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Impact on First Year Initiatives on Retention on Students: Are There Differences in Retention of Students by Ethnicity and Gender?

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Abstract

Project Succeed is a campus-wide initiative funded by the U.S. Department of Education. Its focus is to improve the 5-year graduation and retention rates and close the achievement gap for Under-Represented Minorities (URMs) across all majors at San José State University (SJSU). In addition, SJSU has a high percent of first generation students. We have several thrusts under this project: block scheduling, Faculty/Staff Mentor program, expanding Peer Educators, developing a First Year Experience Program, and developing more student living learning communities. This project is in its fourth year and we have analyzed each project effort with respect to its impact on the retention of freshmen and sophomore students. In this paper, we will analyze the overall results of our efforts as well as describe the retention rates of URM students in our project. We will compare the retention of students participating in block scheduling with students not active in our project to see if there are differences in retention and academic performance for engineering majors.

Introduction

San José State University (SJSU) is the oldest campus in California State University (CSU) system. SJSU is a public, comprehensive university offering bachelor's and master's degrees in 145 areas of study to more than 33,000 undergraduate and graduate students in seven colleges. SJSU is accredited by the Western Association of Schools and Colleges (WASC) and many different programs are accredited by program specific accrediting agencies. As one of the 23 campuses within the CSU system, SJSU is a leader in high-quality, accessible, student-focused higher education.

SJSU is located in San José, California, the heart of Silicon Valley and one of the most ethnically diverse locations in the United States. The 1.8 million residents of Santa Clara County are 44% white, 26% Asian, 24% Latino/a, and 3% African American. The county has had a pluralist majority for many years, with more Asian and Latino/a immigrants than any other Bay Area county. The vast majority (70%) of SJSU's incoming freshmen class comes from the greater San Francisco Bay Area; this brings us a diverse student body each academic year. SJSU is ranked ninth among universities in the Western United States in terms of ethnic diversity among colleges and universities conferring bachelor's and master's degrees [1]. Table 1 summarizes SJSU's undergraduate student ethnicity for the College of Engineering (CoE) and SJSU overall. Persistence in STEM majors is a problem nationwide as well as at SJSU [2] as many students abandon STEM majors at SJSU during their undergraduate years [3].

Table 1. Fall 2017 SJSU Undergraduate Student Ethnicity

	Engineering		SJSU Overall	
	Headcount	% Total	Headcount	% Total
African American	106	2.09%	942	3.4%
American Indian	4	0.08%	30	0.11%
Asian	2,024	40%	9,890	35.66%
Hispanic	1,022	20.2%	7,736	27.89%

Pacific Islander	25	0.49%	118	0.43%
White	855	16.9%	4,466	16.1%
Foreign	600	11.86%	2,096	7.56%
Other	424	8.38%	2,457	8.85%
Total	5,060		27,735	

Nationally, the college completion rate for students who started in four-year public institutions averages a little above 50%. In 15 states, the direction of the change in the college completion rate was actually positive, including California where the college completion rate for students who started in four-year public institutions increased by 1 to 2 percentage points [4]. Overall, the six-year graduation rate for California public universities for freshmen who entered Fall 2009 was 70.07%. If you look at graduation rates by ethnicity, the picture is different. White and Asian students have a 20% higher likelihood to graduate from college as compared to Hispanic and Black students [5].

At SJSU, overall, the retention and graduation rates are lower than similar universities. The first year retention rate is 86.8% (Fall 2015 entering freshmen) and the six-year graduation rate is 56.1% (Fall 2010 entering freshmen); these rates are also low compared to other CSUs. The one-year retention rates at SJSU also differ by ethnicity. At SJSU, there are many students who are first generation, URM and/or low income. 63% of SJSU students qualify for some kind of financial aid (loans, grants, scholarship, etc.) and 38% of SJSU students receive Pell grants. The university has a large number of first-generation students, with 27 percent of students identified as the first in their families to attend college, according to SJSU's Office of Institutional Effectiveness and Analytics' Student Profiles.

Nationwide, approximately 18% of students enrolled in public four-year institutions are first generation and low income students [6] with the fastest growing segment of the college population being low income students of color [7]. National statistics document that first generation, low income students who attended either a two-year or four-year institution were four times as likely to drop out of college after the first year. The Education Longitudinal Study, which tracked a sample of 15,000 students who were in 10th grade in 2002 [8], found that there were lower graduation rates (14%) among students from low social-economic status (SES) backgrounds as compared to students from high SES backgrounds (60%). Compared with other groups, first generation students are most likely to drop out of college and least likely to obtain a college degree in a timely manner [9][10].

Table 2. Bachelor's degree in engineering by ethnicity, overall U.S. numbers, 2016 [11]

	2010	2011	2012	2013	2014	2015
Black or African-American	4.5%	4.2%	4.2%	4.3%	3.5%	4.0%
Hispanic	7.0%	8.5%	9.0%	9.3%	10.1%	10.7%
Other	1.2%	1.6%	2.0%	2.3%	2.9%	3.1%
Asian American	12.2%	12.2%	12.2%	12.9%	13.1%	13.4%
White or Caucasian	69.8%	66.6%	66.2%	65.7%	65.9%	64.9%
Unknown	5.3%	6.9%	6.5%	5.6%	4.5%	3.9%

Despite the increasing numbers of college aged Hispanics in the United States, the percent who major and graduate in any engineering field remains low. According to the American Society for Engineering Education [11], in 2014, only 10.7% of the undergraduate

engineering degrees were awarded to Hispanic students and 4% to Black students (see Table 2). SJSU is a Hispanic serving institution and 20.2% of the undergraduate engineering students are Hispanic (see Table 1). However, the first year retention rates (for students starting in Fall 2015) for Hispanic engineering students at SJSU was 84.4% compared to 94.1% for Asian students and 86.8% for White students. The six year graduation rates (for students beginning in Fall 2010) by ethnicity for engineering undergraduate students differ dramatically: Asian students, 60.4%; Black students, 42.9%; Hispanic students, 32.1%; and White students, 47.3%.

In all STEM fields, SJSU loses many undergraduate students before graduation; among SJSU students with a declared STEM major upon entering the university, only about 39% obtain a STEM degree and another 18% obtain a non-STEM degree within 6 years. At SJSU, there is a gender gap in STEM, particularly in engineering. The percent of undergraduate women in engineering has increased from 2013 (13%) to 2015 (20%) and now is close to nationwide numbers [12]. SJSU women engineering students graduate in much lower numbers (a 6-year graduation rate of 50% for women versus 61% for men for Fall 2010 freshmen). SJSU institutional research indicates that fewer URM students persist in STEM majors and receive STEM degrees after six years than non-URM students at SJSU [13]. For students entering SJSU in Fall 2010, the 6-year graduation rate for URM students is 46% compared to 65% for non-URM students [14].

SJSU was successful in obtaining a U.S. Department of Education Strengthening Institutions grant in October 2014 to improve its retention and graduation rates. In a previous paper [15], Backer and Kato described the block scheduling initiative that was started in Fall 2015 as part of *Project Succeed*. SJSU's activities are comprised of four components: *Component 1: Implementing Block Scheduling; Component 2: Developing First-Year Experience Courses; Component 3: Expanding Mentoring Services; and Component 4: Institutionalizing Student Living Learning Communities*. Many of these components are inter-related and work in unison to meet our three overall goals: Goal 1. Strengthen SJSU's core academic performance in two key areas: retention and graduation, Goal 2. Providing campus supportive environment for underrepresented students, and Goal 3. Improve delivery and integration of academic and co-curricular support services for students to enhance student success and improve retention and graduation rates. Since the most mature initiative at SJSU is block scheduling, this paper will focus on the differences in the success of block scheduling by student group.

Results

In Fall 2015, newly matriculated freshmen in the College of Business, the College of Engineering, and Child and Adolescent Development (CHAD) were assigned schedules including at least two shared classes with other students in their declared majors. Those students and several additional groups were also assigned Peer Mentors, some students participated in Living Learning Communities, and some received all three treatments.

The largest initiative in Fall 2015 was block scheduling of the two colleges and one department. The Faculty/Staff Mentor program was piloted in Fall 2016 and Spring 2017. In Fall 2017, we opened it up to all Faculty and Staff campuswide. We now have a total of 378 Faculty and Staff and 200 students enrolled in this program. The third initiative under this project was increasing the number of peer mentors in classes at SJSU. During the Fall 2015 semester, 9 peer educators were assigned to work with frosh-only courses in blocked scheduling cohorts to develop smaller student learning communities. The mentors were assigned to public speaking

courses. Over the past two years, the number of peer mentors has increased: 49 peer educators in Fall 2016 and 78 in Fall 2017. SJSU's Peer Connections has moved towards institutionalizing peer educators throughout the university. In doing so, we now have five different roles for peer educators: Peer Mentor, Embedded Tutor, Supplemental Instruction Leader, Learning Assistant, and Classic Tutor.

The block scheduling initiative was started in Fall 2015 and we have collected two years of data on the retention of the Fall 2015 cohort. Reporting the most basic descriptive statistics, and using a simple one-tailed, 2 sample t-test, differences between the groups of students who were in the blocked schedules and those who were not are shown below in Table 3. After two years, blocked students (80.3%) were retained at higher numbers than unblocked students (76.1%).

Table 3. One and two year retention of blocked and unblocked students at SJSU (Fall 2015 freshmen).

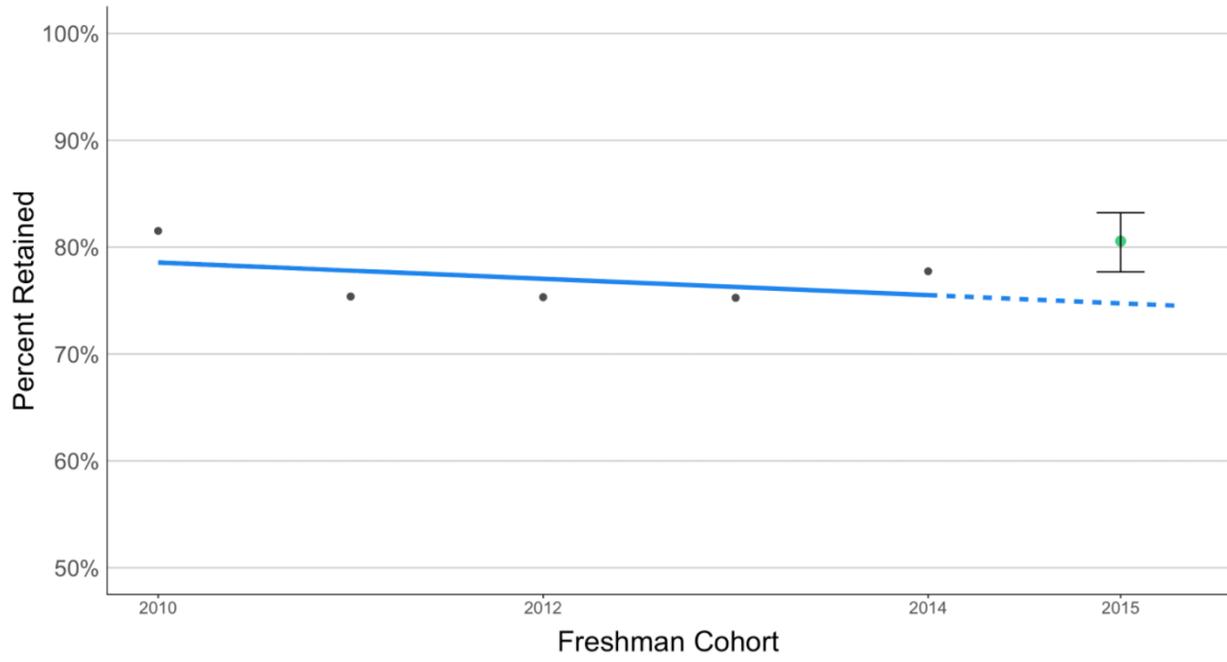
	Blocked	Unblocked			Blocked	Unblocked	
Total enrolled Fall 2015	1,272	2,198			1,272	2,198	
Retention after 1 year	1,136	1,877		Retention after 2 years	1,022	1,672	
% Retention	89.3%	85.4%	$p < .001$	% Retention	80.3%	76.1%	$p < .002$
SJSU units earned	24.8	23.1	$p < .001$	SJSU units earned	51.4	50.8	$p < .05$
SJSU GPA	2.872	2.899	$p < .149$	SJSU GPA	2.94	3.05	$p < .001$
Probation	95	160		Probation	38	41	
% Probation	7.5%	7.3%	$p < .421$	% Probation	3.7%	2.5%	$p < .04$
Disqualified	31	48		Disqualified	79	94	
% Disqualified	2.4%	2.2%	$p < .317$	% Disqualified	6.2%	4.3%	$p < .01$

The difference in percentage of students enrolled after census in the fifth semester (retained) is highly significant, while the number of units earned during the first two years is significant for the blocked group as compared to those in the unblocked group.

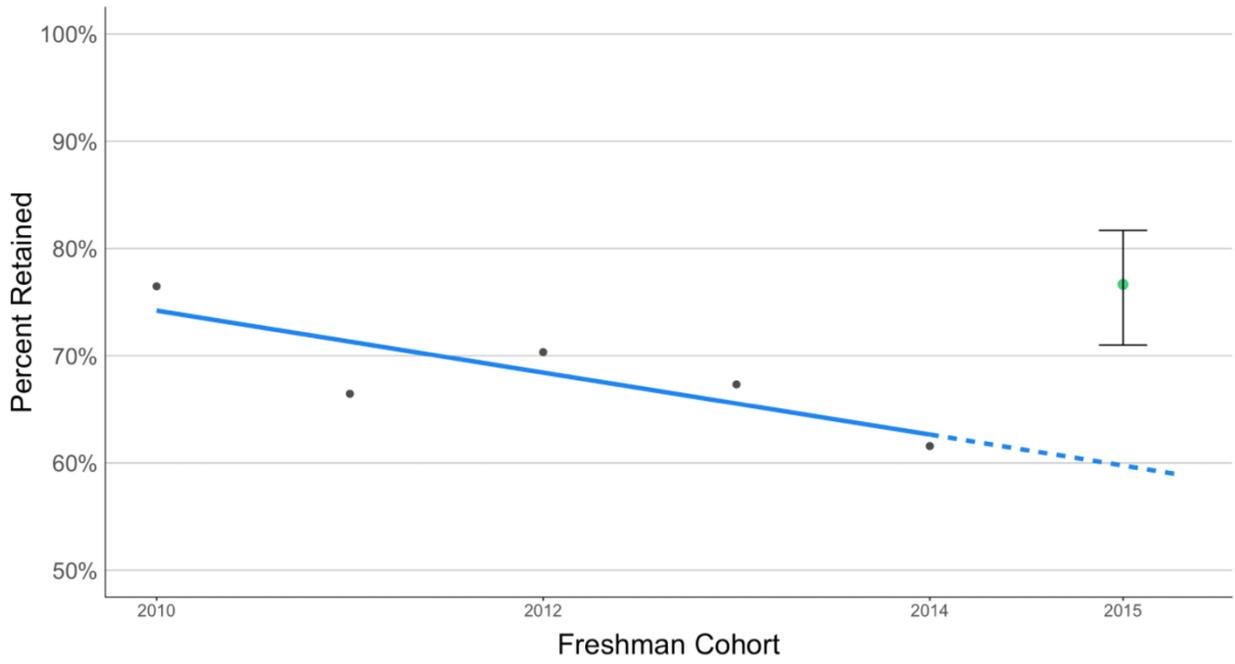
To explore the impact of blocked classes longitudinally, we compared two-year retention rates of engineering students from the 2015 entering cohort to the two-year retention rates of previous engineering cohorts at SJSU. Figure 1A shows this data plotted for the previous five cohorts (students entering the college from 2010-2014), as well as the 2015 entering cohort (which participated in blocked class scheduling). As can be seen from the figure, the 2-year retention rate for the 2015 (blocked) cohort is above what would be expected based on a best fitting regression line from the previous five cohorts (chi-square value = 7.77, $p = .005$).

Similar findings were obtained when conducting separate longitudinal analyses of traditionally underrepresented subgroups, such as URM students and females (see Figures 1B and 1C, respectively). Specifically, two-year retention rates were statistically higher for URM students in the 2015 entering cohort than what would be expected based on a linear regression line from previous cohorts (chi-square value = 15.85, $p < .001$), and there was a trend for higher retention rates in female students using the same analysis (chi-square value = 2.70, $p = .100$).

A)



B)



C)

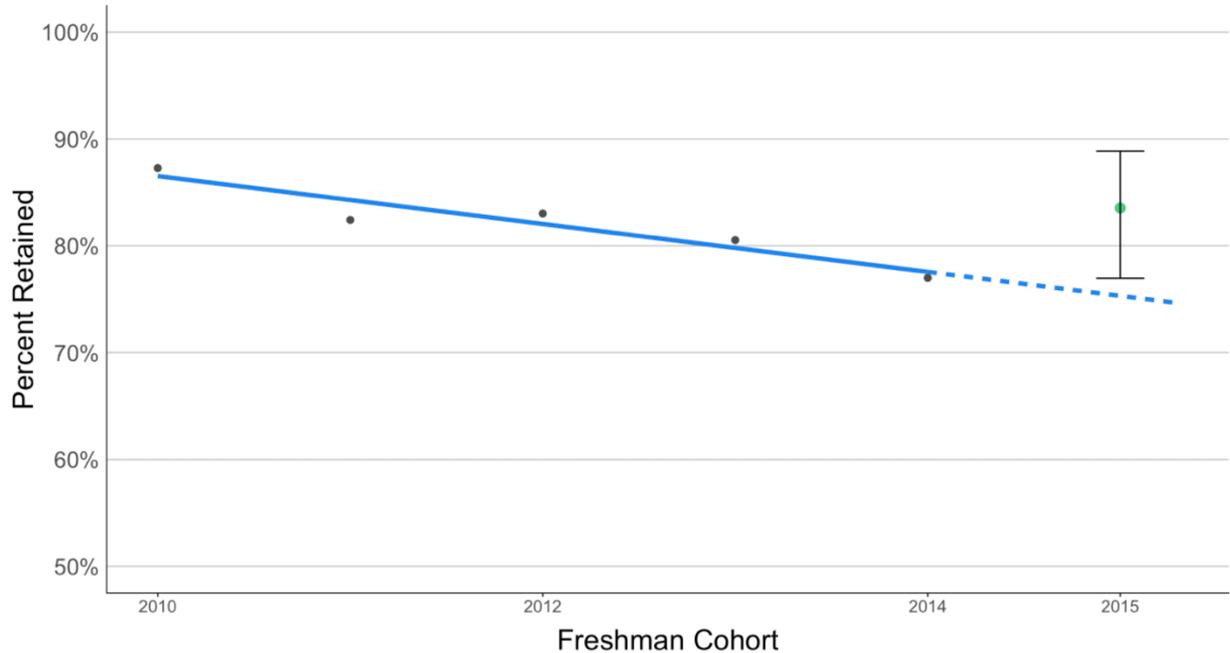


Figure 1. Two-year retention rates for 2010-2015 entering cohorts for (A) all engineering students, (B) URM engineering students, and (C) female engineering students. In each plot, a linear regression line is fit to the two-year retention rates from the 2010-2014 entering cohorts, and is projected out to the 2015 entering cohort. The green dot represents the actual two-year retention rate in the 2015 entering cohort. Error bars represent 95% confidence intervals based on the exact method [16].

Retention Rates by Ethnicity

The three largest ethnic groups in SJSU’s College of Engineering are Asian, Hispanic and White students. Overall, the total number of engineering URM freshmen students in Fall 2015 was 248; this represents 3 Native American students, 26 African-American students, 10 Hawaiian students, and 209 Hispanic students. In addition to the URM students, there were 364 Asian students, 131 Caucasian students and 74 decline-to-state students enrolled as freshmen engineering students at SJSU.

As discussed above, all of the students were block scheduled in Fall 2015 in at least two or three classes with other engineering freshmen students. Students who were math-ready for engineering (enrolled in at least Calculus I) were block scheduled into three classes: their math classes, lab sections of the *Introduction to Engineering* class and an *Introduction to Communication* class (Comm 20, which is in Area A1 of SJSU’s General Education program). Students who were not eligible for Calculus I were block scheduled into two classes: the appropriate mathematics class (for example, Precalculus) and an Area A1 class.

Table 5 displays the one-year retention rates for engineering freshmen by ethnicity. Our three largest groups among freshmen engineering students at SJSU are Asian students, Hispanic students and Caucasian students. The one-year retention rates for all of these groups increased in Fall 2015 as compared to the Fall 2013 and Fall 2014 cohorts except for the Caucasian students who had a higher one-year retention rate in Fall 2014. When comparing the one-year retention

rates for female and male engineering freshmen, block scheduling appears to have a larger effect on male students. Overall, the number of the number of engineering students retained in all three subgroups (Asian, Hispanic and Caucasian) is significantly higher than the Fall 2013 entering freshmen.

Table 5. One year retention of all Engineering students at SJSU (Fall 2013-Fall 2015 freshmen).

	Fall 2013	Fall 2014	Fall 2015
All Freshmen	857	656	817
Overall Rate	86.5%	87.7%	89.8%
Female	113 students (89.4%)	113 students (90.3%)	164 students (90.2%)
Male	744 students (86.0%)	543 students (87.1%)	653 students (89.7%)
URM Students	230	168	248
American-Indian	0.0%	100.0%	100.0%
African-American	86.1%	76.9%	93.8%
Hispanic	79.8%	77.9%	84.4%
Non-URM students	525	378	422
Asian	92.1%	91.6%	94.1%
Pacific Islander	87.5%	100.0%	100.0%
Caucasian	81.2%	90.2%	86.8%
Other	102	110	147
Foreign	90.40%	94.20%	93.60%
Other (decline to state)	84.00%	86.20%	88.40%

Conclusion

Project Succeed appears to be working towards its aim of increasing the retention and graduation rates of freshmen at SJSU. The first initiative in Fall 2015 was block scheduling. Both engineering and all other students who were block scheduled showed significantly higher one and two year retention rates at SJSU. We will continue to track the three+ retention rates for our initial cohort as well as the students block scheduled in Fall 2016 and Fall 2017.

The other components of this project—Faculty Staff Mentor Program, Peer Mentoring, Learning Learning Communities, and a First Year Experience program—are in various stages of development. We expect to be able to assess the effectiveness of the remaining components using the Fall 2017 entering freshmen. Our plan is to determine which components are most effective for SJSU students so that these programs can continue after our U.S. Department of Education funding is ended.

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