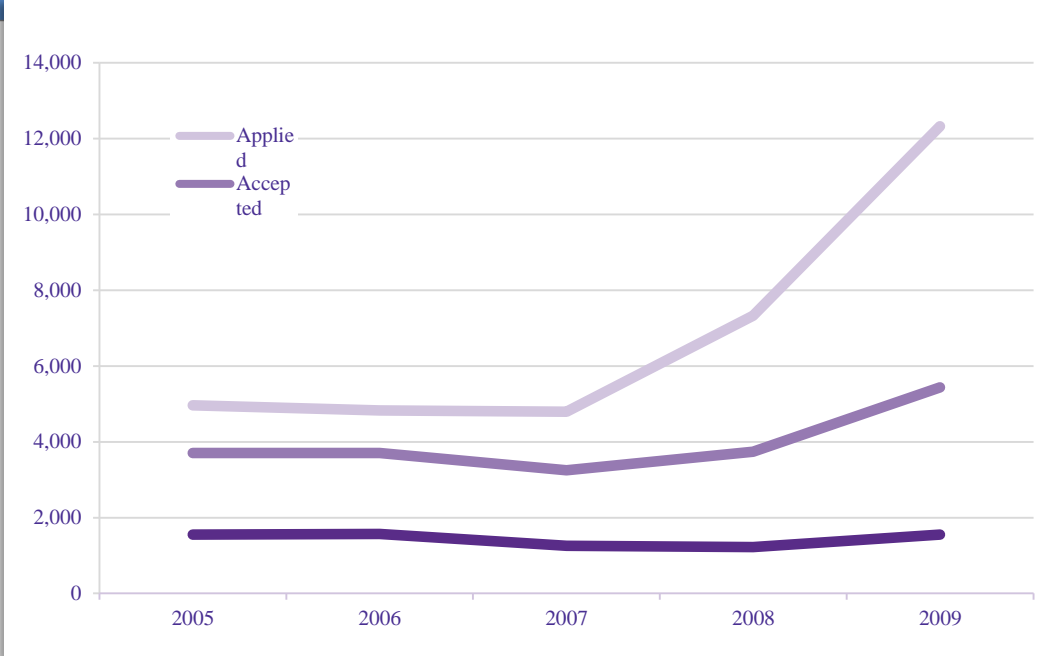
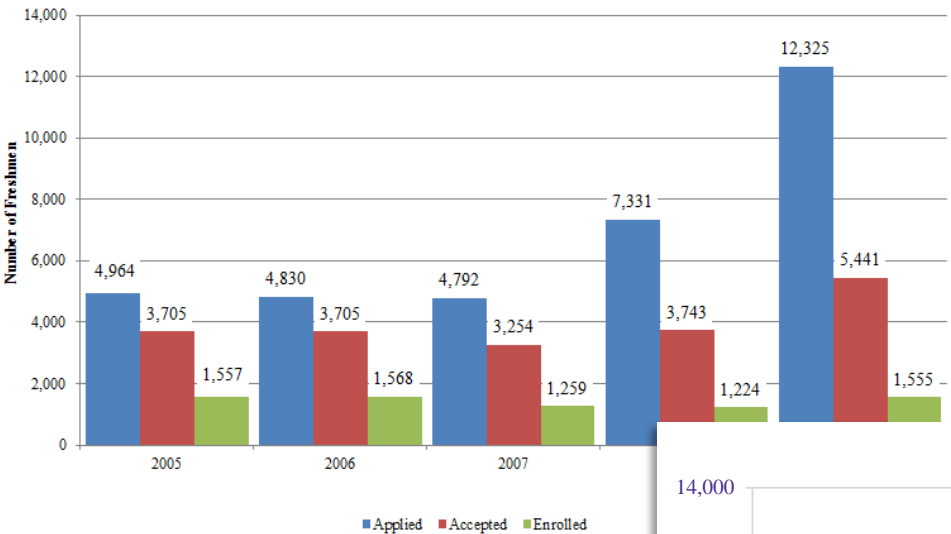









Here is the overall change ...



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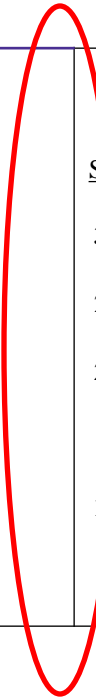
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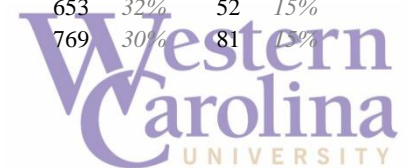
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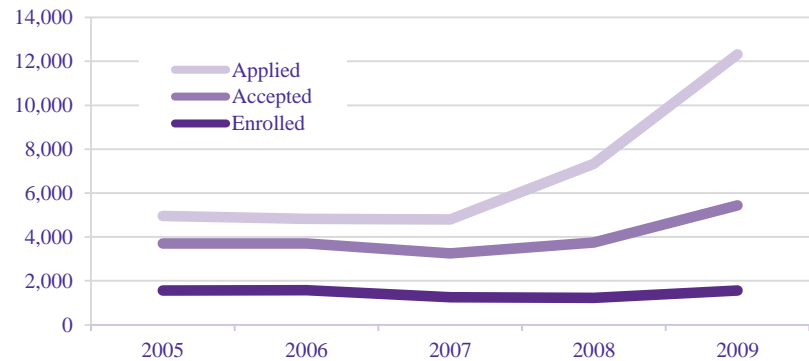
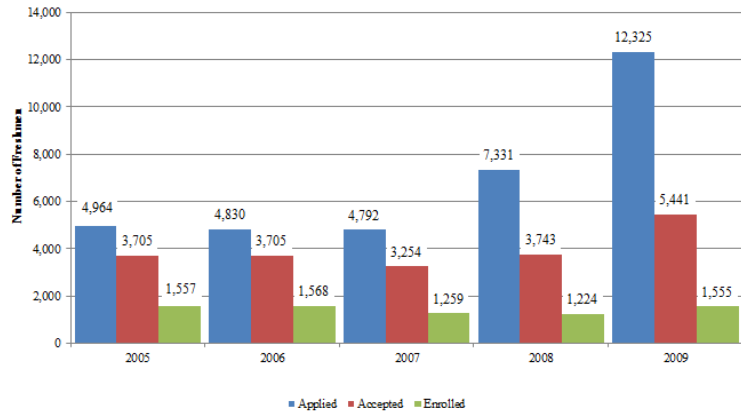


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Male	1,302	67%	207	63%			1,520	53%	226	39%		2,020	49%	341	30%			
Female	1,450	70%	295	63%			1,694	53%	303	43%		2,541	47%	539	32%			
Enrolled	1,150	42%	109	22%	1,259	39%	1,128	35%	96	18%	1,224	33%	1,422	31%	133	15%	1,555	13%
Male	553	42%	49	24%			564	37%	40	18%		653	32%	52	15%			
Female	597	41%	60	20%			564	33%	56	18%		769	30%	81	15%			





	2005		2006		2007		2008		2009	
	In-State	Out-of-State	In-State	Out-of-State	In-State	Out-of-State	In-State	Out-of-State	In-State	Out-of-State
Applied	4,152	812	4,051	779	3,995	797	6,052	1,279	9,502	2,823
Male	1,998	354	1,966	377	1,938	326	2,875	578	4,136	1,151
Female	2,154	458	2,085	402	2,057	471	3,177	701	5,366	1,672
Accepted	3,123	582	3,167	538	2,752	502	3,214	529	4,561	880
Male	1,454	236	1,501	255	1,302	207	1,520	226	2,020	341
Female	1,669	346	1,666	283	1,450	295	1,694	303	2,541	539
% of Applicants Accepted	75	72	78	69	69	63	53	41	58	31
Enrolled	1,438	119	1,459	109	1,150	109	1,128	96	1,422	133
Male	721	59	718	62	553	49	564	40	653	52
Female	717	60	741	47	597	60	564	56	769	81
% of Accepted Enrolling	46	20	46	20	42	22	35	18	26	15

	2007			2008			2009		
	In-State	Out-of-State	Total	In-State	Out-of-State	Total	In-State	Out-of-State	Total
Applied	3,995	797	4,792	6,052	1,279	7,331	9,502	2,823	12,325
Male	1,938	326	2,875	2,875	578	3,453	4,136	1,151	5,287
Female	2,057	471	3,177	3,177	701	3,878	5,366	1,672	7,038
Accepted	2,752	502	3,255	3,214	529	3,744	4,561	880	5,441
Male	1,302	207	1,509	1,520	226	1,746	2,020	341	2,361
Female	1,450	295	1,745	1,694	303	2,000	2,541	539	3,080
Enrolled	1,150	109	1,259	1,128	96	1,224	1,422	133	1,555
Male	553	49	602	564	40	604	653	52	705
Female	597	60	657	564	56	620	769	81	850



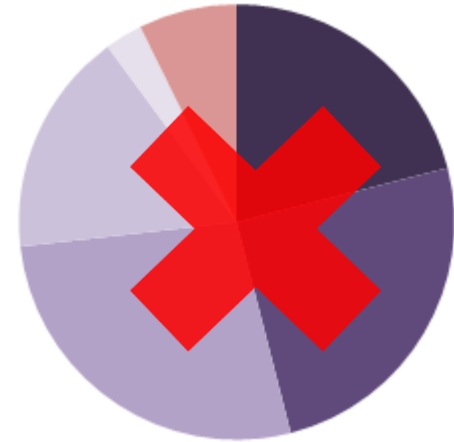
High School Rank of Freshmen

Percentage of New Freshmen*

<u>Class Rank</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Top Fifth	23	22	23	26	31	24
Second Fifth	28	26	27	29	31	31
Third Fifth	28	29	29	27	25	26
Fourth Fifth	20	21	18	16	12	11
Lowest Fifth	1	2	3	2	1	1
Number Not Available	83	88	115	64	77	106

High School Class Rank Percentages*

	2006	2007	2008	2009	2010
Top Fifth	21.0	24.7	29.2	24.4	24.9
Second Fifth	25.0	27.3	29.0	30.7	31.6
Third Fifth	27.2	26.0	23.2	25.9	23.7
Fourth Fifth	16.7	15.2	11.2	11.3	11.1
Last Fifth	2.8	1.7	1.1	0.9	1.5
Did Not Report	7.3	5.1	6.3	6.8	7.2



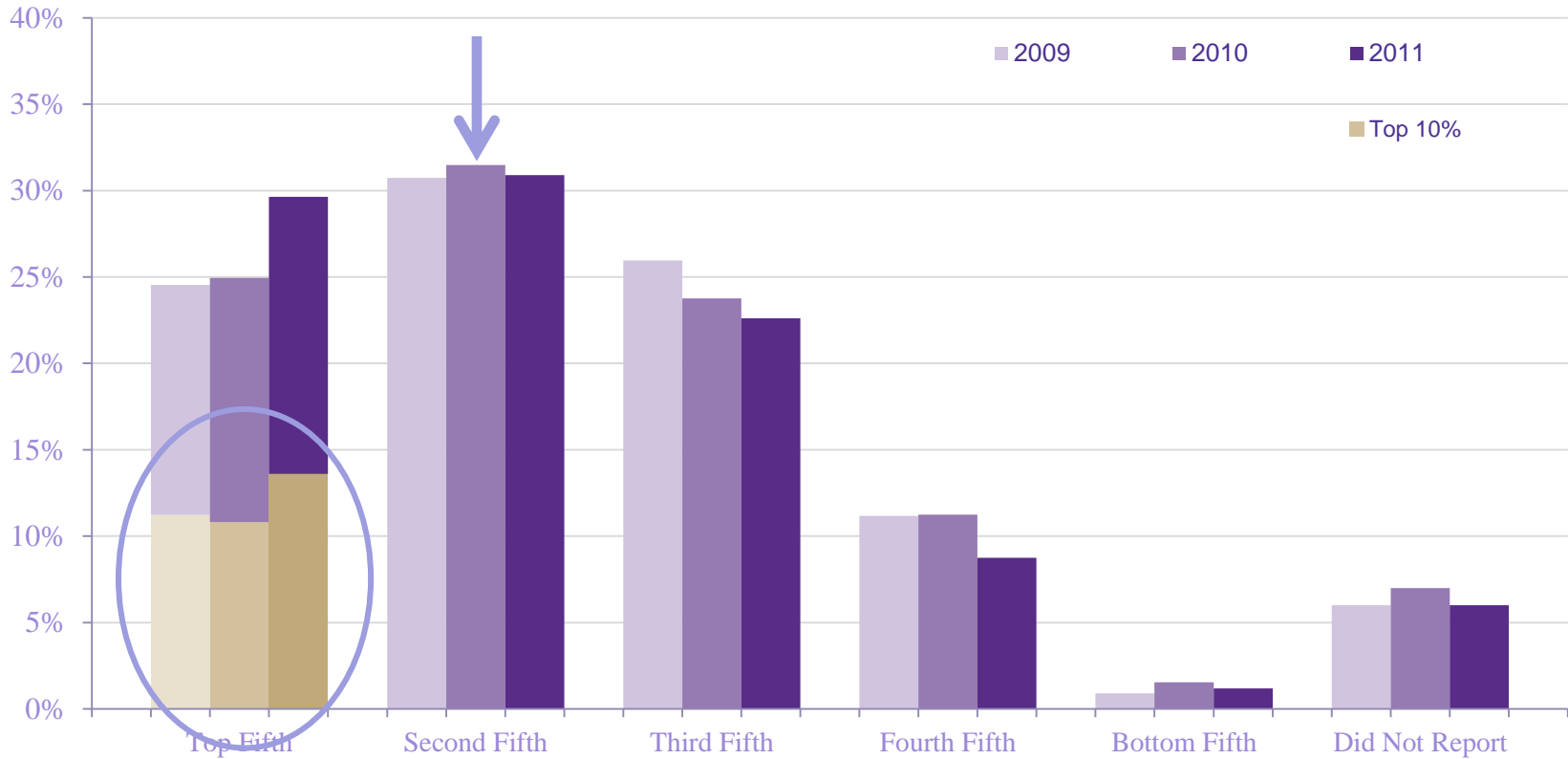
Neither is a good option

Pie and Line charts
comparing multiple criteria

Aside



High School Rank First-Time Full-Time Freshman



Remember our purpose

Conveying information to stakeholders

- What is important?
- What answers are sought?
- What can we learn from this table or graph?
- Is the information easy to decipher?

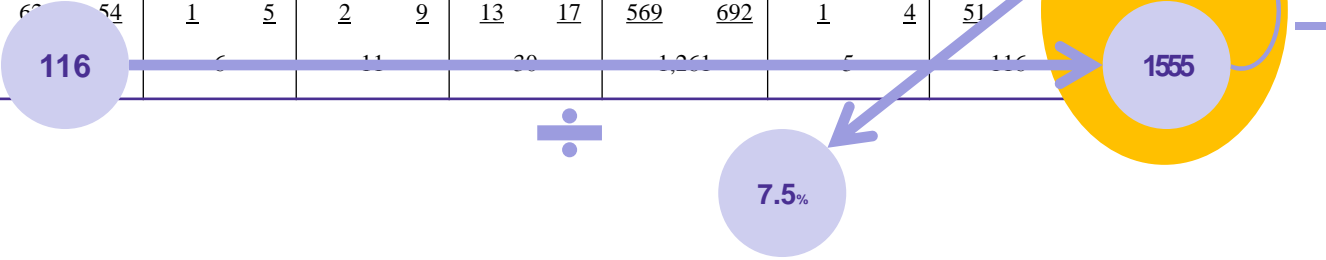


RACE, LOAD, AND GENDER

First-time Freshmen

FALL 2009

LOAD AND CLASS	NON-RESIDENT ALIEN		AFRICAN-AMERICAN		NATIVE AMERICAN		ASIAN		HISPANIC		WHITE		TWO OR MORE		UNKNOWN		TOTAL	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Full-Time																		
New Freshmen	6	4	62	54	1	5	2	9	13	17	565	690	1	4	51	65	695	844
Part-Time																		
New Freshmen	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	6
TOTALS	<u>6</u>	<u>4</u>	<u>62</u>	<u>54</u>	<u>1</u>	<u>5</u>	<u>2</u>	<u>9</u>	<u>13</u>	<u>17</u>	<u>569</u>	<u>692</u>	<u>1</u>	<u>4</u>	<u>51</u>	<u>65</u>	<u>116</u>	<u>1555</u>
GRAND TOTAL	10										1,261		5		116			



RACE, LOAD, AND GENDER



First-time Full-time Freshman
Fall 2011

	ASIAN	BLACK †	HISPANIC †	NATIVE AMERICAN †	NATIVE HAWAIIAN †	NON-RESIDENT ALIEN	WHITE	MULTIRACIAL †	UNKNOWN	TOTAL
Male	11 <i>0.7 %</i>	43 <i>2.9 %</i>	44 <i>2.9 %</i>	4 <i>0.3 %</i>	0 <i>0.0 %</i>	1 <i>0.1 %</i>	536 <i>35.5 %</i>	18 <i>1.2 %</i>	7 <i>0.5 %</i>	664 <i>44.0 %</i>
Female	9 <i>0.6 %</i>	41 <i>2.7 %</i>	42 <i>2.8 %</i>	6 <i>0.4 %</i>	0 <i>0.0 %</i>	4 <i>0.3 %</i>	701 <i>46.5 %</i>	31 <i>2.1 %</i>	10 <i>0.7 %</i>	844 <i>56.0 %</i>
Grand Total	20 <i>1.3 %</i>	84 <i>5.6 %</i>	86 <i>5.7 %</i>	10 <i>0.7 %</i>	0 <i>0.0 %</i>	5 <i>0.3 %</i>	1237 <i>82.0 %</i>	49 <i>3.2 %</i>	17 <i>1.1 %</i>	1508 <i>100.0 %</i>

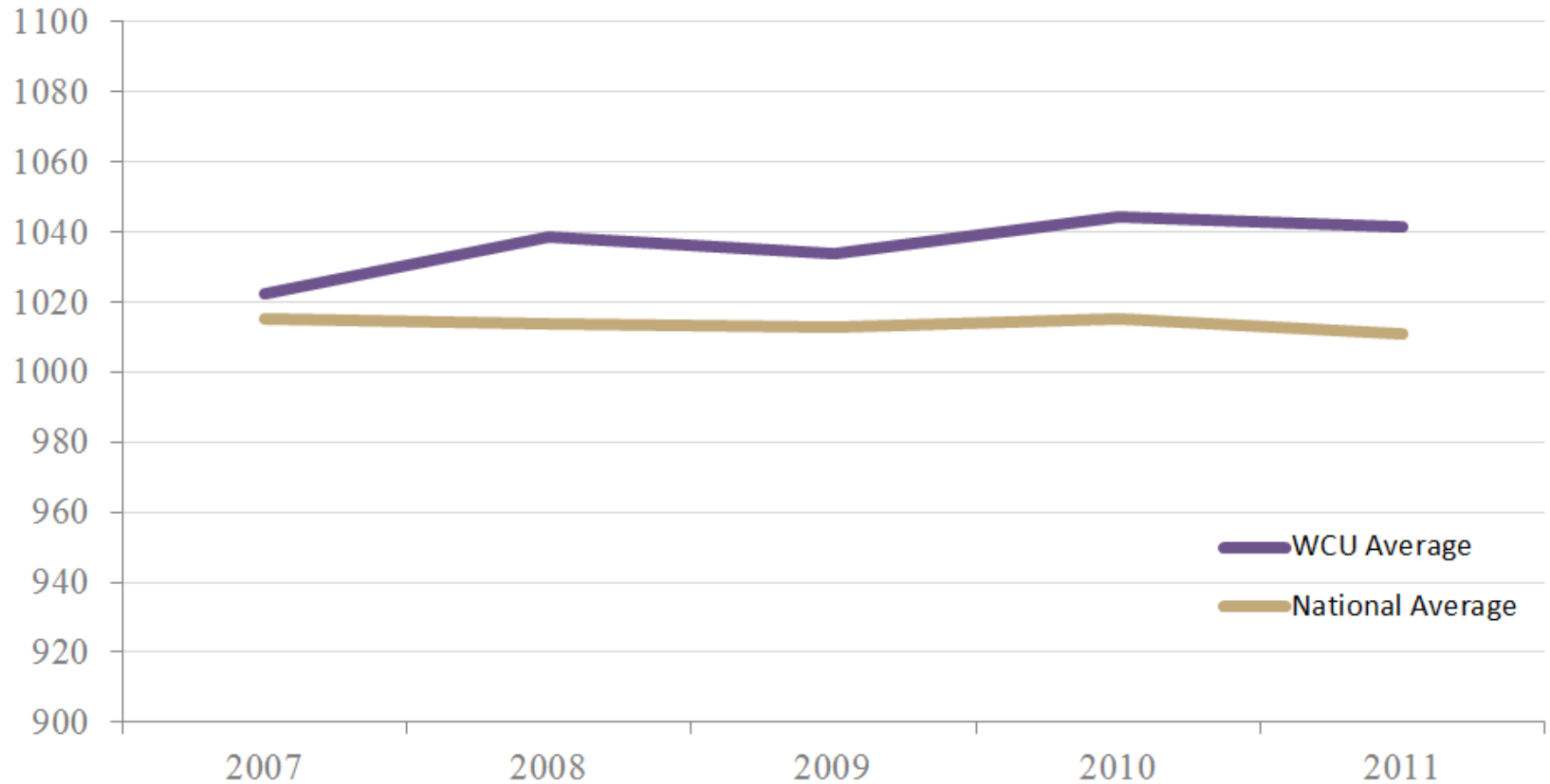


	ASIAN	BLACK†	HISP.†
Male	59 <i>0.6%</i>	300 <i>3.2%</i>	143 <i>1.5%</i>
Full-Time	44 <i>0.5%</i>	248 <i>2.7%</i>	118 <i>1.3%</i>
Part-Time	15 <i>0.2%</i>	52 <i>0.6%</i>	25 <i>0.3%</i>
Female	46 <i>0.5%</i>	260 <i>2.8%</i>	138 <i>1.5%</i>
Full-Time	40 <i>0.4%</i>	193 <i>2.1%</i>	110 <i>1.2%</i>
Part-Time	6 <i>0.1%</i>	67 <i>0.7%</i>	28 <i>0.3%</i>
Grand Total	105 <i>1.1%</i>	560 <i>6.0%</i>	281 <i>3.0%</i>
Full-Time	84 <i>0.9%</i>	441 <i>4.7%</i>	228 <i>2.4%</i>
Part-Time	21 <i>0.2%</i>	119 <i>1.3%</i>	53 <i>0.6%</i>

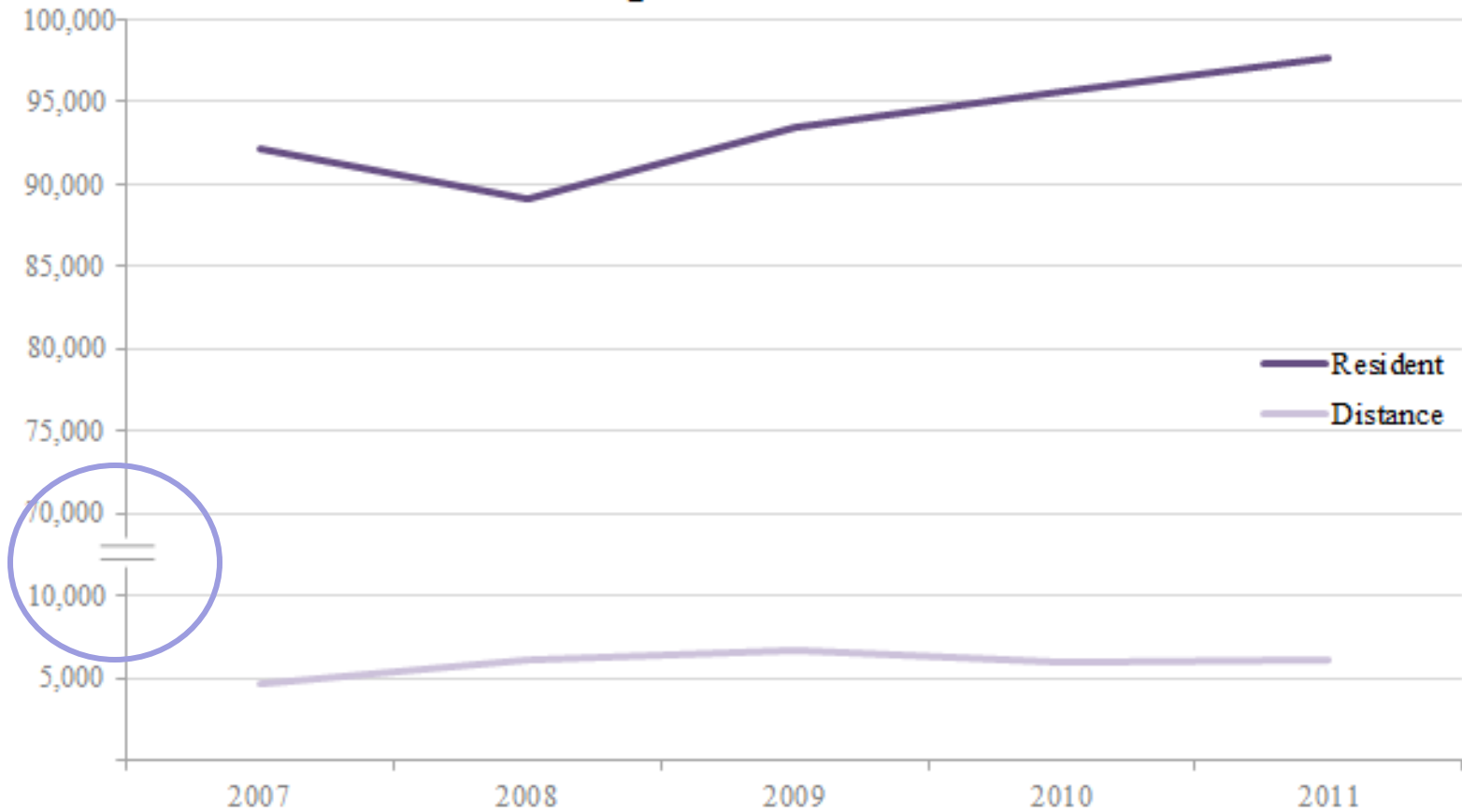
LOAD AND CLASS	NON-RESIDENT ALIEN		AFRICAN-AMERICAN		NATIVE AMERICA	
	Male	Female	Male	Female	Male	Female
Full-Time						
New Freshmen	6	4	62	54	1	
Part-Time						
New Freshmen	0	0	0	0	0	
TOTALS	<u>6</u>	<u>4</u>	<u>62</u>	<u>54</u>	<u>1</u>	
GRAND TOTAL	10		116		6	



Combined SAT Scores* First-Time Full-Time Freshmen

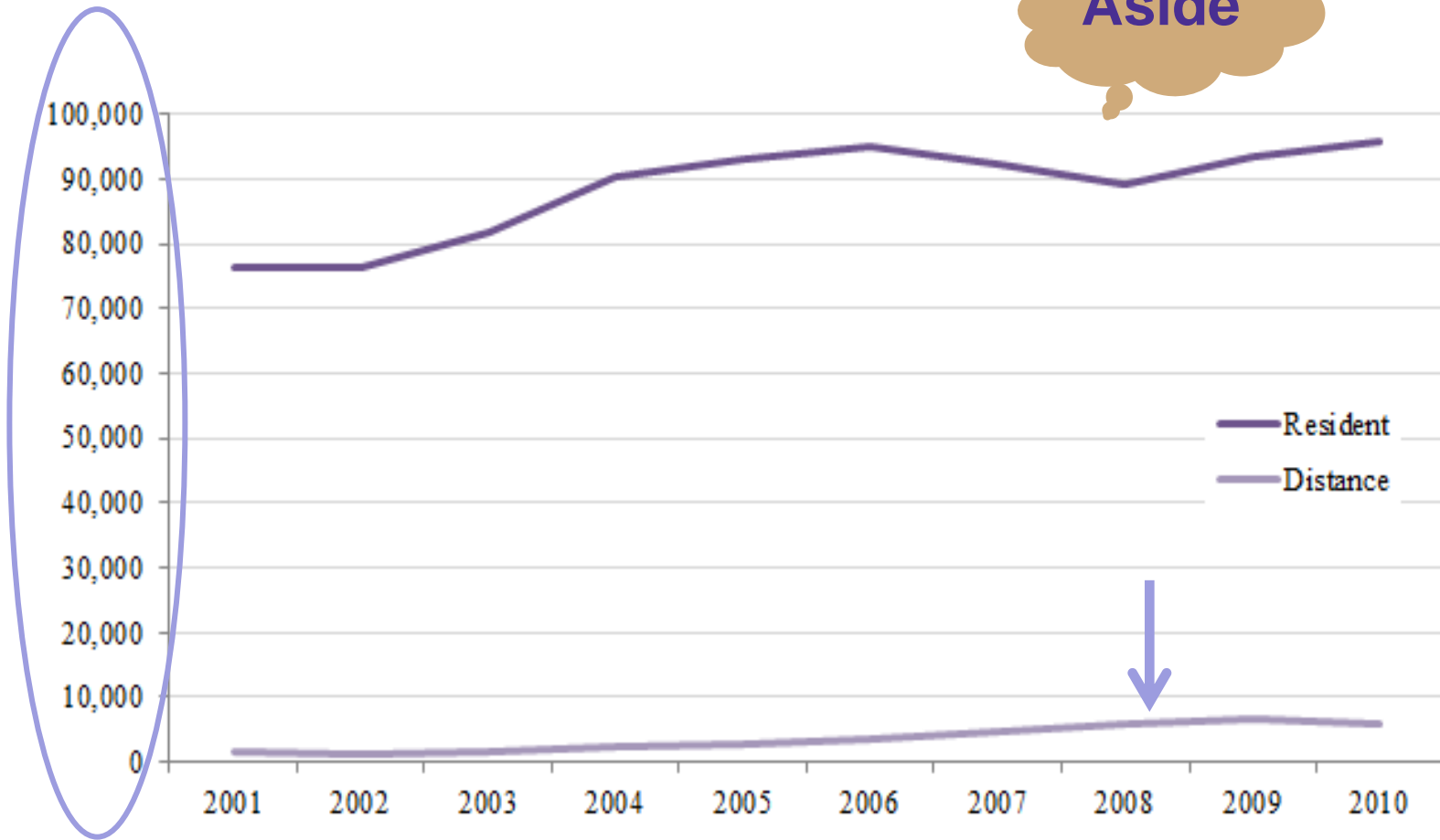


Enrolled Credit Hours Undergraduate Students



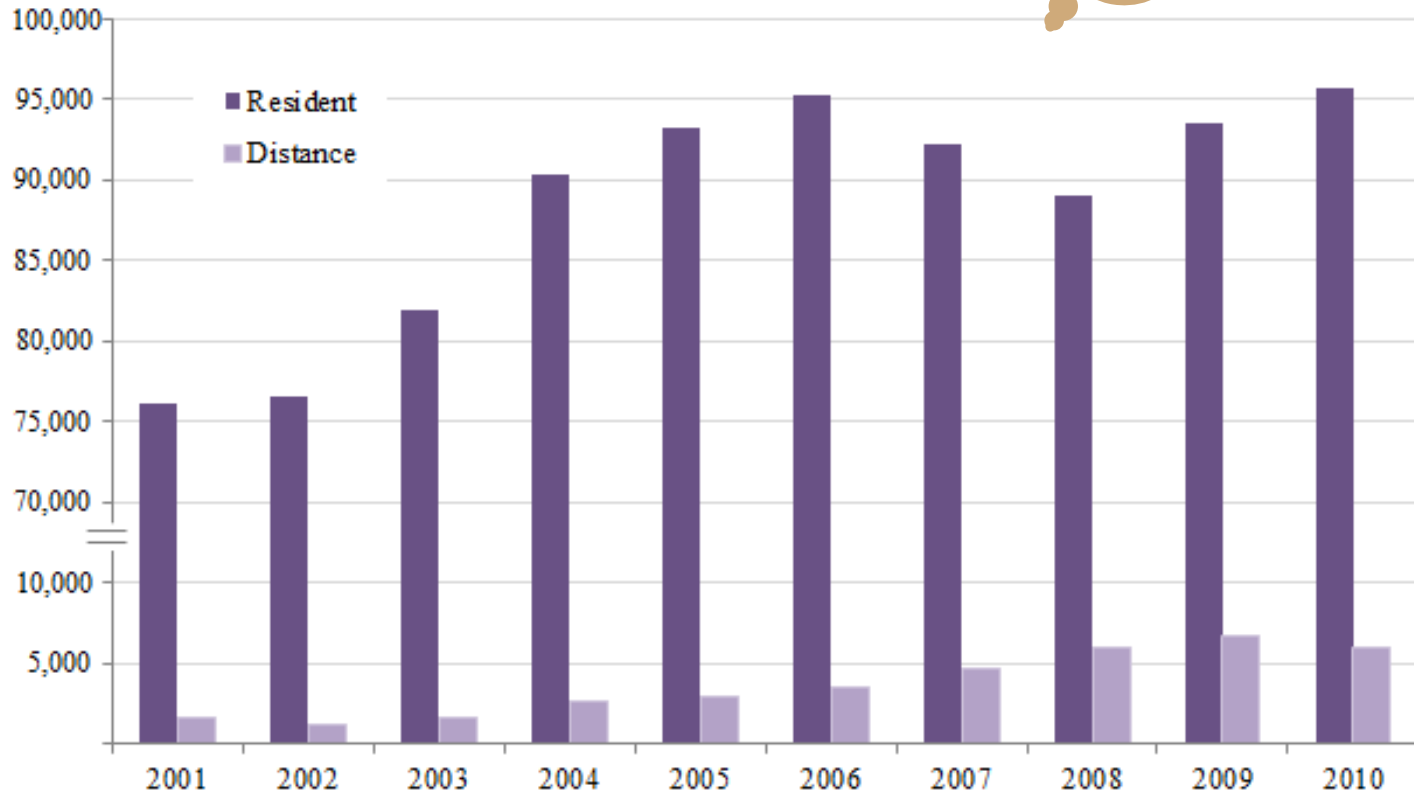
Without axis break

Aside



As bar chart with
axis break

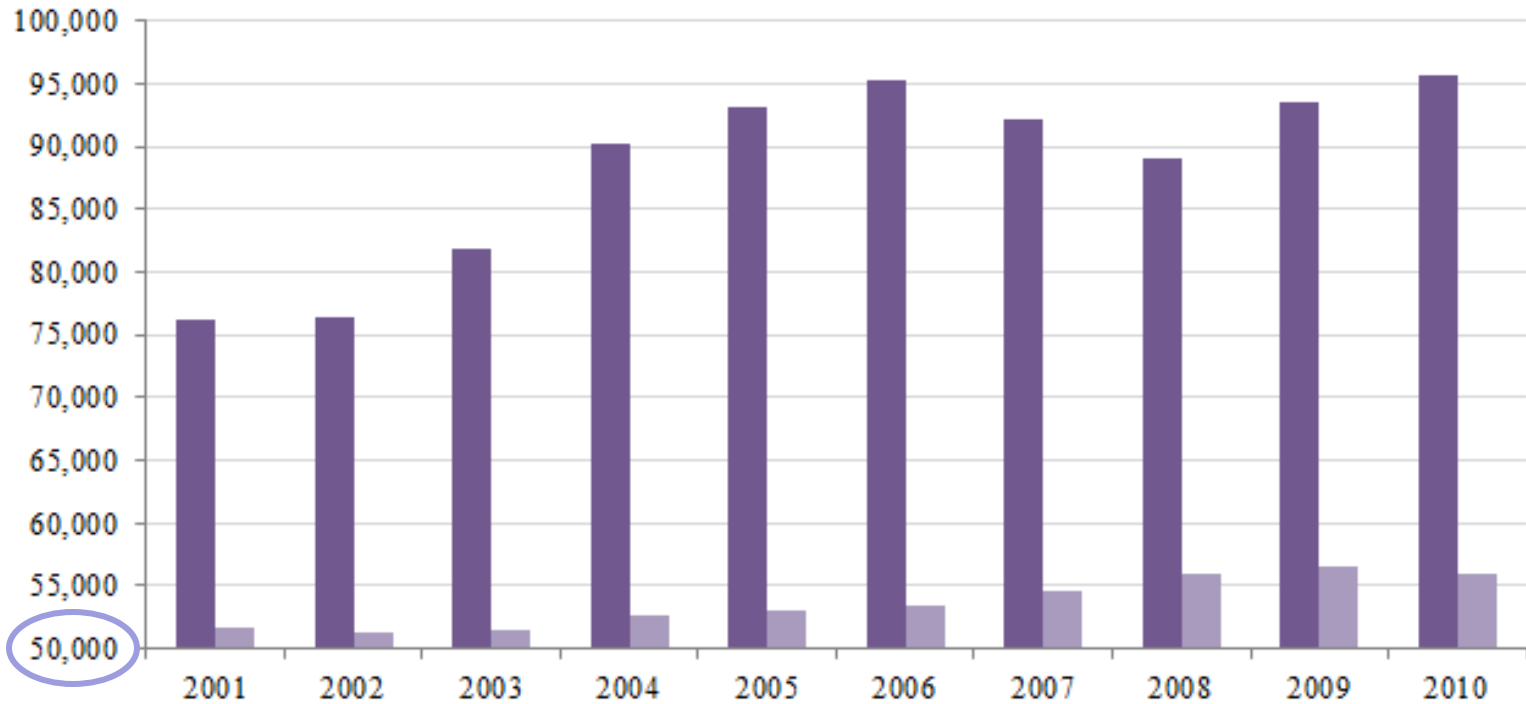
Aside



As bar chart

Aside

Aside



JUNIOR SENIOR ENROLLMENT INCLUDING SECOND MAJORS

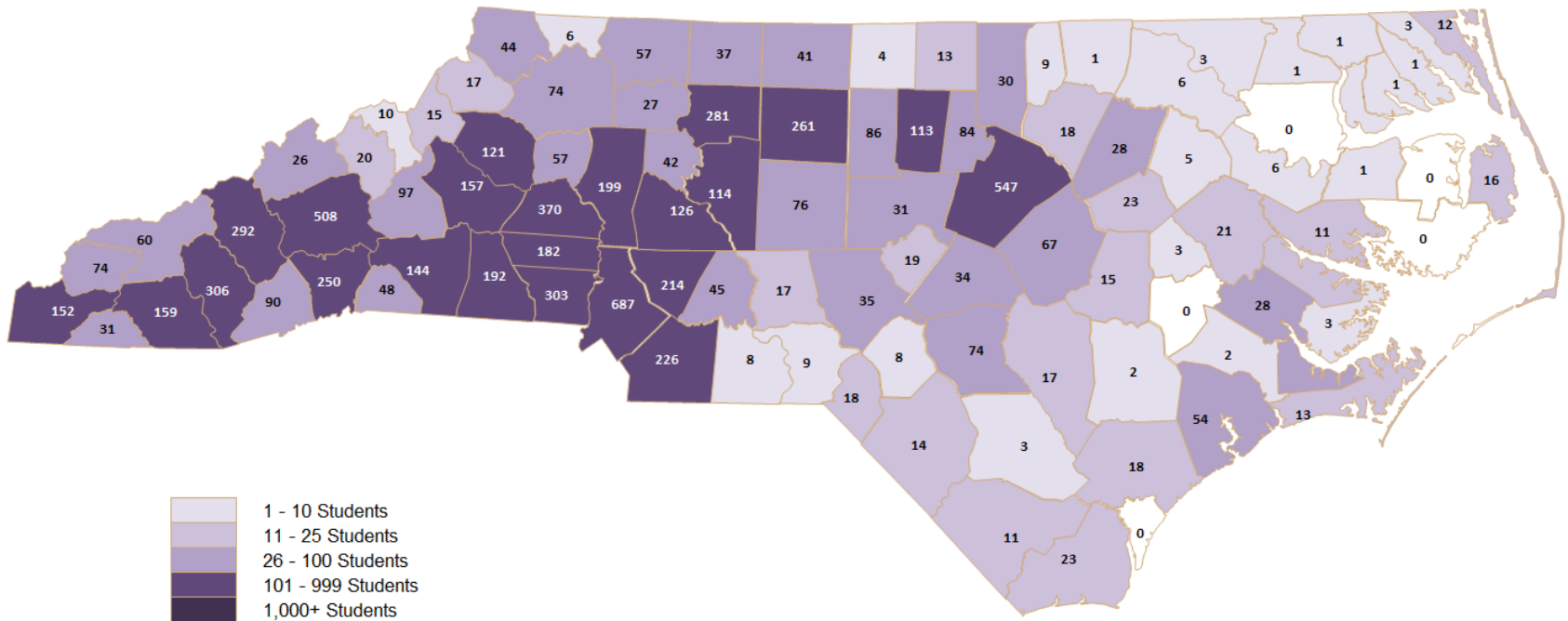
ARTS & SCIENCES (CIP)	33	36
Anthropology & Sociology	<u>29</u>	<u>47</u>
Anthropology (45.0201)	62	83
Sociology (45.1101)		
Total	73	78
Biology	<u>15</u>	<u>13</u>
Biology (26.0101)	88	91
Comprehensive Science Education (13.1316)*		
Total	44	47
Chemistry & Physics	2	6
Chemistry (40.0501)	0	0
Environmental Science (03.0104)	0	0
Total	46	53

Arts & Sciences (CIP)	2006	2007
Anthropology & Sociology	83	75
Anthropology (45.0201)	36	37
Sociology (45.1101)	47	38
Biology	91	116
Biology (26.0101)	78	97
Comprehensive Science/Secondary Education (13.1316)*	13	19
Chemistry & Physics	53	66
Chemistry (40.0501)	47	55
Environmental Science (03.0104)	6	10
Forensic Science (43.0106)	-	1



Geographic Distribution

First-time Full-time Freshmen Enrollment by County

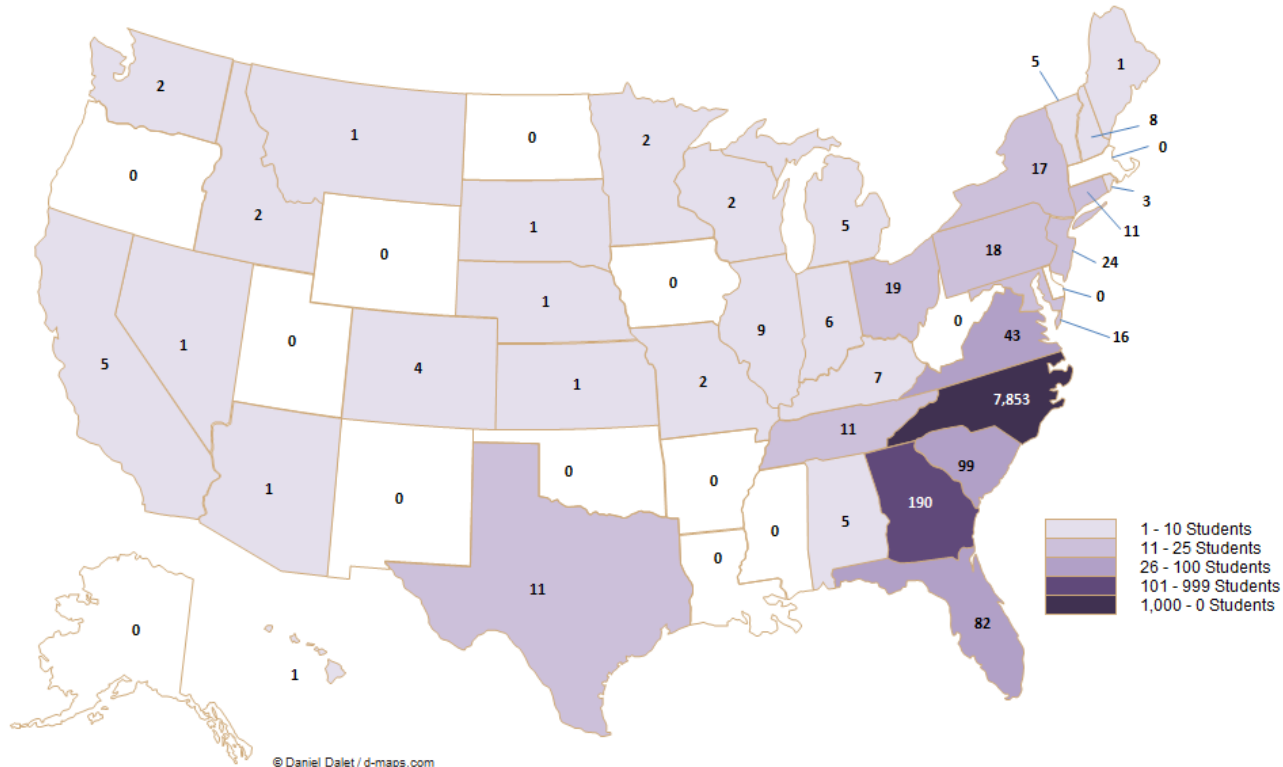


http://www.clearlyandsimply.com/clearly_and_simply/2009/06/choropleth-maps-with-excel.html



Geographic Distribution

First-time Full-time Freshmen Enrollment by State

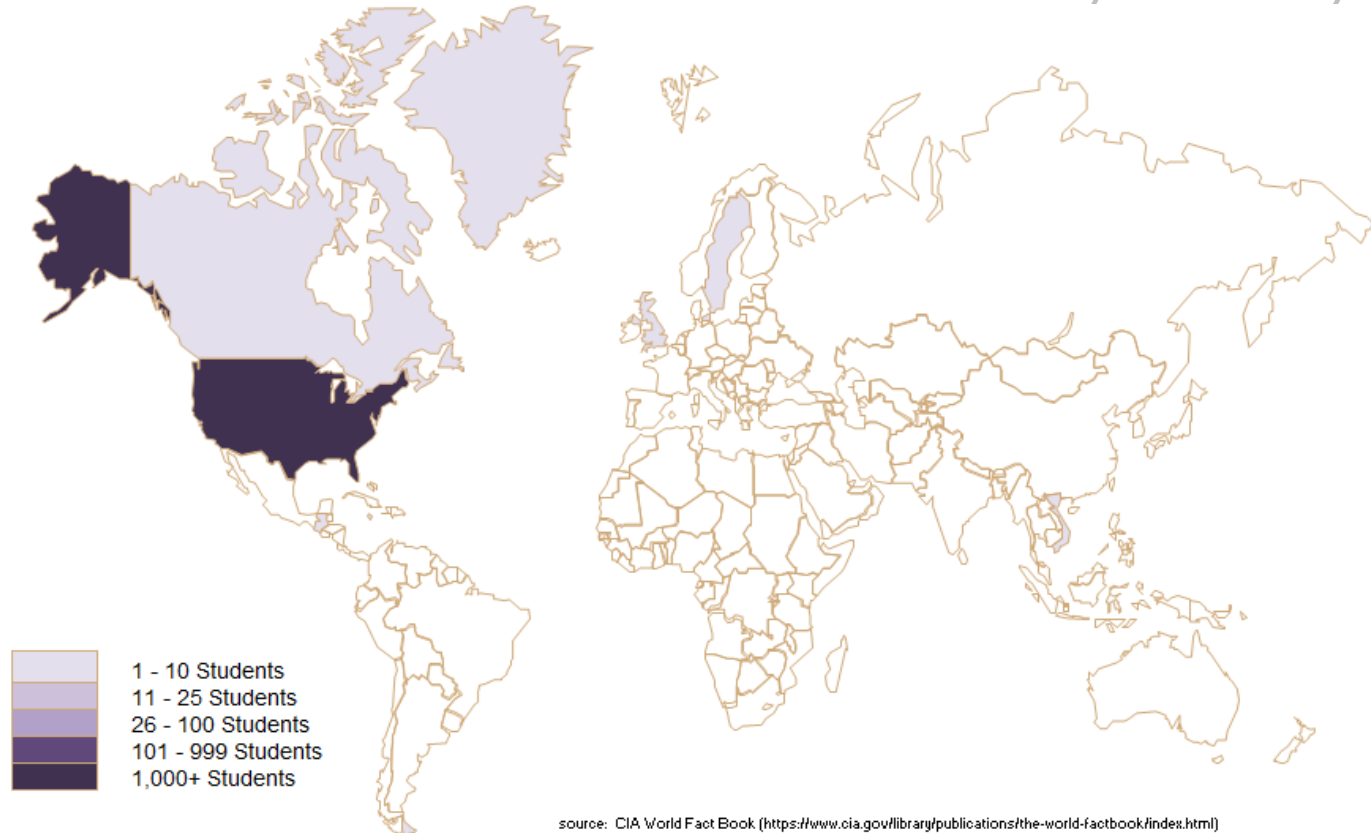


http://www.clearlyandsimply.com/clearly_and_simply/2009/06/choropleth-maps-with-excel.html



Geographic Distribution

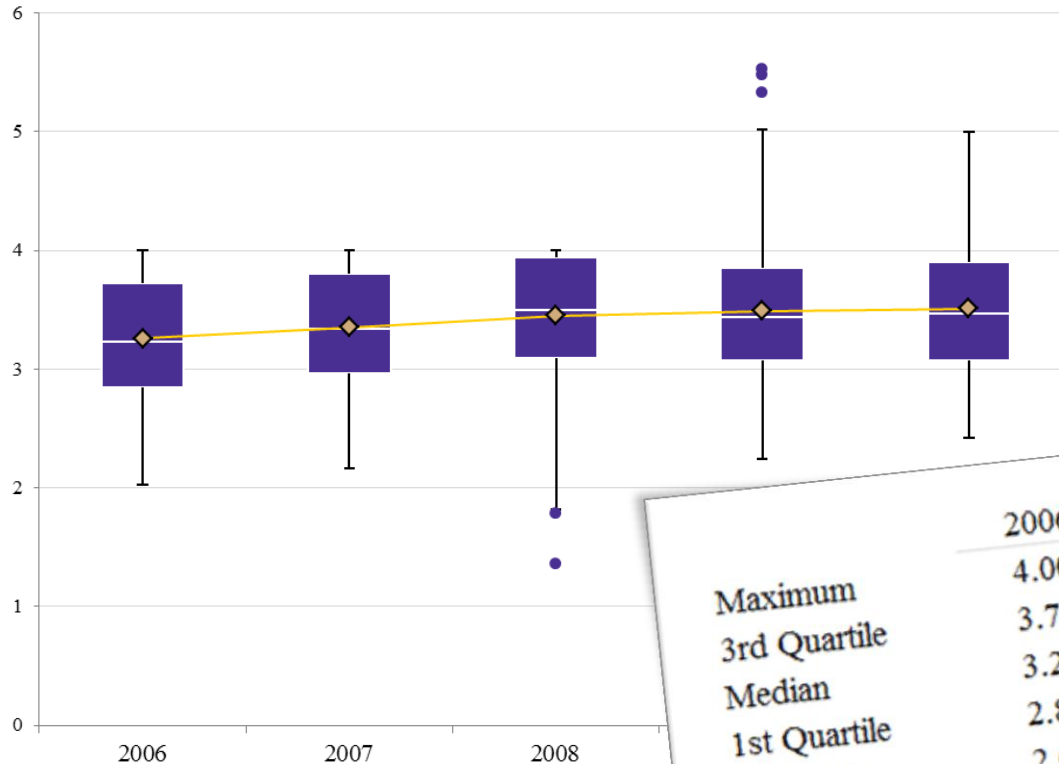
First-time Full-time Freshmen Enrollment by Country



http://www.clearlyandsimply.com/clearly_and_simply/2009/06/choropleth-maps-with-excel.html



HS GPA



	2006	2007	2008
Maximum	4.00	4.00	4.00
3rd Quartile	3.72	3.80	3.94
Median	3.23	3.34	3.09
1st Quartile	2.85	2.96	1.36
Minimum	2.03	2.16	3.45
Mean	3.26	3.35	

<http://peltiertech.com/WordPress/excel-box-and-whisker-diagrams-box-plots/>



Resources

- **Edward Tufte (<http://www.edwardtufte.com/>)**
 - The Visual Display of Quantitative Information, 2001
- **Stephen Few (<http://www.perceptualedge.com/>)**
 - Show Me the Numbers, 2004
 - Information Dashboard Design, 2006
 - Now you see it, 2009
- **<http://www.extremepresentation.com/design/charts/>**
- **<http://www.juiceanalytics.com/chart-chooser/>**
- **Purna Duggirala (<http://chandoo.org/wp/>) – Excel help**
- **Jon Peltier (<http://peltiertech.com>) – Excel templates**



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