

# Effect of cohorts on student retention in engineering

## 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). There are three major goals: strengthen SJSU's core academic performance in retention and graduation; provide an improved supportive environment for URM students; and enhance the delivery and integration of academic and co-curricular support services.

For Fall 2015, newly matriculated students in the College of Business, College of Engineering, and Child and Adolescent Development Department (CHAD) were assigned schedules that included at least two shared classes with other students in their declared majors. A total of 1,272 new freshmen (37%) of the class participated in the block scheduling program. The block scheduling approach had a significant difference in student retention among engineering freshmen as compared to previous years and led to more retention of freshmen after one year. For students in the College of Business, the one-year retention rate for Fall 2015 freshmen was 88% compared to 87.4% for Fall 2014 freshmen. For students in the College of Engineering, the one-year retention rate for Fall 2015 freshmen was 90% compared to 87.5% for Fall 2014 freshmen. For CHAD students, the one-year retention rate for Fall 2015 freshmen was 90.3% compared to 81.4% for Fall 2014 freshmen. There was also a difference in the retention of URM students. In this paper, we will discuss the techniques and strategies used in block scheduling the engineering students in Fall 2015 and Fall 2016. Also, we will discuss the results of student opinion of block scheduling.

## Introduction

SJSU is the oldest campus in California State University (CSU) system. SJSU is a fully-accredited, public, comprehensive university offering bachelor's and master's degrees in 134 areas of study to more than 27,000 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.

The extraordinary diversity of Santa Clara County and the City of San José provide the primary context for our student body. The 1.8 million residents of Santa Clara County are 33% white, 35% Asian, 27% 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.

**Table 1.** Fall 2015 Student Characteristics of SJSU. Total Enrollment of 32,773 students (82% Undergraduate)

Asian	10,519	32.1%	5,635	4,884
Pacific Islander	115	0.4%	59	56
Hispanic	7,601	23.2%	3,429	4,172
Total Minority	19,291	58.9%	9,634	9,657
White	6,511	19.9%	3,380	3,131
Foreign	3,985	12.2%	2,177	1,808
Other/Decline to State	2,986	9.1%	1,556	1,430

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]. In Fall 2015, 19,291 (58.9%) of the 32,773 SJSU students were from racial/ethnic minority groups. The largest ethnic group was Asians (32.1%), and the next largest groups were Latino/as (23.2%) and white students (19.9%). Figure 1 above summarizes SJSU's student characteristics as of Fall 2015.

SJSU ranks comparatively low against similar universities in terms of six-year graduation rates. The first-year retention rate for Fall 2013 was 86.4% for all SJSU students and 86.5% for SJSU engineering students. The six-year graduation rate was 48.1% for Fall 2010 engineering students and 56.1% for all Fall 2010 entering freshmen which is less than comparable CSU campuses. While we have made great improvements in six-year graduation rates, not all students share the benefits of that progress. SJSU reported a six-year graduation rate of 56.8 percent in 2015, up nearly 10 percentage points in just the last few years. The university's four-year graduation rates remain stubbornly low at 10 percent.

Graduation rates for underrepresented minority (URM – Black or African American, Hispanic/Latino and Native American) students are increasing at a slower rate than non-URM students, a national trend. SJSU's six-year graduation rates for URM students is 44 percent. Between 2003-2013, 77 percent of universities in the United States increased URM graduation rates, but only 45.7 percent were successful in decreasing the gap between URM and non-URM students, according to a report by the Education Trust [2] that reviewed more than 255 institutions.

The nation faces an imperative to produce an educated workforce accompanied by more than a trillion dollars in outstanding student loan debt that is often debilitating for those who do not complete college, SJSU is not alone in the quest to improve graduation rates. The CSU launched a system-wide Graduation Initiative in 2009 [3] to improve six-year graduation rates and reduce the gap between URM and non-URM student graduation rates. As the 2015 initiative wrapped up, the Chancellor's Office launched CSU Graduation Initiative 2025 with a student success dashboard to track progress of each campus as they increase six-year and four-year graduation rates, and decrease the attainment gap between URM and non-URM students.

To collect more information on our students, SJSU surveyed first-time freshmen who left SJSU before completing their degrees. The study looked at demographic data of all first-time freshmen who began their studies at SJSU in fall 2012, fall 2013 and fall 2014. Of the students who enrolled in the fall for those three years, 14 percent were stopouts or dropouts by spring or summer 2015.

The students who left campus included those in good standing (47 percent), on probation (21 percent), on continuing probation (3.8 percent) or who were disqualified (27 percent). The top reasons drop-out students listed for leaving included difficulty enrolling in classes, SJSU was not what they expected, family or personal problems, and not feeling connected to campus. This paper reports on one project at SJSU, *Project Succeed*, which was funded under the *Strengthening Institutions* program from the U.S. Department of Education in 2014. *Project Succeed* is focused on increasing the sense of belonging for freshmen at SJSU.

The *Project Succeed* plan is designed to strengthen SJSU’s campus climate and provide freshmen and sophomores with a culture that promotes academic and social success. This kind of campus climate will also promote undergraduate success with the goal of increasing retention and graduation rates, as well as closing the achievement gap for Under-Represented Minority (URM) students at SJSU. SJSU’s Title III *Project Succeed* proposal has over-arching goals that form the context for improving student experience at SJSU.

**Table 2.** Five-Year (2014-2019) *Project Succeed* Goals and Objectives

<b>CDP Goal 1.</b> Strengthen SJSU’s core academic performance in two key areas: retention and graduation.
Objective 1.1. By Fall 2019, SJSU will increase freshman to sophomore student retention by 5%.
Objective 1.2. By Fall 2019, SJSU will increase the 6-year graduation rate by 9% for all first-time frosh.
Objective 1.3. By Fall 2019, for upper division transfers, SJSU will increase the 5-year graduation rate by 6%.
<b>CDP Goal 2.</b> Providing an academically supportive environment for underrepresented students.
Objective 2.1. By Fall 2019, SJSU will increase the freshman to sophomore retention for URM frosh by 12%.
Objective 2.2. By Fall 2019, SJSU will increase the 6-year graduation rate of URM frosh by 12%.
Objective 2.3. By Fall 2019, SJSU will increase the 5-year graduation rate of URM upper division transfer students by 12%.
<b>CDP Goal 3.</b> Improve delivery and integration of academic and co-curricular support services for students to enhance student success and improve retention and graduation rates.
Objective 3.1. By Fall 2019, we will develop and implement Living Learning Communities for 1,000 URM frosh.
Objective 3.2. By Fall 2019, we will implement block scheduling for all incoming URM frosh.
Objective 3.3. By Fall 2015, we will implement a Faculty Mentor Program for incoming URM frosh.
Objective 3.4. By Fall 2017, we will coordinate our student success programs & provide a one-stop shop about student success programs to students, advisors, and faculty.

Our *Project Succeed* components are based on effective research practices developed at SJSU and other institutions. Our overarching theoretical model for student retention is based on Vincent Tinto's model [4]. Tinto's model posits student retention as a complex, multifaceted environment where students' background characteristics and educational goals all contribute to student engagement. According to this model, effective and positive interactions in college should increase the student's commitment, persistence and effort in college, and thereby, increase student retention.

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. This paper will discuss the implementation and results of *Component 1: Implementing Block Scheduling* for freshmen students in SJSU's College of Engineering.

*Component 1: Implementing Block Scheduling* is designed to foster a sense of community among freshmen high-need students through the organization of students into student learning communities. We adapted the existing FYE block scheduling models from other institutions [5] to create close-knit communities among freshmen students that additionally satisfy GE requirements.

## Review of the literature

Research shows that student learning communities (SLCs) lead to increased student engagement on campus and increased retention and graduation rates [6]. Many diverse students benefit from being placed in learning communities [7] with purposeful integration into the university environment [8]. For example, Georgia State University, found that students in a SLCs had higher GPAs and higher graduation rates than non-SLC students [9]. In a longitudinal study of thirteen two-year and six four-year institutions, Engstrom and Tinto [10] found that, across institutions, students who participated in SLCs were more engaged in the classroom, had higher freshmen to sophomore retention rates, earned more credits, and perceived greater encouragement and support on campus. For example, a program at Kingsborough Community College put freshmen into blocked cohorts with up to 25 fellow students who took three classes together in their first semester [11]. They found that the blocked students passed more courses and had more earned units than unblocked students. As a result, first-year students feel a sense of community and belonging to an institution with embedded peer activities and components throughout their academic pathway that motivates them to continue in college.

In general, there is more attrition in engineering than in non-STEM disciplines and engineering attrition generally happens in the first two years of enrollment [12]. Block scheduling has been tested at several engineering schools over the past two decades. At the University of Buffalo,

freshmen engineering students were registered into a block of classes with the same classmates. They found that blocked scheduling led to a higher retention rate [13]. At the University of Alabama, freshmen engineering students took their mathematics and science classes with the same group of students. Student participating in this program graduated from engineering disciplines in significantly higher numbers as compared to matched students with similar pre-college academic performances [14].

## Methodology

At SJSU, all new freshmen attend a required orientation program. The segments of this program that provide basic academic advising and first semester course registration are managed by the General Education advising group, Academic Advising and Retention Services. Students are grouped by college for these segments so that college-specific variations in GE patterns can be easily addressed. In addition, registration occurs in each college's computer labs with assistance from college faculty, college success center advisors, and peer advisors. Each student is provided with a computer generated standard worksheet showing the recommended first two semesters of classes for the student's major.

For Fall 2015, all newly matriculated freshman students in the College of Business, College of Engineering, and Child and Adolescent Development Department were assigned schedules that included at least two shared classes with other students in their declared majors. These colleges and this major were chosen because the administrators in these programs expressed interest and requested to be involved from the first year. Blocked classes included at least one major class and one General Education class chosen in consultation with the Associate Dean for Business, the Undergraduate Associate Dean for Engineering, and the Department Chair for Child and Adolescent Development. Numbers of estimated needed spaces/expected enrollment for each college/major were determined using a database of those who have declared intent to enroll, registered for an orientation session, and paid for that session. This database includes pertinent information from the admissions application as well as placement test scores in math and English, AP scores, and any college level work completed in concurrent high school/community college programs. A total of 1,272 new freshmen (37% of the incoming freshman class) participated in the block scheduling program.

For classes outside the major department, agreements were established between the administrator in charge of block scheduling and the department chairs of other departments, such as Mathematics and Communication Studies, to allocate the appropriate estimated number of seats for these students. Those participating departments either designated specific sections of their chosen classes or, in the case of large sections, either artificially lowered the seat limit of the section or, when there was a linked subsection such as an activity class or lab class, designated the specific smaller sections. The administrator managing the block scheduling was then allowed to provide permission codes to those students for those extra seats or specific sections. In addition to the standard worksheet showing the recommended first two semesters of classes for the student's major provided to each incoming freshman, students in the blocked majors were provided with an additional sheet with the identified class section and permission code they would use for the block scheduled classes during the registration process. Students were free to choose their additional 2-3 classes to complete a full-time schedule.

Because the prerequisite string and required knowledge base for Engineering is heavily math dependent, the 818 College of Engineering incoming freshmen were assigned to classes based on their math placement as determined by ACT or SAT math subscores, AP scores, the SJSU math placement exam, or previous college class completion by those in concurrent high school/community college enrollment programs. All students who were General Education math and English ready as defined by California State University Executive Order based on the aforementioned scores were provided with permission codes for specific sections of math, pre-calculus through calculus III levels. Half of these students were provided permission codes for Engineering 10, an *Introduction to Engineering* class, a major requirement class that also carries a General Education designation. Half of these students were assigned to a General Education public speaking class. Some students were assigned in cohorts to an additional General Education class, such as freshman composition. College of Engineering students who were assigned remedial status in math and/or English were assigned to the appropriate developmental class and a General Education public speaking class.

For the College of Business, the 391 incoming freshmen were provided permission codes for a business class, either the Money Matters class, a major requirement that also carries a General Education designation, or the Introduction to Leadership & Innovation class. They were also all assigned a General Education public speaking class. The 63 incoming freshmen for Child and Adolescent Development were assigned to a Child Development class, a major requirement that also carries a General Education designation, and a General Education public speaking class.

Some of the designated class sections had assigned Peer Mentors who met with the students during the first semester. In addition, for both Engineering and Business, some students in those majors had chosen campus housing in living/learning communities dedicated to either Engineering or Business. Students in those groups were scheduled together in sub-cohorts and were also provided with Peer Mentors.

Fall 2016 was the second year we block scheduled all new freshmen in the College of Business, College of Engineering, and Child and Adolescent Development Department. For Fall 2016, freshmen from the Department of Music were added. A total of 956 new freshmen (29.8% of the incoming freshman class) participated in the block scheduling program. The classes chosen again followed the pattern of a class required in the major and another that fulfilled a General Education requirement, most often the foundational public speaking class. As much as possible, we used General Education classes that were major specific, such as the math requirement for Engineering or the Child Development for those in the Child and Adolescent Development major.

Based on our experience in Fall 2015, in Fall 2016 we block scheduled only 2 classes and focused on refining the block scheduling process. We deliberately wanted to balance the cohort experience with other students in the major with classes shared with students in other majors. We also chose not to create the entire schedule both to leave some choice as to topic and schedule to the students and to provide them the opportunity to experience the registration system they would need to use in subsequent semesters. We preregistered students for the blocked classes and increased proactive communication with instructors regarding block scheduling, peer

mentors, etc. Preregistration was accomplished using the Block Enrollment function in Oracle/Peoplesoft, our student records management program. A service indicator was placed to allow additions to the schedule but prevent drops so that students could only change the schedule after consultation with an advisor.

Again students were block scheduled into one major class and one General Education class. Classes to be block scheduled were again chosen in consultation with the College Associate Dean (Business and Engineering) or Department Chair (CHAD and Music). For Engineering students, students in calculus I or higher were placed into the appropriate math class and the Engineering 10 class. Those who placed into pre-calculus or lower in math were placed into the appropriate math class and the public speaking class. Business students who were General Education math ready were block scheduled into the Introduction to Leadership & Innovation class and either macro- or microeconomics. Anyone in remedial math status was scheduled into the appropriate math class and Introduction to Leadership & Innovation. Child and Adolescent Development majors were scheduled into Lifespan Development in the 21st Century, a major class with a General Education designation, and the public speaking class, while Music majors were scheduled into Music in World Cultures, a major class with a General Education designation, and an additional General Education class.

For Fall 2017 we will continue block scheduling with the prior groups and add majors in the College of Science (Biology and Computer Science), the College of Social Science (Economics), the College of Applied Sciences and Arts (Health Science), and Undergraduate Studies (Undeclared-PreNursing). We expect to block schedule roughly 1700 of 4000 incoming freshmen (42.5%) and will continue the pattern of creating student cohorts using one major specific class (which in most cases also carries a General Education designation) and one General Education class.

## Survey

To assess student opinion about the block scheduling and other *Project Succeed* efforts, we created a survey that was distributed to all freshmen blocked students in Spring 2016. After we received IRB approval, we sent an email to all selected Fall 2015 asking them to complete this survey. Approximately two weeks later, we sent a reminder to those who did not complete the survey. A second and last reminder was sent two weeks after this.

The survey was divided into several sections that related to the various parts of our project: background demographics, block scheduling, peer mentors, and student learning communities. The questions related to the background demographics and block scheduling are included in the appendix to this paper.

## Participants

Comparisons of participant characteristics for blocked and unblocked students show some expected differences with the majors with blocked schedules having a higher percentage of males and of non URM (under-represented minorities). URM at our institution is defined as Pacific Islander, Native American, Black, and Hispanic based on student's self-identification.

Non-URM groups at SJSU include students who self-identified as White, Asian, or Not Specified. The gender breakdown was 33.8% female (430) and 66.2% male (842) of those in the blocked schedules as opposed to 54.5% female (1198) and 45.5% male (1000) of those not in blocked schedules. Gender breakdown for the entire freshman class was 46.9% female (1628) and 53.1% male (1842). The URM breakdown was 30.6% URM (389) for those in blocked schedules and 34.3% URM (754) for those not in blocked schedules. The URM breakdown for the entire freshman class was 32.9% URM (1143).

Comparisons of standardized test score and subscore averages and high school grade point average for the blocked and unblocked groups are in the table below. As we might expect, students declared in Engineering and Business had higher average subscores in the math portions of both the ACT and SAT. The averages of other subscores and high school grade point averages, however, are very close.

**Table 3.** Demographic Data for Blocked and Unblocked Freshmen, Fall 2015

	ACT Math	ACT Science	ACT English	ACT Reading	ACT Composite	SAT Math	SAT Verbal	HS GPA
blocked	25	23	23	23	24	566	517	3.483
unblocked	23	23	22	23	23	532	512	3.400
Engr majors only	26	24	23	23	24	589	524	3.520

## Results

Under-represented minority students had different percentages in the blocked vs. unblocked groups. As discussed above, the URM breakdown was 30.6% URM (389) for those in blocked schedules and 34.3% URM (754) for those not in blocked schedules. For Engineering in particular, 256 (31.3%) of students were in the URM group, while 562 (62.7%) of students were not.

Overall, data suggests improvement for URM students in block scheduling. 41.3% of URM students from the Fall 2015 class earned 24 or more degree applicable units at the end of the first year as compared to 36.2% of URM students from the Fall 2014 class. 45.2% of Engineering students self-identified as URM earned 24 or more degree applicable units in Fall 2015. That same number of the Fall 2014 Engineering freshmen was 35.7%. For the Fall 2015 class 333 (85.6%) of URM students in block scheduled majors were retained at the end of the first year, while 592 (78.5%) of URM students on majors that were not block scheduled were retained at the end of the first year. 223 (87.1%) of Engineering students self-identified as URM were retained at the end of the first year.

Low academic performance data among the URM students as indicated by academic probation and academic disqualification numbers and percentages for the 3 groups followed a similar pattern, with 32 (8.2%) of those in blocked schedules, 81 (13.8%) of those not in blocked schedules, and 70 (8.6%) of URM Engineering students on probation. 12 (3.1%) of those in blocked scheduling were academically disqualified due to inadequate academic performance. after 2 semesters. 28 (3.7%) of those not in blocked scheduling were academically disqualified

after 2 semesters. 7 (2.7%) of Engineering students were disqualified.

The largest URM group at our institution is composed of students who self-identify as Hispanic, 923 of the 1143 students in the URM group (80.8%). This subgroup showed the greatest differences among the URM groups. 322 Hispanic students (34.9%) were in blocked schedules as opposed to 601 students (65.1%) who were not in block scheduling. 274 (85.1%) of those in blocked schedules were retained at the end of the first year, while 467 (77.7%) of those not in blocked schedules returned for the second year. Hispanic students in the blocked group earned an average of 23.1 degree applicable units during the first year, and those not in the blocked group earned an average of 21.2 units. The difference in the number of Hispanic students in each group on academic probation at the end for the first year was also significant, with 25 (7.8%) of those in blocked schedules on probation and 65 (10.8%) of those not in blocked schedules on probation. The 217 Engineering students who self-identify as Hispanic showed similar results. 187 (86.2%) of these students were retained at the end of the first year, 5 (2.3%) were academically disqualified, and 20 (10.6%) were on academic probation.

Although the retention, units earned, and probation differences for the other URM groups between those with blocked and not blocked schedules were not as large, the other 3 groups (Pacific Islander, Native American, and Black) had higher retention percentages, earned more units at the end of the first year, and had fewer students on probation among the students with blocked schedules.

Reporting the most basic descriptive statistics, and using a simple one-tailed, 2 sample t-test, there are significant differences between the groups of students who were in the blocked schedules and those who were not from the Fall 2015 freshmen cohort. The difference in percentage of students enrolled after census in the third semester (retained) is highly significant, as is the number of units earned during the first year for the blocked group as compared to those not in the blocked group. Other differences are not significant.

For purposes the comparisons below, retention is defined as being enrolled at SJSU the third semester, regardless of whether a student changed major. The continuous variable used in the t-test is the percentage of students in each group who enrolled in the third semester. For Engineering in particular, 31 of 818 students (3.8%) changed to a major outside of the College of Engineering by the third semester. 23 of the 818 students (2.8%) changed their major by choice, while 8 (1%) were disqualified from the Engineering major and moved to Undeclared. Students may be disqualified from the major either due to low academic performance in the major classes (math and physics in particular) or because the student changed their classes to those outside the Engineering major working toward a change of major.

**Table 4.** Results of Block Scheduling for Fall 2015

	<b>ENGR (all blocked)</b>	<b>All Majors Blocked</b>	<b>All Majors Unblocked</b>	<b>Percent Blocked</b>	<b>probability blocked vs unblocked</b>
Total enrolled Fall 2015	818	1272	2198	37%	
<b>Retention at SJSU</b>	736	1136	1877		

<b>after 1 year</b>				
% Retention	90.0%	89.3%	85.4%	$p < .001$
<b>SJSU units earned</b>	25.1	24.8	23.1	$p < .001$
SJSU GPA	2.814	2.872	2.899	$p < .149$
<b>Probation</b>	70	95	160	
% Probation	8.6%	7.5%	7.3%	$p < .421$
<b>Disqualified</b>	20	31	48	
% Disqualified	2.4%	2.4%	2.2%	$p < .317$

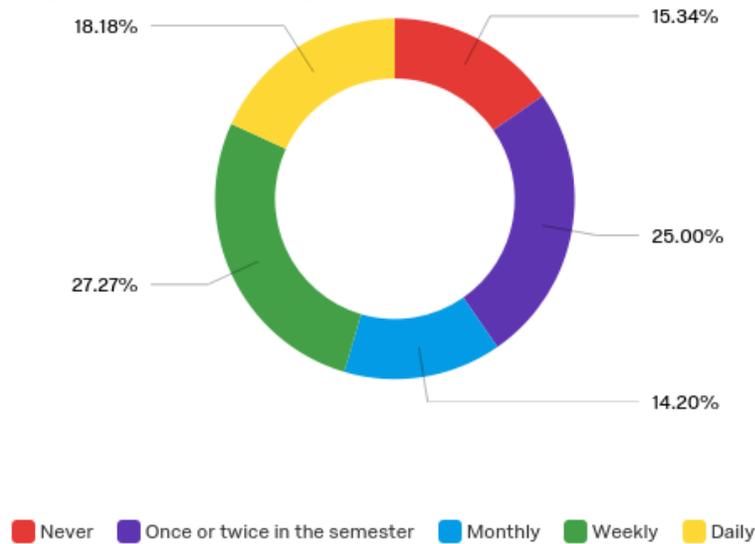
Block scheduling appeared to have a positive impact on the one-year retention of students at SJSU. In 2013 and 2014, the one-year retention of freshmen engineering students was 86.8% and 87.5%, respectively. For the Fall 2015 block scheduled freshmen engineering students, the one-year retention rate was 90%. For students in the College of Business, the one-year retention rate for Fall 2015 freshmen was 88% compared to 87.4% for Fall 2014 freshmen. For CHAD students, the one-year retention rate for Fall 2015 freshmen was 90.3% compared to 81.4% for Fall 2014 freshmen.

Block scheduling also appeared to have a positive impact on the percentage of students who earned 24 or more degree applicable units during the first year. 58% of the Fall 2015 block scheduled engineering freshmen earned 24 or more units during the first year, as compared to 51.2% of the Fall 2014 engineering freshmen. 59.5% of the the Fall 2015 block scheduled business freshmen earned 24 or more units during the first year, as compared to 51.5% of the Fall 2014 business freshmen.

We surveyed the Fall 2015 freshmen to determine their perspectives about block scheduling as well as the other *Project Succeed* initiatives. Three hundred forty (340) students initiated the survey. Of those 340 students who initiated the survey, 309 agreed to participate (91%). However, of those 309 students who agreed to participate, only 262 (85%) answered any survey questions beyond the initial question of consent. Thus, of the 340 who initiated the survey, only 77% responded to any of its items. 176 of the students who completed the survey were freshmen in the College of Engineering.

Survey results indicate that students generally had a positive appraisal of the block scheduling program. Over half of engineering students surveyed reported that they liked being in blocked scheduling, with an additional 22% as neutral about it. 85% of the freshmen engineering said they interacted with other students from their block at least once during the semester outside of class with 45% interacting with the blocked students either daily or weekly (see Figure 4). Most of the engineering students (61.93%) planned to keep in touch with the other engineering students in their block and 32% of the engineering students scheduled their Spring 2016 classes with other students from their block.

**Figure 1.** Responses of Engineering Freshmen to Survey Question: Outside of class, how much did you interact with any other students from your block?



## Conclusion

By 2025, SJSU expects to meet the target of 57 percent for six-year graduation rates and 17 percent for four-year graduation rates, while reducing the achievement gap between URM and non-URM students to six percent or less. Internally, university leaders have set goals of increasing six-year graduation rates to at least 60 percent, reducing time to degree, and ensuring that these benefits are shared by all students. Crucial to this plan is increasing the retention of freshmen at SJSU.

One-year retention data from our Fall 2015 freshmen indicate that block scheduling of engineering freshmen has a positive impact on student retention. This year (Fall 2016 freshmen), we have again block scheduled all freshmen in the College of Engineering. The results from this cohort will indicate whether block scheduling is truly one of the solutions for the retention issues at SJSU.

## References

- 1 *U.S. News & World Reports*, <http://colleges.usnews.rankingsandreviews.com/best-colleges/rankings/regional-universities-west/campus-ethnic-diversity>.
- 2 Eberle-Sudré, K., Welch, M., & Nichols, A. H. (2015). *Rising tide: Do college grad rate gains benefit all students?* Washington, DC: The Education Trust. Available: <https://edtrust.org/wp-content/uploads/2014/09/TheRisingTide-Do-College-Grad-Rate-Gains-Benefit-All-Students-3.7-16.pdf>
- 3 California State University (n.d). *CSU Graduation Initiative*. Available: <http://graduate.csuprojects.org/>
- 4 Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Univ. of Chicago Press.
- 5 Siegel, M. & Cutright, M. (2005). The first year at Texas A&M University-Corpus Christi. In B. Barefoot, et. al. (Eds.) *Achieving and sustaining institutional excellence for the first year of college*.

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- 6 Astin, A. W. (1993). *What matters in college: Four critical years revisited*. San Francisco: Jossey-Bass;  
Kuh, G. D. et al. (2005). *Student success in college: Creating conditions that matter*. Jossey-Bass.
- 7 Engstrom, C. & Tinto, V. (2008). Learning better together: The impact of learning communities on the  
persistence of low-income students. *Opportunity Matters: A Journal of Research Informing Educational  
Opportunity and Practice, 1*, 5-21; Lardner, E. D. (2003). *Approaching diversity through learning  
communities*. WA Ctr Impr Qual Und Edu.
- 8 Anderson, J. A. (2004). Academic and social integration: A key to first-year success for students of color.  
In. L. Rendón, *Transforming the first year of college of students of color* (pp. 77-89). National Resource  
Center for the FYE and Students in Transition; Zhao, C. & Kuh, G. (2004). Adding value: Learning  
communities and student engagement. *Res High Ed, 45*(2), 115-138.
- 9 Bigham, W. (2009). Making Connections: New Students Bond in Freshman Learning Communities.  
Available: <http://www.gsu.edu/20925.html>
- 10 Engstrom, C., & Tinto, V. (2008). Op. cit.
- 11 Scrivener, S. et al. (2008, March). A Good Start: Two-year effects of a freshmen learning community  
program at Kingsborough Community College. **ERIC Number:** ED500477 Retrieved from  
<http://www.eric.ed.gov>.
- 12 Wild, W. G. & Ryan, M. E. (2002). Retention and success of undergraduates: A discussion of retention-  
related initiatives at the University of Buffalo. *ASEE Proceedings*.
- 13 Wild & Ryan, IBID.
- 14 Richardson, J., & Dantzler, J. (2002). Effect of a freshmen engineering program on retention and academic  
performance. *Proceedings of the 32nd ASEE/IEEE Frontiers in Education Conference, USA*, doi:  
10.1109/FIE.2002.1158656