

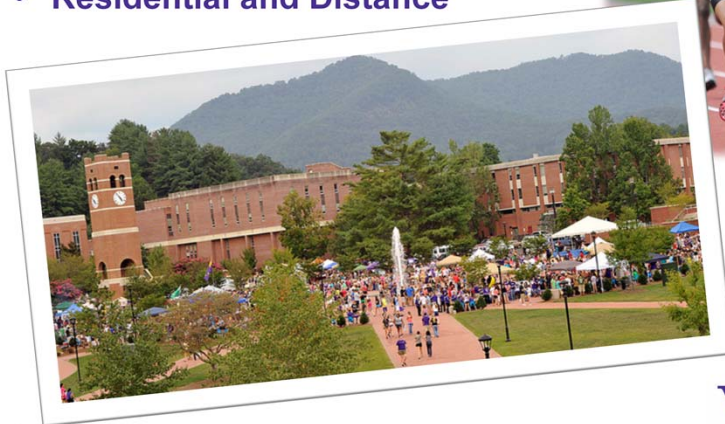


**It's Not About Pie When It Comes To
The Facts...**

David Onder & Alison Joseph

SAIR 2012

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



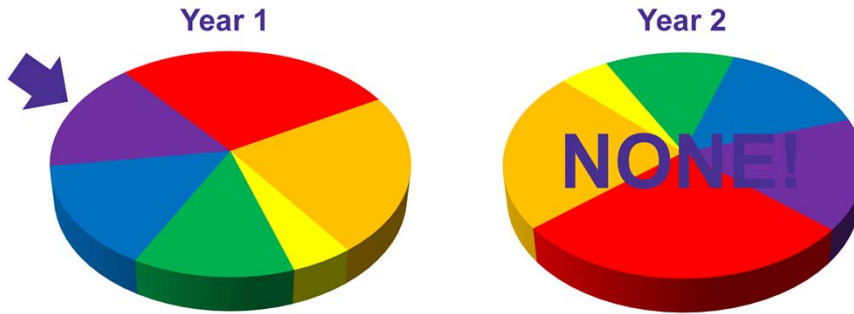
**Western
Carolina**
UNIVERSITY

Home of the Catamounts and the 2009 Sudler Trophy winners.

Eye on the pies

Which is the largest in **Year 1** - Green, Blue, or Purple?

Which have increased from **Year 1** to **Year 2**?



→ 3

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?



4

Inspiration

Edward Tufte

Stephen Few

Juice Analytics

Others



5



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



6



Data-Ink ratio and Chartjunk

Less clutter = cleaner look

Fewer labels

Gradient colors – most noticeable colors for the most important data

Quantitative perception

Very Precise

Not Very Precise

Length

Width

2-D Position

Size

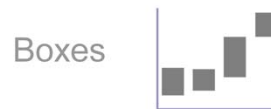
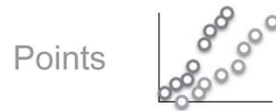
Intensity

Blur



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

Few, 2004, p. 46

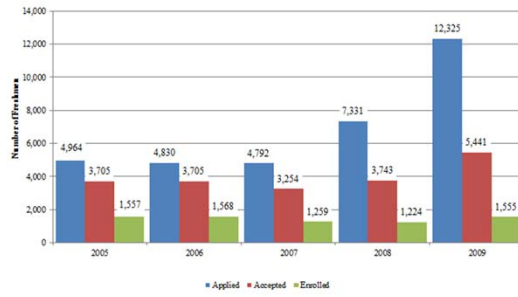


8



Notice – No bullseye, pie chart, pyramids, 3-D anything, stacked anything (though sometimes this is OK)

Freshman Applicants, Acceptances & Enrollees

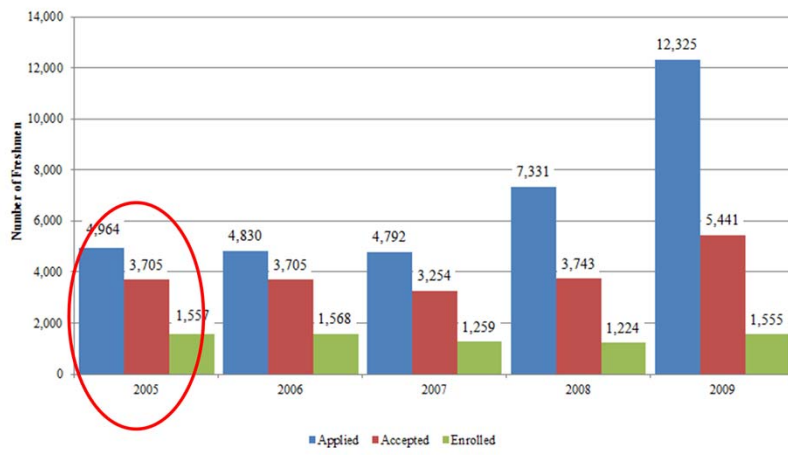


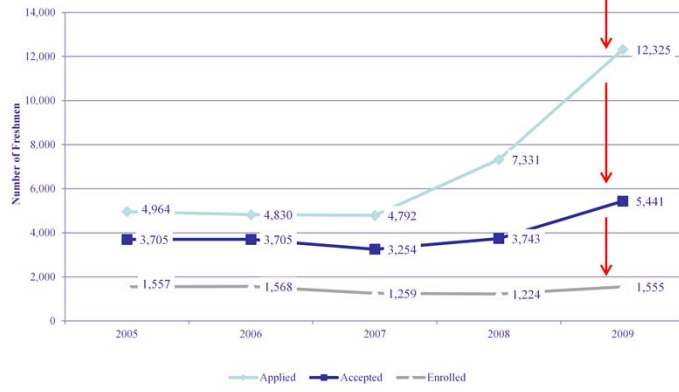
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Male	1,998	354	1,966	377	1,938	326	2,875	578	4,136	1,151
Female	2,154	458	2,085	402	2,057	471	3,177	701	5,366	1,672
Accepted	3,123	582	3,167	538	2,732	502	3,214	529	4,561	880
Male	1,454	236	1,501	255	1,302	207	1,520	226	2,020	341
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% of Applicants Accepted	75	72	78	69	69	63	53	41	58	31
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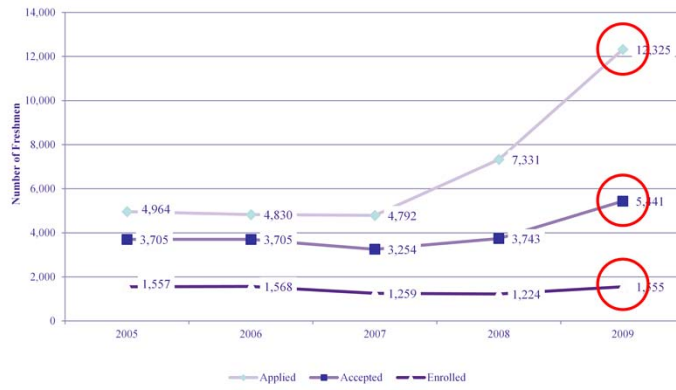


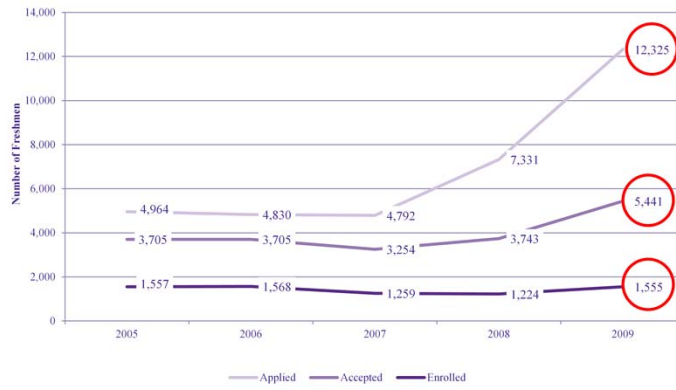
9

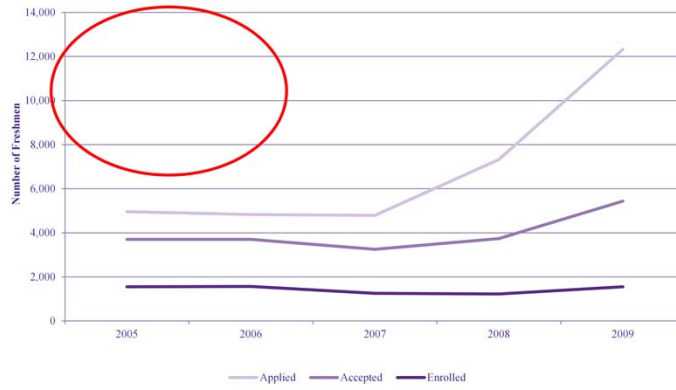


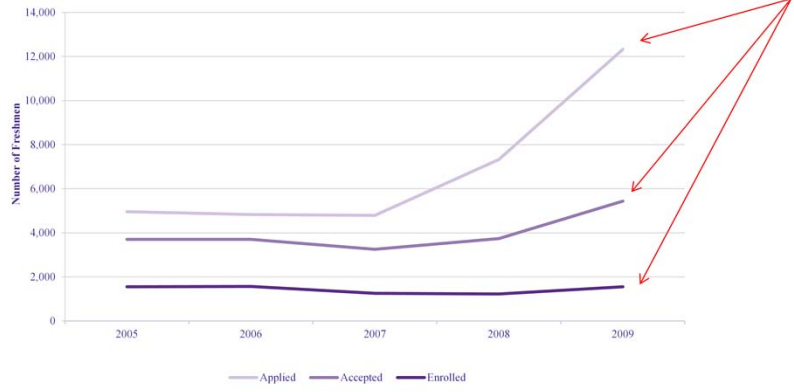


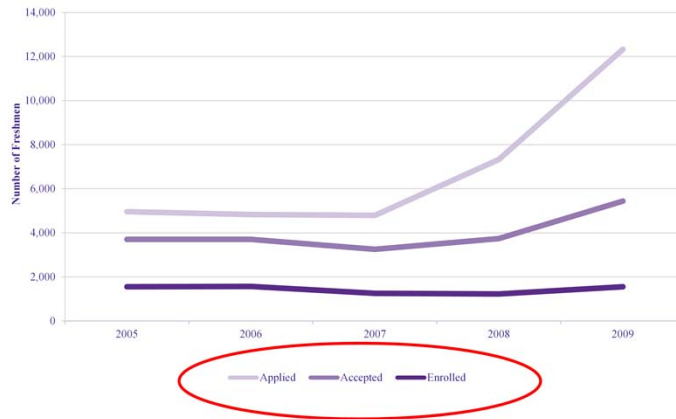


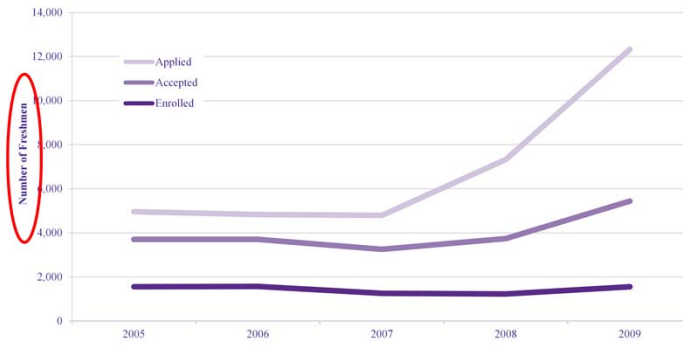


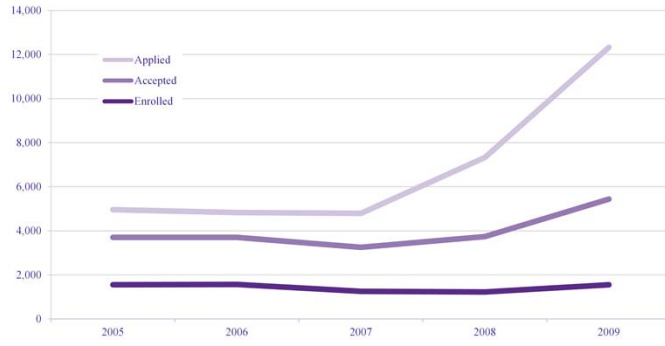




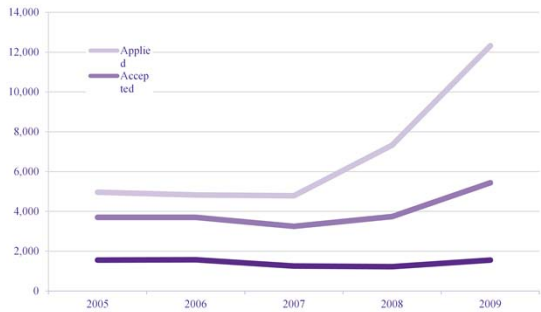
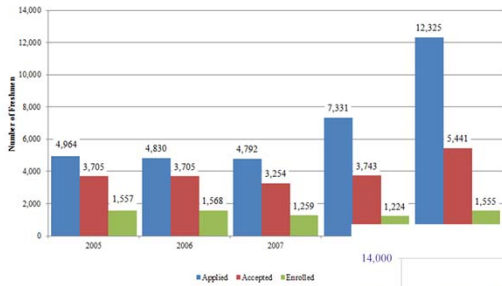









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Accepted	2,752	502	3,254	3,214	529	3,743	4,561	880	5,441
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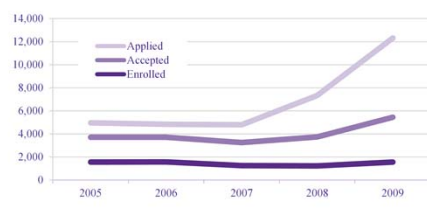
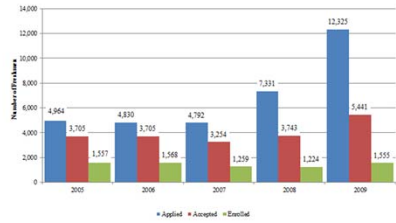


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Male	721	59	718	62	553	49	564	40	653	52
Female	717	60	741	47	597	51	564	56	769	81
% of Accepted Enrolling	48	20	46	20	42	22	35	18	36	15

	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	2,264	2,875	578	3,453	4,136	1,151	5,287
Female	2,057	471	2,528	3,177	701	3,878	5,366	1,672	7,045
Accepted	2,752	502	3,254	3,214	529	3,744	4,561	880	5,441
Male	1,302	297	1,599	1,520	226	1,746	2,020	341	2,361
Female	1,450	205	1,655	1,694	303	1,997	2,541	539	3,080
Enrolled	1,150	100	1,250	1,128	96	1,224	1,422	133	1,555
Male	553	49	602	564	40	604	653	52	705
Female	597	51	648	564	56	620	769	81	850



High School Rank of Freshmen

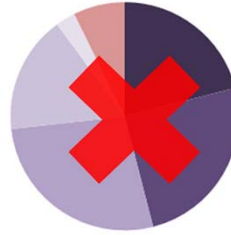
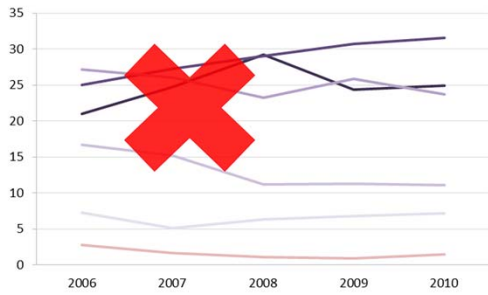
Percentage of New Freshmen*

Class Rank	2004	2005	2006	2007	2008	2009
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	87	88	115	64	77	106



	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





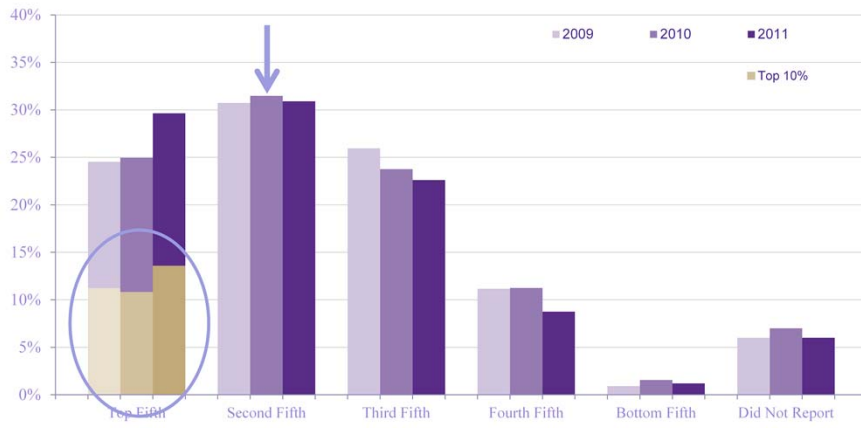
Neither is a good option

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?



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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	4	6
TOTALS	6	4	62	54	1	5	2	9	13	17	569	692	1	4	51	65	1549	1555
GRAND TOTAL	10		116		6		11		30		1261		5		116		1555	

How many first-time full-time freshmen were female? 844 (CLICK)

What percent of the first-time full-time freshmen were African-American? $116/1549 \approx 7.5\%$ (CLICK)

[Alison] What cannot be answered?

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	43	44	4	0	1	536	18	7	664
	0.7 %	2.9 %	2.9 %	0.3 %	0.0 %	0.1 %	35.5 %	1.2 %	0.5 %	44.0 %
Female	9	41	42	6	0	4	701	31	10	844
	0.6 %	2.7 %	2.8 %	0.4 %	0.0 %	0.3 %	46.5 %	2.1 %	0.7 %	56.0 %
Grand Total	20	84	86	10	0	5	1237	49	17	1508
	1.3 %	5.6 %	5.7 %	0.7 %	0.0 %	0.3 %	82.0 %	3.2 %	1.1 %	100.0 %



Applied changes discussed before

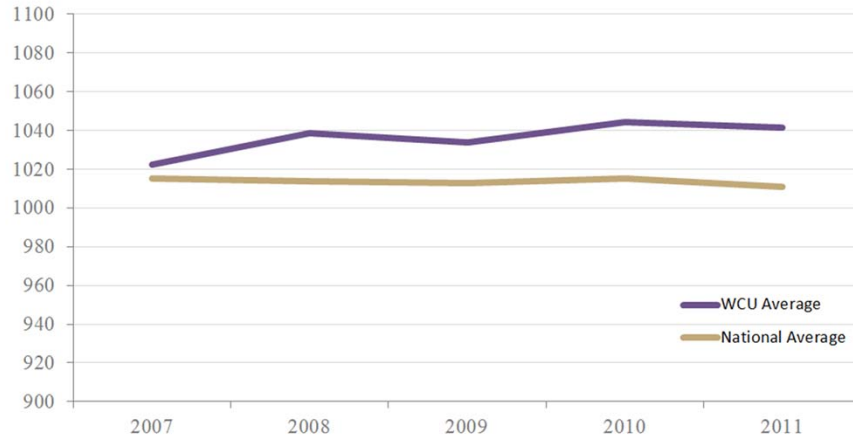
How many first-time full-time freshmen were female? 844(CLICK)

What percent of the first-time full-time freshmen were African-American? 5.6% (CLICK)

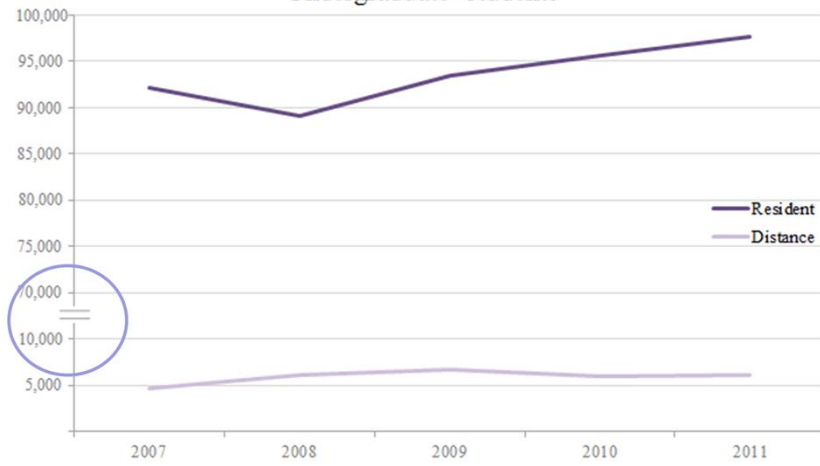
	ASIAN	BLACK*	HISP?
Male	59	300	143
	0.6%	3.2%	1.5%
Full-Time	44	248	118
	0.5%	2.7%	1.3%
Part-Time	15	52	25
	0.2%	0.6%	0.3%
Female	46	260	138
	0.5%	2.8%	1.5%
Full-Time	40	193	110
	0.4%	2.1%	1.2%
Part-Time	6	67	28
	0.1%	0.7%	0.3%
Grand Total	105	560	281
	1.1%	6.0%	3.0%
Full-Time	84	441	228
	0.9%	4.7%	2.4%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

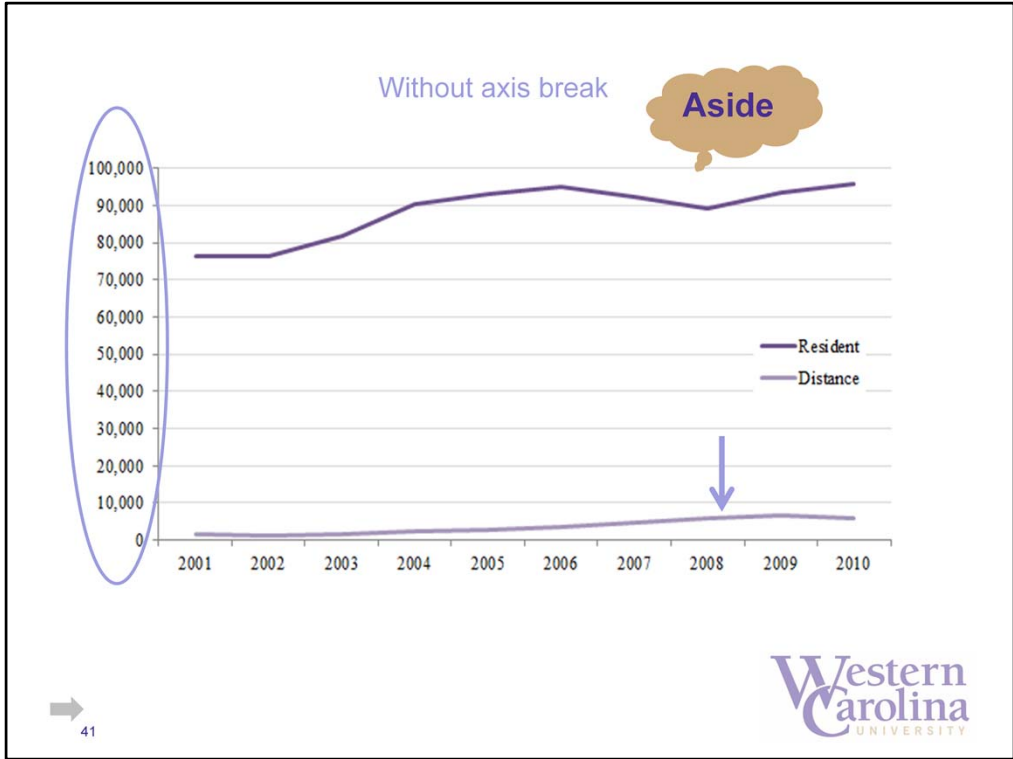
LOAD AND CLASS	NON-RESIDENT ALIEN		AFRICAN-AMERICAN		NATIVE AMERICAN	
	Male	Female	Male	Female	Male	Female
Full-Time						
New Freshmen	6	4	62	54		1
Part-Time						
New Freshmen	0	0	0	0		0
TOTALS	6	4	62	54		1
GRAND TOTAL	10		116			6

Combined SAT Scores* First-Time Full-Time Freshmen



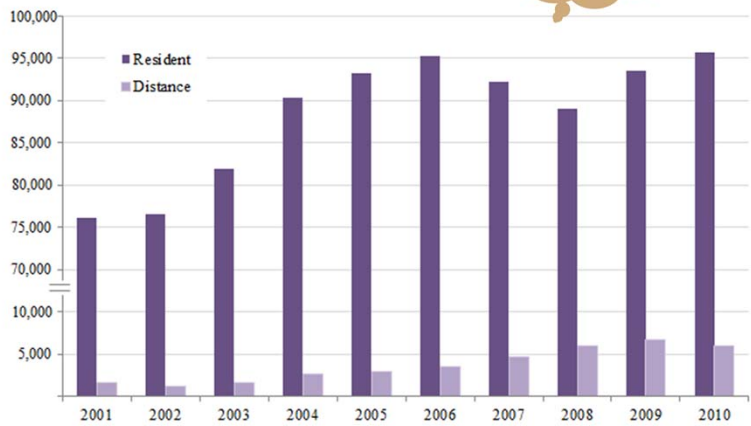
Enrolled Credit Hours Undergraduate Students



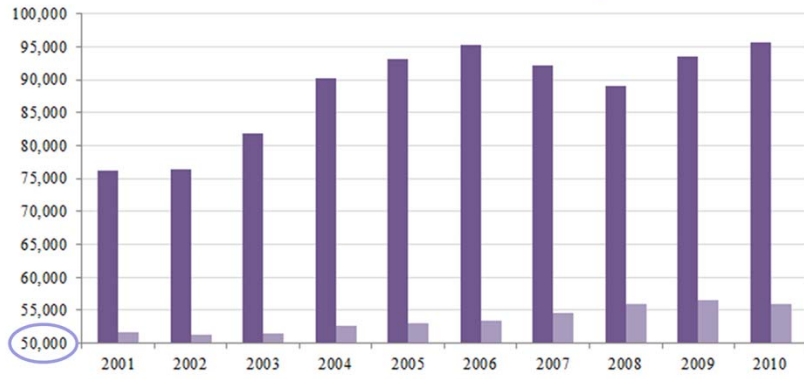
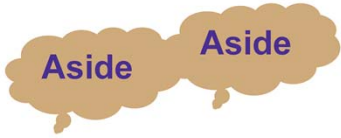


As bar chart with axis break

Aside



As bar chart



JUNIOR SENIOR ENROLLMENT INCLUDING SECOND MAJORS

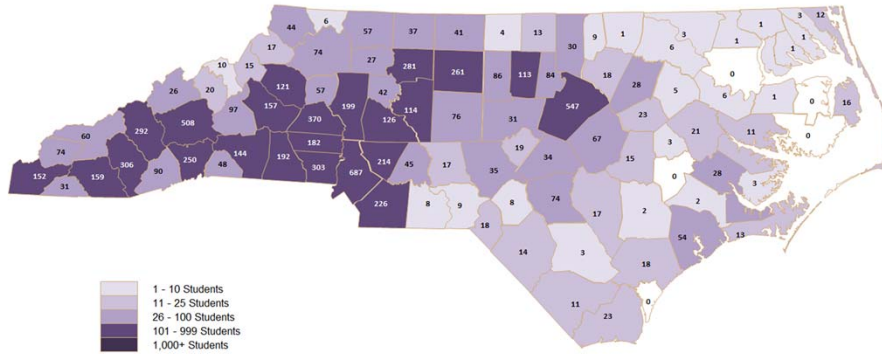
ARTS & SCIENCES (CIP)		2006	2007
Anthropology & Sociology			
Anthropology (45.0201)		33	36
Sociology (45.1101)		29	47
Total		62	83
Biology			
Biology (26.0101)		73	78
Comprehensive Science Education (13.1316)*		15	13
Total		88	91
Chemistry & Physics			
Chemistry (40.0501)		44	47
Environmental Science (03.0104)		2	6
Forensic Science (43.0106)		0	0
Total		46	53

Arts & Sciences (CIP)		2006	2007
Anthropology & Sociology			
Anthropology (45.0201)		36	37
Sociology (45.1101)		47	38
Total		83	75
Biology			
Biology (26.0101)		78	97
Comprehensive Science/Secondary Education (13.1316)*		13	19
Total		91	116
Chemistry & Physics			
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

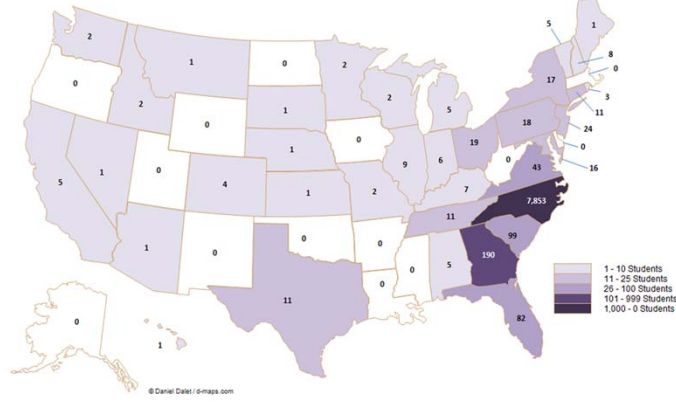


http://www.clearlyandsimply.com/clearly_and_simply/2009/06/choropleth-maps-with-excel.html



Geographic Distribution

First-time Full-time Freshmen Enrollment by State

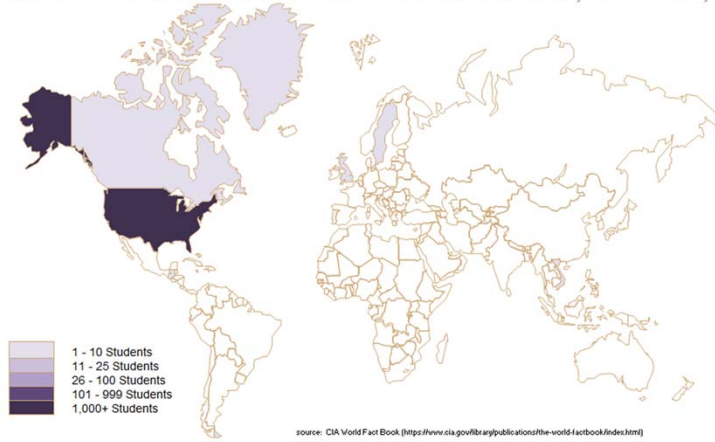


http://www.clearlyandsimply.com/clearly_and_simply/2009/06/choropleth-maps-with-excel.html



Geographic Distribution

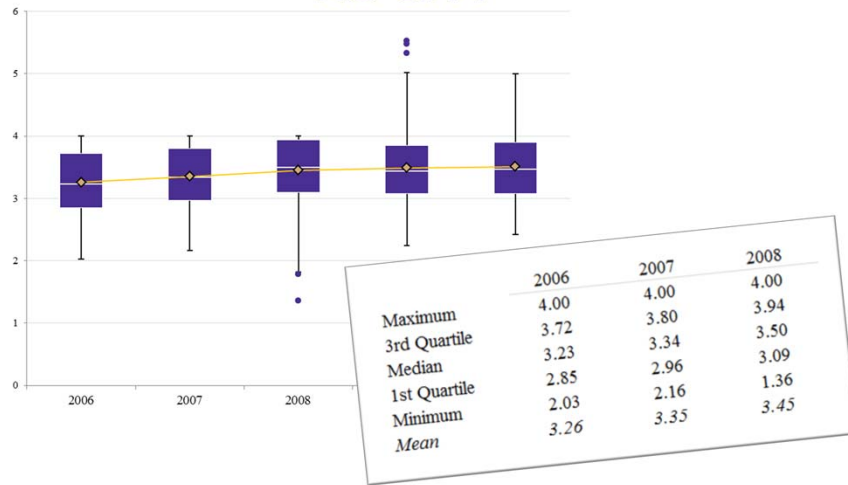
First-time Full-time Freshmen Enrollment by Country



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



HS GPA



<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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