

From Tracking to Analyzing to Action: Using Data to Improve Retention at UC Santa Cruz



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Context



- **WASC Accreditation Process Redesign**
 - Off-site review of retention and graduation rates for all institutions, including data templates, contextualizing narrative, and some form of benchmarking or comparisons.
- **UCSC theme in last reaccreditation review**
- **Provost's "5 for 15" Goals for Undergraduate Education**
 - Increase first year retention by 3%
 - Reduce attrition after second year to under 10%

“Tracking”



- **Annual Report**
 - **Latest Statistics**
 - **Trends**
 - **Breakouts**
 - ✦ **Race/Ethnicity; Gender; Residency; College; SAT; HS GPA**
 - **External Benchmarking**
 - ✦ **UC campuses; Division I; Public 4 years**

“Contextualizing and Analyzing”



- **More refined comparison groups**
 - UC campuses, Carnegie Very High Research, AAU non-med
- **Regression Based Benchmarking: Predicted vs. Actual**
 - Based on HERI study of 262 4-years
- **More refined analysis of sub-group populations**
 - Predicted vs. actual by breakout groups
- **National Student Clearinghouse**
- **Predictive Modeling using Logistic Regression**

Recent Rates and Trends



- 2004 cohort: campus high 6-year graduation 74%
- Six year rates have been slowly but steadily improving since we began tracking them.
- Six year graduation rates track 1 and 2 year retention rates pretty closely.
- One year retention rates had been improving for over a decade but have leveled off at 89% since 2004.
- Without intervention our graduation rates are likely to level off into the foreseeable future.

External Benchmarking: Select Comparators



	1 Year Retention			6 Year Graduation		
	2006	2007	2008	2001	2002	2003
UC Santa Cruz	89	88	89	68	72	73
UC Mean	92	92	93	79	80	80
Carnegie Very High Research	90	90	91	77	77	78
AAU without medical schools	91	91	91	79	79	80

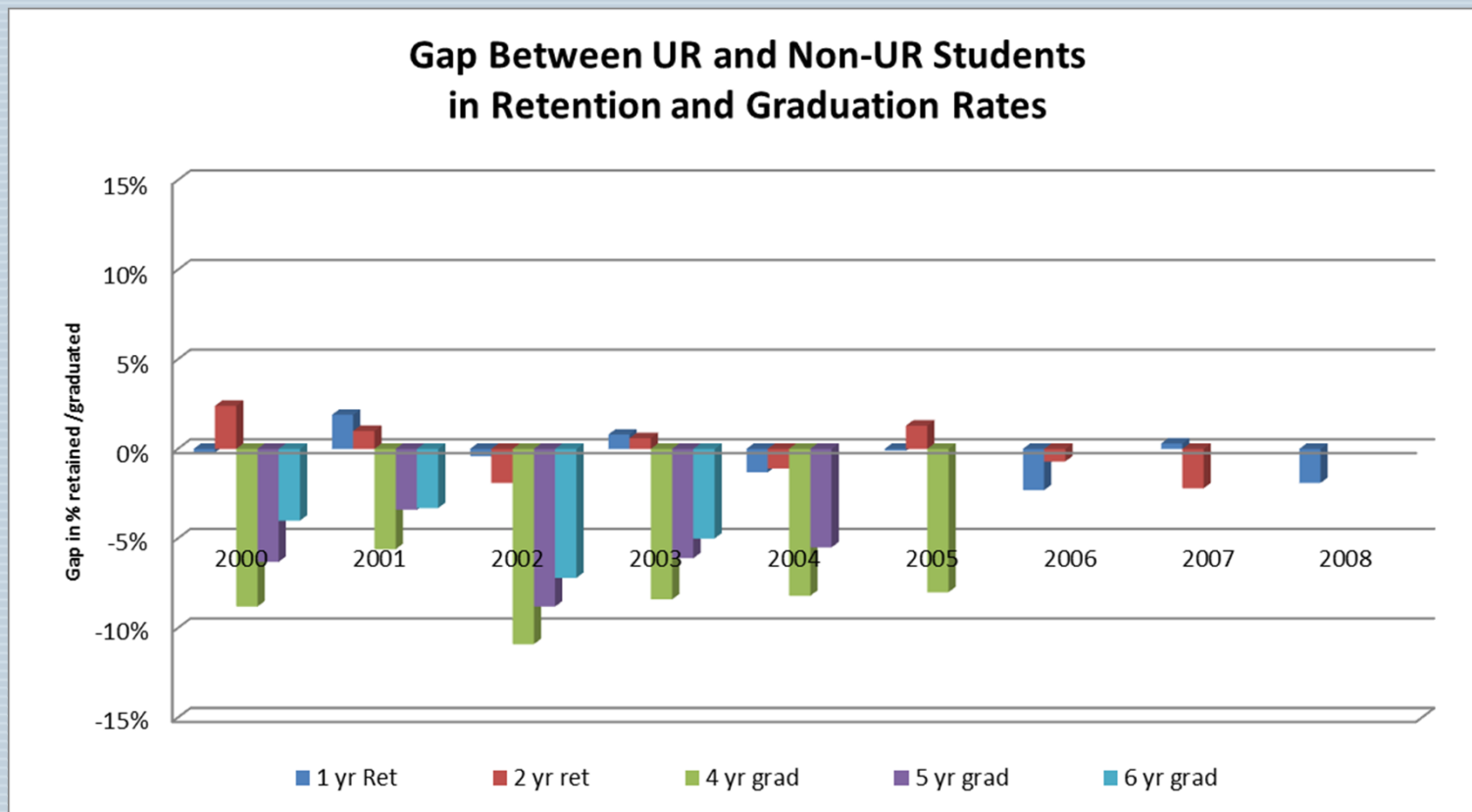
Internal Benchmarking



Predicted vs. Actual UCSC 6 Year Graduation Rates by Cohort Year 1998-2002 Freshmen Cohorts

Cohort Entry Year	Predicted	Actual
1998	66	69
1999	67	70
2000	67	70
2001	66	68
2002	65	71
1998-02	66	70

Internal Comparisons by Race/Ethnicity



External Comparisons by Race/Ethnicity Gaps



6-Year Graduation Rate Gaps by UC Campus

2003 Cohort: 6-Year Graduation Rates	% UCSC gap			% UCB gap			% UCD gap			% UCI gap			% UCLA gap			% UCR gap			% UCSD gap			% UCSB gap		
Total	73			90			80			82			89			65			84			80		
Men	45%	74	1	46%	88	-2	46%	76	-4	51%	80	-2	40%	87	-2	48%	63	-2	45%	84	0	42%	79	-1
Women	55%	73	0	54%	92	2	54%	83	3	49%	84	2	60%	90	1	52%	67	2	55%	85	1	58%	81	1
White, non-Hispanic	51%	74	1	29%	89	-1	42%	81	1	24%	79	-3	34%	90	1	20%	60	-5	36%	84	0	54%	82	2
Black, non-Hispanic	3%	69	-4	4%	73	-17	2%	70	-10	2%	78	-4	3%	81	-8	7%	66	1	1%	70	-14	2%	75	-5
Hispanic	15%	70	-3	11%	84	-6	8%	67	-13	11%	71	-11	15%	81	-8	22%	60	-5	9%	71	-13	16%	74	-6
Asian/Pacific Islander	19%	75	2	44%	94	4	41%	83	3	51%	85	3	42%	92	3	43%	70	5	43%	88	4	16%	84	4
Amer. Ind./Alaska Native	1%	72	-1	0%	69	-21	1%	81	1	0%	73	-9	0%	88	-1	0%	27	-38	0%	86	2	1%	80	0
Race/Ethnicity Unknown	11%	72	-1	9%	88	-2	5%	76	-4	10%	84	2	5%	88	-1	7%	64	-1	10%	86	2	10%	79	-1
Nonresident Alien	0%	63	-10	3%	90	0	2%	84	4	1%	81	-1	1%	86	-3	1%	67	2	0%	97	13	1%	63	-17

* Source: IPEDS - <http://nces.ed.gov/ipeds/datacenter/>

Internal Benchmarking by Race/Ethnicity



Predicted vs. Actual UCSC 6 Year Graduation Rates by Race/Ethnicity
1998-2002 Freshmen Cohorts

Cohort Entry Year	Predicted	Actual
American Indian/Alaskan Native	67	68
Asian/Pacific Islander	67	71
Black, Non-Hispanic	57	66
Hispanic	54	66
White, Non-Hispanic	69	71

Internal Benchmarking by Academic Preparation



Predicted vs. Actual UCSC 6 Year Graduation Rates by HS GPA Quintiles
1998-2002 Freshmen Cohorts

Cohort Entry Year	Predicted	Actual
High Quintile	80	76
4th	72	73
3rd	65	70
2nd	60	70
Low Quintile	55	67

Internal Benchmarking by Academic Preparation



Predicted vs. Actual UCSC 6 Year Graduation Rates by SAT Quintiles
1998-2002 Freshmen Cohorts

Cohort Entry Year	Predicted	Actual
High Quintile	74	70
4th	70	71
3rd	67	71
2nd	64	70
Low Quintile	58	68

Was that just an anomaly?



UCSC Systemwide Graduation Rates by UC Campus: 1999-2003 Freshmen Cohorts

Graduated from:	1999 cohort N= 2,350		2000 cohort N= 2,869		2001 cohort N= 2,939		2002 cohort N= 3,168		2003 cohort N= 3,353	
	n	%	n	%	n	%	n	%	n	%
Santa Cruz	1,649	89.8%	2,006	69.9%	2,011	68.4%	2,250	71.0%	2,444	72.9%
Berkeley	11	0.5%	21	0.7%	25	0.9%	17	0.5%	17	0.5%
Davis	19	0.8%	34	1.2%	30	1.0%	21	0.7%	18	0.5%
Los Angeles	15	0.6%	25	0.9%	27	0.9%	27	0.9%	15	0.4%
Riverside	1	0.0%	6	0.2%	10	0.3%	8	0.3%	4	0.1%
San Diego	23	1.0%	17	0.6%	16	0.5%	25	0.8%	14	0.4%
Santa Barbara	15	0.6%	15	0.5%	23	0.8%	26	0.8%	13	0.4%
Irvine	8	0.3%	14	0.5%	8	0.3%	15	0.5%	8	0.2%
missing	0	0.0%	0	0.0%	1	0.0%	0	0.0%	0	0.0%
Other UC	92	3.9%	132	4.6%	140	4.8%	139	4.4%	89	2.7%
any UC	1,741	74.1%	2,138	74.5%	2,151	73.2%	2,389	75.4%	2,533	75.5%

Predictive Modeling: Data and Methods



- **Four Outcomes**
 - **First to second year retention**
 - ✦ 2005-2009 freshmen cohorts
 - **Second to third year retention**
 - ✦ 2004-2008 cohorts
 - **Third to fourth year retention (or graduation)**
 - ✦ 2003-2007 cohorts
 - **Fourth year to graduation within six years**
 - ✦ 2001-2004 cohorts

Predictive Modeling: Data and Methods



- **Predictor Variables**
 - **Academic Performance**
 - ✦ UCSC GPA (ranges: <2.0, 2.0-2.49, 2.5-2.99, 3.0-3.49, ≥ 3.5)
 - **Academic Preparation**
 - ✦ High School GPA; SAT Scores (quintiles)
 - **Socio-Demographic Characteristics**
 - ✦ Race/Ethnicity; Gender; First Generation College Status
 - **Experiences and Attitudes**
 - ✦ UCUES 2010 Factors: (satisfaction, sense of belonging, academic engagement and disengagement, self-assessed gains in academic and social competencies, and perceptions of campus climate)

Predictive Modeling: Data and Methods

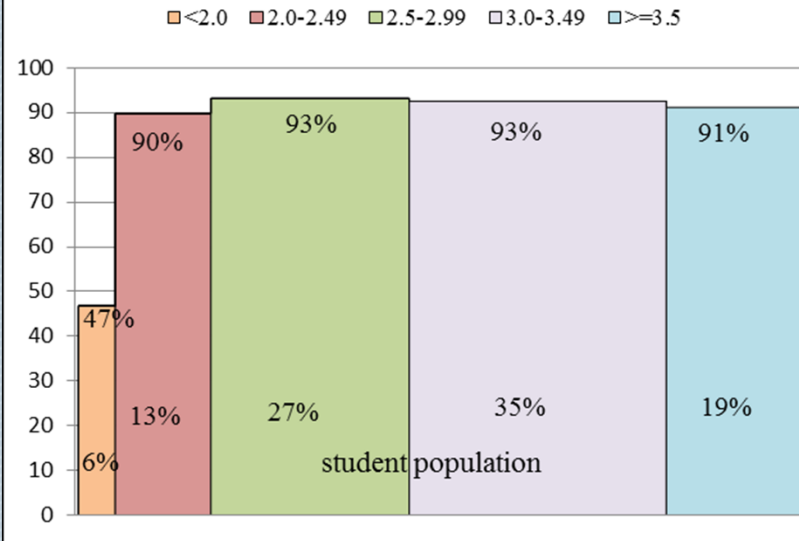


- **Logistic Regression to estimate three models at each of the four time points.**
 - **Model 1:**
 - ✦ UCSC GPA only
 - **Model 2:**
 - ✦ UCSC GPA; Academic Preparation; Socio-Demographics
 - **Model 3:**
 - ✦ UCSC GPA; Academic Preparation; Socio-Demographics; UCUES factors
 - ✦ Sample weighted by retention, UCSC GPA, gender to control for non-response bias.

First to Second Year Retention



Year 1 to Year 2 retention rates by 1st year GPA range and proportional to the size of student population in each GPA range

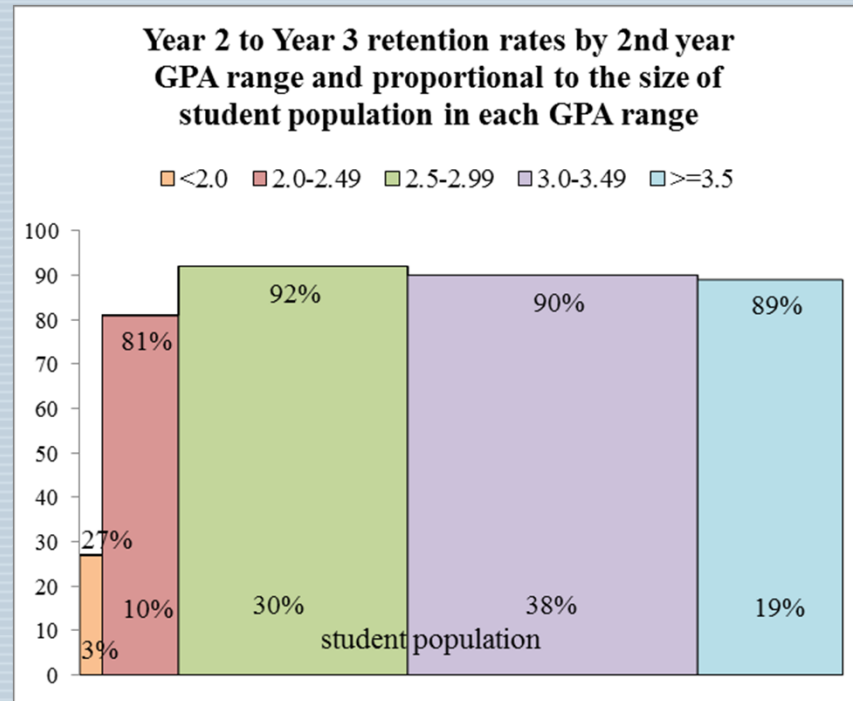


Regression Models Year 1 to Year 2



		Model 1	Model 2	Model 3
1st year GPA	<2.0	0.07***	.06***	0.06***
	2.0-2.49	0.70***	.64***	0.42*
	2.5-2.99	1.09	1.05	1.13
	3.0-3.49 (ref)	-	-	-
	>=3.5	0.83*	0.86	0.88
Sociodemographic Characteristics				
Gender	Male		1.31***	
	Female (ref)		-	
Race/ethnicity	American Indian		0.94	reference group
	Hispanic		1.37***	
	African American		1.54*	
	Asian American		1.45***	
	International		0.74	
	White (ref)		-	
	First generation			5.77**
	Not first generation			-
Interaction	1st generation*Belonging			0.63***
UCUES factors	Belonging			2.27**
	Financial concern			0.81*
R2 (Nagelkerke)		0.145	0.154	0.300
N of respondents		17083	15882	833
*p<.05; **p<.01; ***p<.001				

Second to Third Year Retention

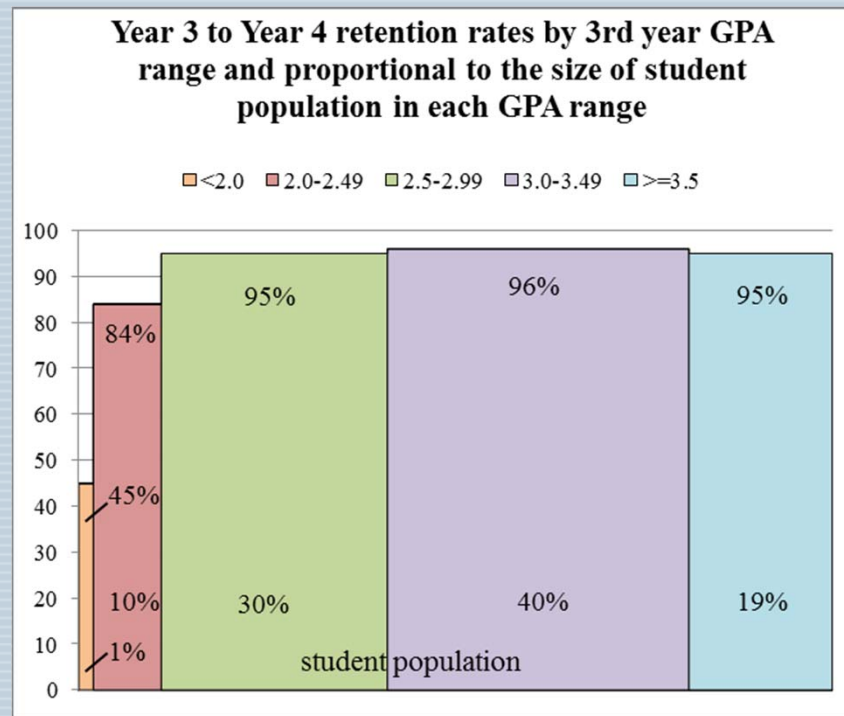


Regression Models Year 2 to Year 3



		Model 1	Model 2	Model 3
2nd year GPA	<2.0	0.04***	0.03***	0.06***
	2.0-2.49	0.48***	0.35***	0.57
	2.5-2.99	1.24**	1.10	0.95
	3.0-3.49 (ref)	-	-	-
	>=3.5	0.93	1.02	0.58
Academic Preparation				
HS GPA (quintiles)	1st (lowest)		0.72***	0.28*
	2nd		0.75**	0.70
	3rd		0.83*	0.55
	4th		0.74**	0.35*
	5th (ref)		-	-
Race/Ethnicity				
	American Indian		1.64	
	Hispanic		1.34**	0.20**
	African American		1.16	
	Asian American		1.01	1.17
	International		0.54	0.07
	White (ref)		-	-
Interaction terms				
	(GPA 2.0-2.49)*Hispanic		1.61*	
	(GPA 2.0-2.49)*African American		3.96*	
	(GPA 2.0-2.49)*Asian American		1.90***	
	(GPA 2.5-2.99)*Asian American		1.94***	
	(GPA >=3.5)*Hispanic		0.56**	
	(GPA >=3.5)*Asian American		0.51*	0.23*
	HSGPA 1st quint*Hispanic			11.53**
	HSGPA 4th quint*Hispanic			6.11*
UCUES factors				
	Belonging			1.32***
	Career Orientation			0.74***
	R2 (Nagelkerke)	0.12	0.135	0.22
	N of respondents	15,283	13,572	973
*p<.05; **p<.01; ***p<.001				

Third to Fourth Year Retention (or Graduation)



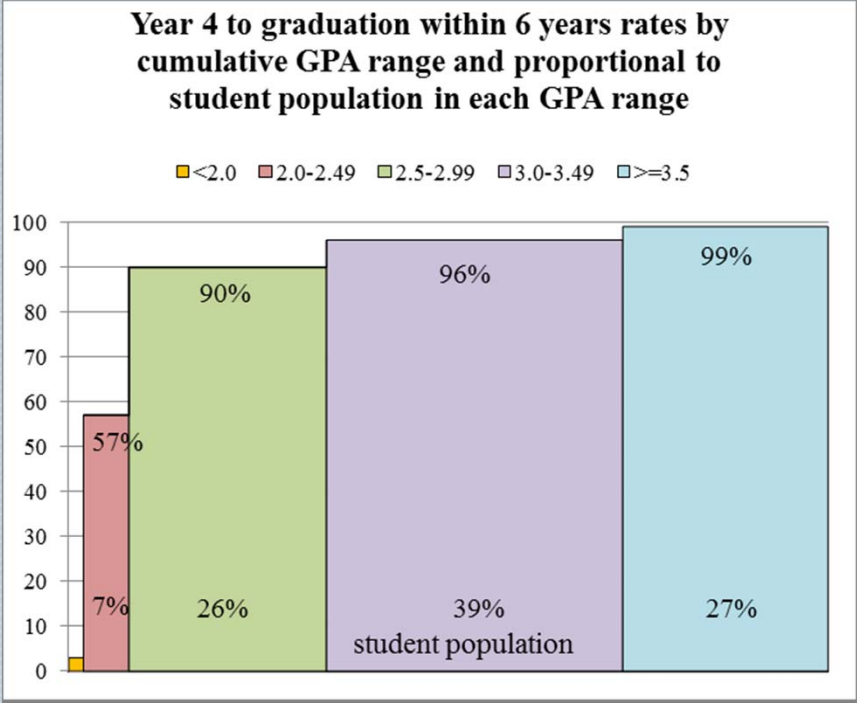
Regression Models Year 3 to Year 4



		Model 1	Model 2	Model 3
3rd year GPA	<2.0	0.04***	0.03***	low n
	2.0-2.49	0.24***	0.22***	0.17**
	2.5-2.99	0.88	0.77*	0.50
	3.0-3.49 (ref)	-	-	-
	>=3.5	0.88	1.07	0.29*
Academic Preparation				
SAT (quintiles)	1st (lowest)		1.92***	
	2nd		1.69***	
	3rd		1.64***	
	4th		1.30*	
	5th (ref)		-	
Race/Ethnicity				
	American Indian		1.25	-
	Hispanic		1.07	0.05*
	African American		1.15	-
	Asian American		1.81**	0.08*
	International		1.25	
	White (ref)		-	-
Interaction terms	(GPA >=3.5)*Asian American		0.49*	
UCUES factors				
	Gains in Non-quant. skills			1.35*
	Curricular foundations for reasoning			1.34*
	Quantitative Skills			0.98
Interaction terms	Quantitative skills*Asian American			2.38*
	Curriculum foundations*Hispanic			3.70*
	R2 (Nagelkerke)	0.098	0.113	0.415
	N of respondents	12961	11696	597

*p<.05; **p<.01; ***p<.001

Fourth Year to Six Year Graduation



Regression Models Year 4 to 6 Year Graduation



		Model 1	Model 2
Final GPA	<2.0	0.00***	0.00***
	2.0-2.49	0.06***	0.05***
	2.5-2.99	0.38***	0.34***
	3.0-3.49 (ref)	-	-
	>=3.5	4.39***	6.29***
Academic Preparation			
SAT (quintiles)	1st (lowest)		2.87***
	2nd		2.15***
	3rd		1.71***
	4th		1.38*
	5th (ref)		-
Sociodemographic Characteristics			
Race/Ethnicity	American Indian		0.6
	Hispanic		0.81
	African American		0.87
	Asian American		1.67***
	International		1.6
	White (ref)		-
	First Generation		0.63***
Unknown if 1st gen		0.71**	
Not first generation (ref)		-	
Interaction terms	(GPA >=3.5)*Hispanic		0.29**
	R2 (Nagelkerke)	0.293	0.314
	N of respondents	9603	8468

*p<.05; **p<.01; ***p<.001

Implications



- **Early identification and intervention for low academic performance**
- **Opportunities for challenges for the highest prepared and highest achieving students**
- **Getting students who make it to the upper division “across the finish line”**