

# STUDY OF THE RELATIONSHIP BETWEEN TIME WHEN SSSP CORE SERVICES ARE PROVIDED AND STUDENT ACADEMIC ACHIEVEMENT

## A Recommendation Report

### Abstract

This study examined whether there is a significant relationship between the time when first-time, full-time students received SSSP (Student Success and Support Program) services throughout the academic year and measures of their academic achievement, including the number of units earned and GPA by the end of the academic year (spring term) and the number of units they enrolled in the fall term for the following academic year. SSSP core services include orientation, assessment for placement, education planning, and counseling. To also examine quality of services, the relationship between the length of the students' education plan (number of units in the education plan with the highest number of units developed by the winter term) and their academic achievement was also assessed. Results for standard regression analyses for two college cohorts were compared to examine the extent to which results generalize across different student populations at two community colleges. Results showed that time when SSSP core services are provided can predict cumulative number of units by the end of the academic year and number of units students registered in the fall term for the following academic year.

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## Executive Summary

The purpose of this study is to examine whether there is a statistically significant relationship between the time when first-time students at Foothill College or De Anza College receive SSSP (Student Success and Support Program) core services and their academic achievement by the end of the academic year. SSSP core services include orientation, assessment for placement, education planning, and counseling. For education planning, services are classified as assistance with the development of an abbreviated (one of two terms) or comprehensive plan (three or more term). In addition to assessing when services for the abbreviated or comprehensive plan were first provided, this study also examines if there is any significant relationship between the length of the plan (number of units for the plan with highest number of units prior or during the winter term) and measures of students' academic achievement. To assess students' academic achievement by the end of the academic year, the following three measures were used: (1) cumulative number of earned units for the spring term, (2) cumulative GPA for the spring term, and (3) number of units students registered in the fall term of the following academic year. Correlational and standard regression analyses were used to assess the relationship between independent variables (time of SSSP services, length of student education plan) and each of the dependent variables (measures of academic achievement). The relative importance of each independent variable in the model when predicting each outcome was also examined. Results for each college cohort (Foothill cohort and De Anza cohort) were compared to cross-validate or assess the extent to which the results can be generalize across groups.

Study results suggest that the earlier students receive SSSP core services, the more likely they are to succeed academically at the college, as measured by the number of credit units they earned by the end of the academic year and the number of units they registered in the fall term for the following academic year. There was limited support for a relationship between the time when SSSP services were provided and cumulative GPA. Regarding the importance of SSSP services, results across college cohorts point to the development of a comprehensive plan or the length of the plan as the key factors or more important services.

Based on results, the study recommends that the colleges require all first-time students to receive SSSP core services before they registered in the second or follow-up primary term for the academic year. Part of these services must include a comprehensive plan that covers all required courses to achieve their education goal (all courses needed to earn the certificate, degree, or meet transfer requirements). To facilitate the development of a comprehensive plan, templates for all degrees and certificates (including transfer certificates) must be made available in the degree audit system at the colleges. The study also recommends further research on the quality of different types of services and the need to tailor services to specific student groups or special populations.

## Introduction

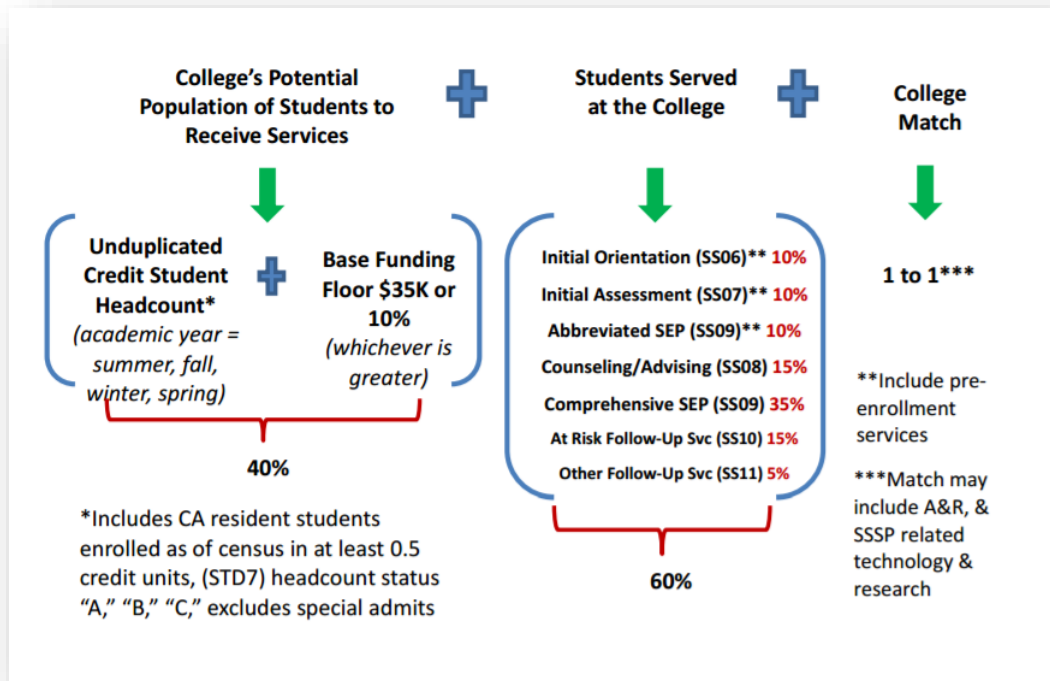
In 2012, the Seymour-Campbell Student Success act created the Student Success and Support Program (SSSP) and reformed matriculation services across community college in California “to ensure that all credit and noncredit students promptly define their educational and career goals, complete their courses, persist to the next academic term, and achieve their educational objectives in a timely manner” (2016 SSSP Handbook). The act emphasized support for first-time students (entering students with no prior higher education experience) by requiring that colleges assist these students by providing core services either prior their enrollment or by the end of their first academic year.

The SSSP process stipulates that first-time students receive orientation, assessment for placement, and education planning services (at least an abbreviated education plan) before they enroll at the college. Once they have enrolled, first-time students should have received counseling services and developed a comprehensive education plan by the end of their first academic year. At-risk students (for example, students in foster care or receiving financial aid) or with special needs (for example, students enrolled in basic skills courses or placed in academic probation) are expected to receive follow-up services that will help them succeed and attain their educational or career goal.

To underscore the responsibility of the college in students’ success, the Seymour-Campbell Student Success act changed the formula to allocate funds and resources to be based not just on student headcount, but also on the number of students served. Prior to SSSP, funding for matriculation or student support services was based on the annual headcount for first-time students at the college. Under SSSP, the new funding formula takes into account annual student headcount (all students enrolled) and the number of students served. Specific to credit students, 60% of total funding is allocated based on annual headcount of students served at the college and 40% is based on headcount of students enrolled. (See Figure 1 for details).

Another key component of SSSP is that it requires colleges and districts to “establish a program of institutional research for the ongoing evaluation of the services funded through the Student Success and Support Program” (Title 5, section 55512). The study proposed here is intended to address this requirement by assessing whether there is a significant relationship between the time when first-time students receive core support services and their academic success during their first academic year at the college, including fall-to-fall persistence. It is expected that the earlier students received core service, the more likely they are to persist and achieve higher academic achievement. If this is not the case, then a more in depth data analysis will follow to better understand the results and make recommendations.

Figure 1. SSSP Credit Funding Formula



Source: Student Success and Support Programs (SSSP) 2016 Program Handbook

## Research Methods

The purpose of the study is to assess the relationship between the time when first-time students receive SSSP services (orientation, placement, counseling, and education planning) and three academic achievement outcomes: cumulative number of credit units earned by the end of the academic year, cumulative GPA by the end of the academic year, and number of units registered in fall 2016. The study also explored whether the length of the student education plan (measured by the number of credit units in the plan) was related to the academic achievement measures. The research questions addressed in the study are the following:

- 1) To what extent does the time when first-time students first receive SSSP core services and the length of their education plan predict each of the following academic achievement outcomes?
  - i) Cumulative number credit units earned by the end of the academic year
  - ii) Cumulative GPA by the end of the academic year
  - iii) Number of units students register in the following fall term
- 2) What is the relative importance of variables representing the time when first-time students received initial SSSP core services and the length of their education plan when used for predicting each of the following academic achievement outcomes?
  - i) Cumulative number credit units earned by the end of the academic year
  - ii) Cumulative GPA by the end of the academic year
  - iii) Number of units students register in the following fall term

### Data Analyses

Statistical analyses used in this study include descriptive statistics, correlational analysis, and multiple standard regression. Descriptive statistics will provide measures of central tendency (how the data centers or appear to group together in the distribution of scores) or variability (how the data spread out from the center or along a numerical scale). Statistical correlation procedure will estimate the statistical significance (the extent to which results cannot be explained by chance alone) of the direction and strength of a liner relationship between each individual SSSP services and outcome measures. Standard multiple regression analyses will assess the degree to which combined SSSP services can predict each outcome and the relative importance of each variable.

### Data Sources and Variables

Data from reports submitted to the California Community College Chancellor's Office (MIS Student Success and MIS Student Characteristics), the student information system at the FHDA CCD, and the degree audit system developed to assist student education planning services at the colleges were used to develop measures for the independent (predictor) and dependent (outcome of academic achievement) variables used in the study.

Measures for the independent variables of initial orientation, placement, abbreviated education plan, and comprehensive education plan were operationally defined as the term when the student first received the service at the college, which may include a term for a prior academic year (spring term, when recruitment activities at high schools occur) or no service by the end of the first academic year of enrollment at the college. For counseling, time of service was defined as the first term of the academic year when the student received the service. For most SSSP services, the terms were coded based on the following scheme, in which a greater weight is given to the earlier terms: prior to or equal to summer 2015, 4; fall 2015, 3; winter 2016, 2; spring 2016, 1; no service or service provided after spring 2016, 0. For counseling services, the summer and fall were coded as 3 for this service is viewed as one intended

for enrolled students, and a significant number of students begin their enrollment for the academic year during the fall.

For the length of the education plan (intended as a measure of quality of service), the plan with the highest number of units developed by each student in the cohorts during or prior to the winter term was selected, and the number of units for that plan was used as the student's score for this variable. Students who did not have an education plan developed by this time period in the college degree audit system were given a score of 0. The winter term was used as a cutoff point because the occurrence of all predictors in the statistical model needed to precede that for the outcomes measures, which began by the end of the spring term.

Measures for the dependent variables (measures of academic achievement) included the cumulative number of units earned and GPA for the academic year (spring 2016), and the number of units registered by census date, fall 2016. Cumulative units earned included all credit units (including units earned in non-graded courses, such as basic or remedial courses). For analyses that included GPA, students without attempted quality units (applicable to GPA) were excluded. The score for the number of units registered in fall 2016 for students who did not enroll during this term was set to zero. Instead of a dichotomous variable (for example, "yes" or "no"; 0 or 1) the number of units registered in fall was used because this approach was considered to provide more information regarding the degree or level of persistence to which students who during their first-year were originally enrolled as full-time return to their enrollment status the following academic year.

### **Selection of Subjects for Cohorts**

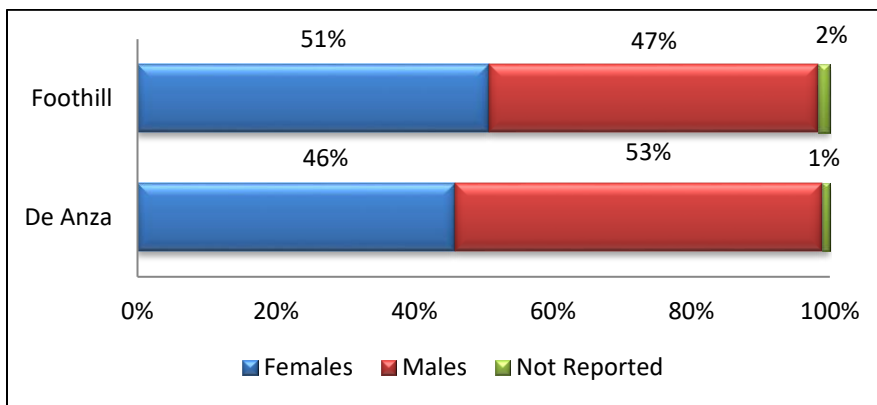
First-time students registered in fall 2015 with at least 12 credit units at De Anza College or Foothill College were selected for the study and disaggregated based on college attendance to form the De Anza cohort and the Foothill cohort. In this study, first-time status refers to not having higher education experience prior to summer 2015, not including experience as a special admit or high school concurrent enrollment student. The cohorts did not include students who were non-California residents; had earned more than 15 credit units prior to summer 2015 while enrolled as special admit at the college; and reported as their education goal, "University/4-year college student taking courses to meet university requirements." These students were excluded to avoid introducing confounding or extraneous variables, which may adversely impact the interpretation of the study results. The final headcount for each cohort was: De Anza, 2,409; Foothill, 773.

## Results

Descriptive analyses for each college cohort showed the following statistics for gender, age, race/ethnicity, high school graduation date, education goal, and high school district.

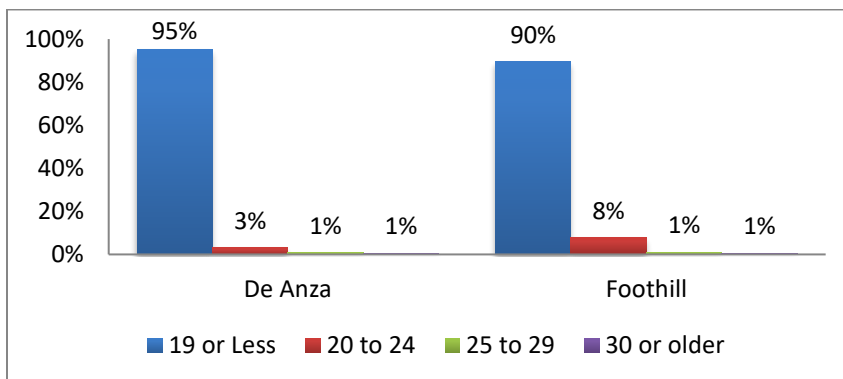
- Gender: 46% of the students in De Anza cohort were female; 53%, male; and 1%, did not report their gender. For the Foothill cohort, 51% were female; 47%, male; and 2%, did not report their gender. (See Figure 2.)

*Figure 2. Cohort Headcount Percentage by Gender Group and College*



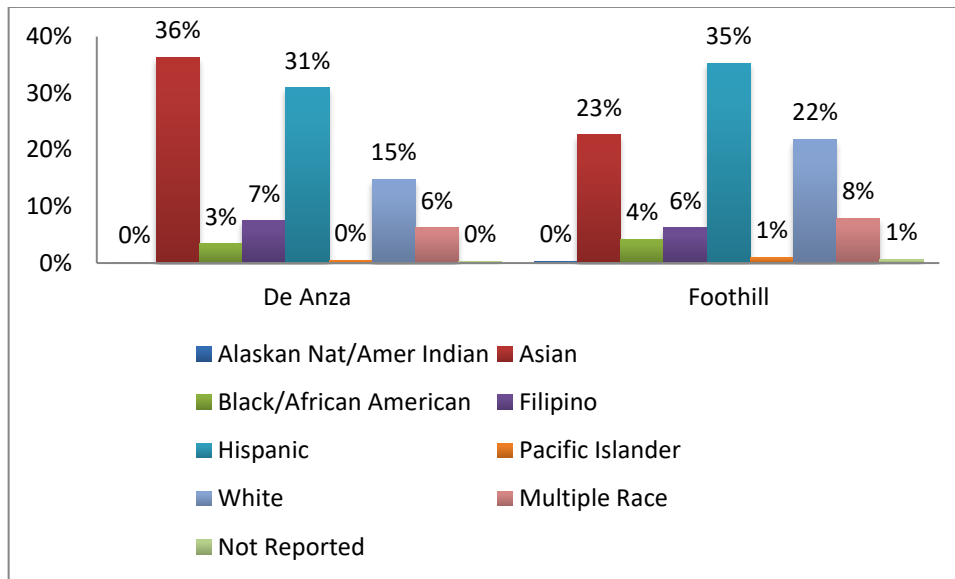
- Age: By the start of the fall term, the median age for students in the Foothill and De Anza cohorts was 18; however, students in the De Anza cohort were somewhat younger (95% were 19 or younger), when compared to the Foothill cohort (90% were 19 or younger), as shown in Figure 3.

*Figure 3. Cohort Headcount Percentage by Age Group and College*



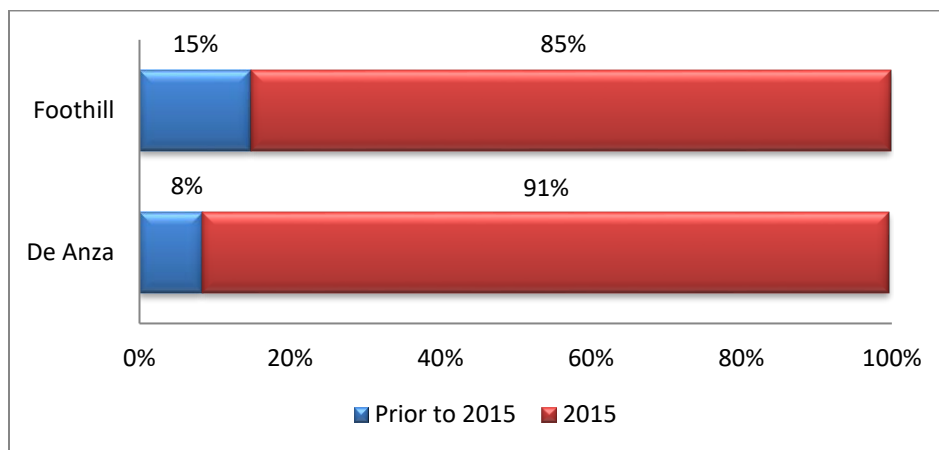
- Race/Ethnicity: For De Anza, the race/ethnic group with the largest percentage in the cohort was Asians (36%), followed by Hispanics (31%), and Whites (15%). For Foothill, participants in the cohort were mainly Hispanics (35%), followed by Asians (23%), and Whites (22%). (See Figure 4.)

*Figure 4. Cohort Headcount Percentage by Race/Ethnic Group and College*



- High school graduation year: About 91% of participants in the De Anza cohort graduated from high school the same year they enrolled at the college, 2015; compared to 85% for the Foothill cohort, as shown in Figure 5.

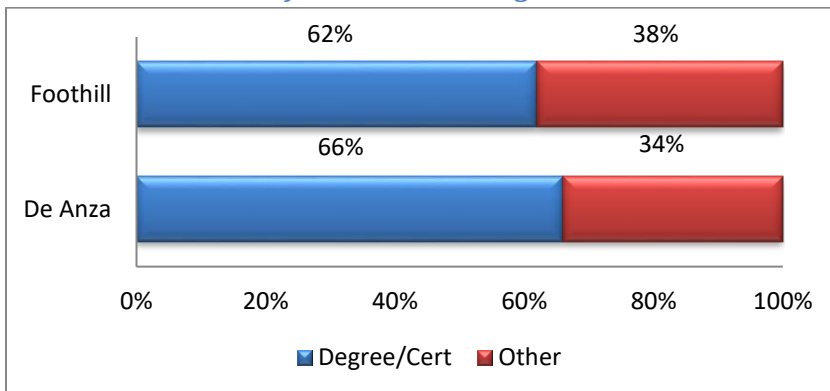
*Figure 5. Cohort Headcount Percentage by Graduation Year and College*



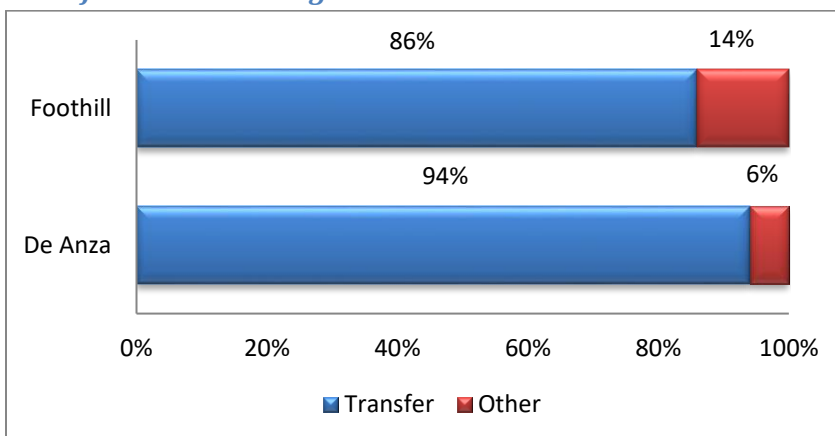


- Education Goal: When taking into account whether the education goal reported by the participants was related to earning a certificate or degree (“Earn a career technical certificate without transfer,” “Obtain a two-year associate degree without transfer,” “Obtain an associate degree and transfer to a baccalaureate granting institution”), 62% of the participants in the De Anza cohort and 66% in the Foothill cohort reported they intended to obtain a degree or certificate at the college. When transfer was the factor taken into account for classifying the type of education goal (“Obtain an associate degree and transfer to a baccalaureate granting institution,” “Transfer to a baccalaureate granting institution without an associate degree”), 86% and 94% of participants for Foothill and De Anza, respectively, indicated that their education goal was transferring to a 4-year institution. (See Figure 6 and Figure 7.) Results indicate that while the education goal for more than half of these students is to earn a degree or certificate, the ultimate goal for most of them is to transfer to a four-year institution or university.

**Figure 6. Cohort Headcount Percentage by Degree/Certificate Education Goal Classification and College**

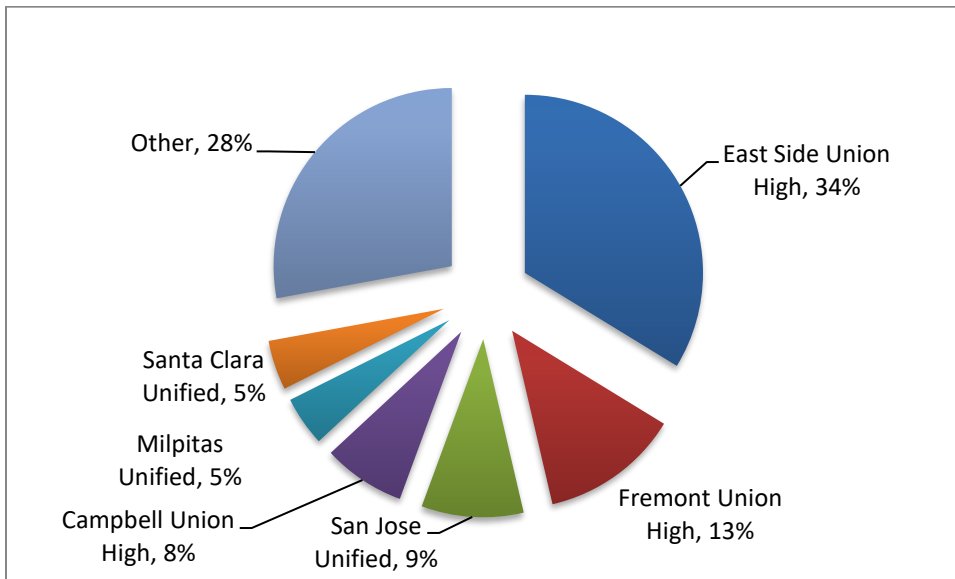


**Figure 7. Cohort Headcount Percentage by Transfer Education Goal Classification and College**

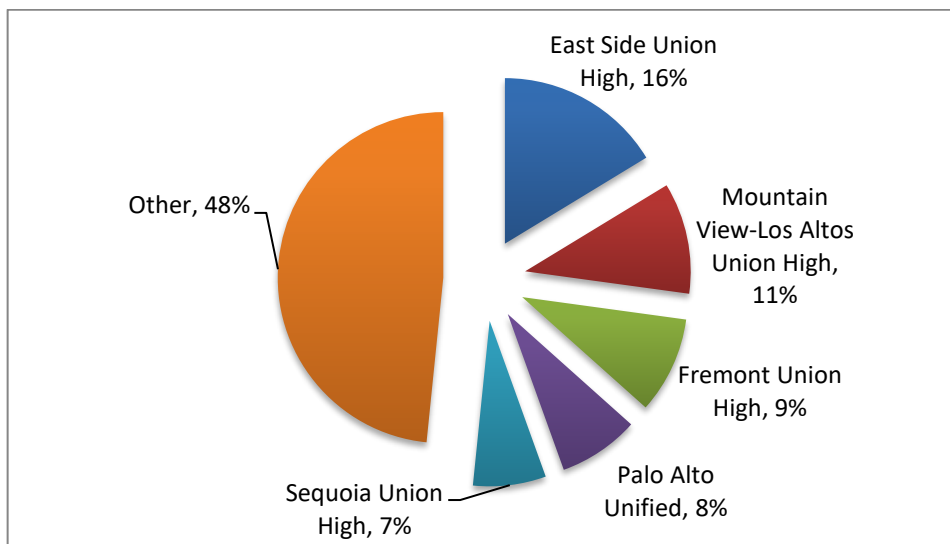


- High school district: The San Jose East Side Union was the district with the largest representation in both cohorts. For the De Anza College cohort, the school districts with the highest percentages for high school graduates included the East Side Union High (34%), followed by Fremont Union (13%) and Union High (9%). For Foothill College, participants graduated from a wider range of high school districts. San Jose East Side Union showed the largest percentage (16%) in the Foothill cohort, followed by Mountain View-Los Altos Union (11%), Fremont Union High (9%), Palo Alto Unified (8%), and Sequoia Union (7%). (See Figure 8 and Figure 9.)

**Figure 8. De Anza Cohort Headcount Percentage by High School District**



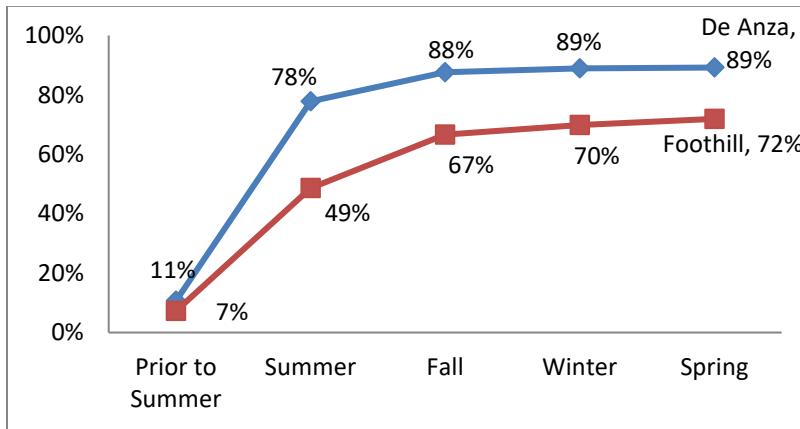
**Figure 9. Foothill Cohort Headcount Percentage by High School District**



## Descriptive Statistics for SSSP Services and Academic Achievement Outcomes

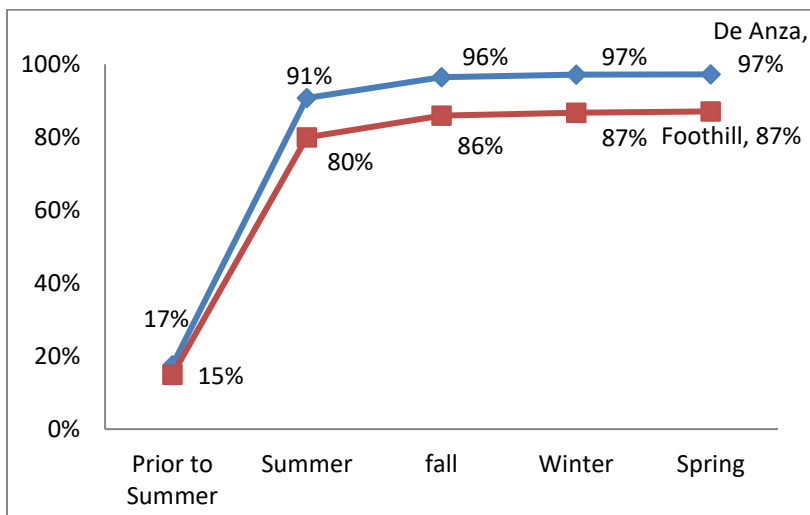
For initial orientation services, statistics in Figure 10 showed that 89% of participants in the De Anza cohort received these services during their first academic year, compared to 72% for the Foothill cohort. The data also showed that a larger percentage of students in the De Anza cohort received the services early in the academic year (78% by summer), when compared to those in the Foothill cohort (49% by summer).

*Figure 10. Initial Orientation Services: Cumulative Headcount Percentage by College Cohort and Term*



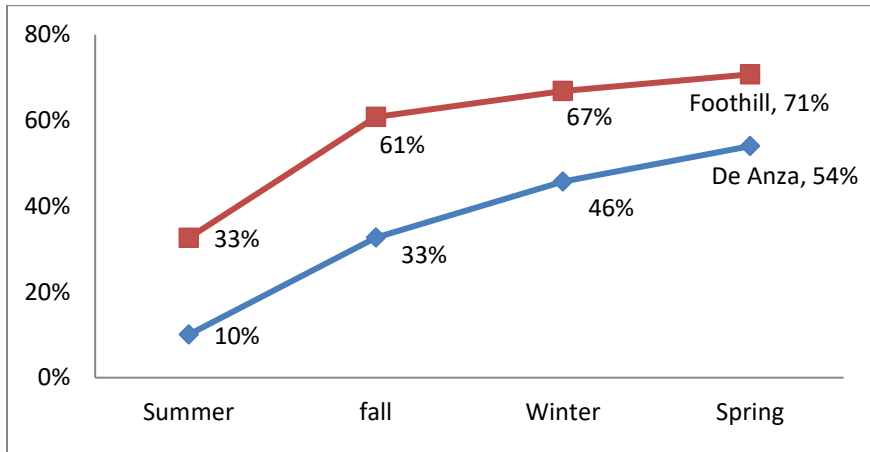
Statistics in Figure 11 showed that 97% of students in the De Anza cohort had received initial assessment for placement services by the end of the academic year, compared to 87% for those in the Foothill cohort. The data also showed that most of the students in the cohorts received these services during the summer (De Anza, 91%; Foothill, 80%).

*Figure 11. Initial Assessment for Placement Services: Cumulative Headcount Percentage by College Cohort and Term*



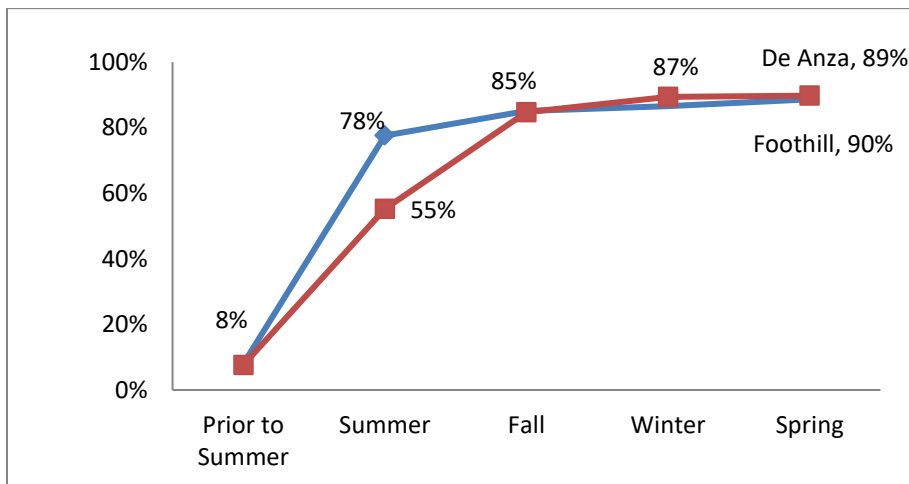
Regarding counseling services, statistics in Figure 12 showed that 71% of students in the Foothill cohort received counseling services at least once during the academic year, compared to 54% for the De Anza cohort. The data also showed that students in the Foothill cohort received these services earlier during the year (61% had seen a counselor by fall), when compared to students in the De Anza cohort (33% had seen a counselor by fall).

*Figure 12. Counseling Services: Cumulative Headcount Percentage by College Cohort and Term*



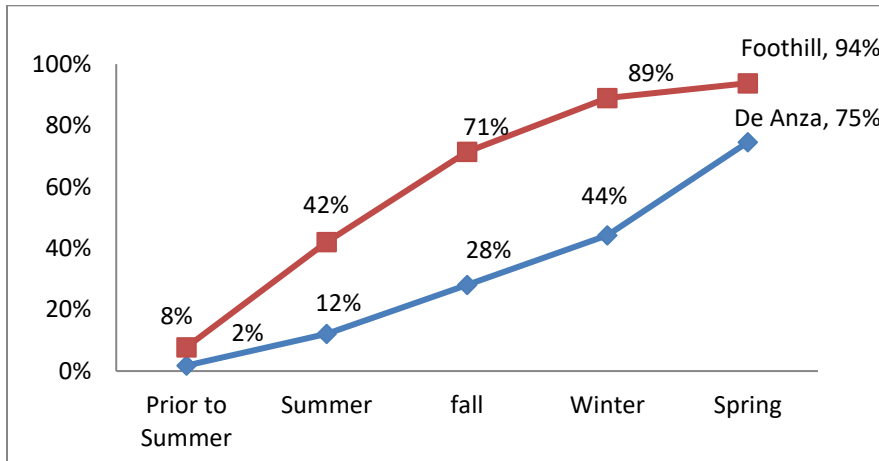
Statistics in Figure 13 showed that by the end of the academic year about 90% of all students in both cohorts had developed an abbreviated education plan (a plan that covered less than three terms). The data also showed a larger percentage of students in the De Anza cohort with an abbreviated education plan by the fall term (78%), when compared to students in the Foothill Cohort for the same period (55%).

*Figure 13. Initial Abbreviated Education Plan Services: Cumulative Headcount Percentage by College Cohort and Term*



Statistics in Figure 14 showed that 94% of students in the Foothill cohort had developed their first comprehensive education plan (a plan that covered at least three terms) by the end of the academic year, compared to 75% for the De Anza cohort. The data also showed that students in the Foothill cohort received these services at a faster rate, than students in the De Anza cohort. For instance, 71% of students in the t Foothill cohort had developed their first comprehensive plan by the fall term, compared to 28% for the De Anza cohort.

*Figure 14. Initial Comprehensive Education Plan Services: Cumulative Headcount Percentage by College Cohort and Term*



After selecting the education plan with the highest number of units created by each student on each cohort during or before the winter term, statistics for the analysis (see Table 1) showed that for the De Anza cohort 49% of these plans were created at the beginning of the academic year or before (summer or a prior term), compared to 32% in the Foothill cohort for the same period. However, the median (midpoint in the distribution) for the number of units for education plans created during this period for the De Anza cohort was 15 (about 3 courses), while for the Foothill cohort the median was 58 (11 to 12 courses). Statistics at the cohort level showed that the number of units in education plans developed by students in the Foothill cohort by the winter term were significantly higher when compared to those for the De Anza cohort (Foothill cohort, median of 56 units; De Anza cohort, median of 30 units).

*Table 1. Descriptive Statistics by College Cohort for Students' Education Plans with the highest Number of Credit Units Developed by the Winter Term*

<b>De Anza Cohort</b>	<b>Max Units</b>	<b>Min Units</b>	<b>Average</b>	<b>Median</b>	<b>Count</b>	<b>Count Percent</b>
Summer or Prior Term	157	1	25	15	1,066	49%
Fall	182	1	47	42	547	25%
Winter	175	5	58	52	568	26%
All	182	1	39	30	2,181	100%
<b>Foothill Cohort</b>	<b>Max Units</b>	<b>Min Units</b>	<b>Average</b>	<b>Median</b>	<b>Count</b>	<b>Count Percent</b>
Summer or Prior Term	185	2	68	58	237	32%
Fall	200	2	64	60	302	41%
Winter	160	7	53	43	221	30%
All	200	2	62	56	760	100%

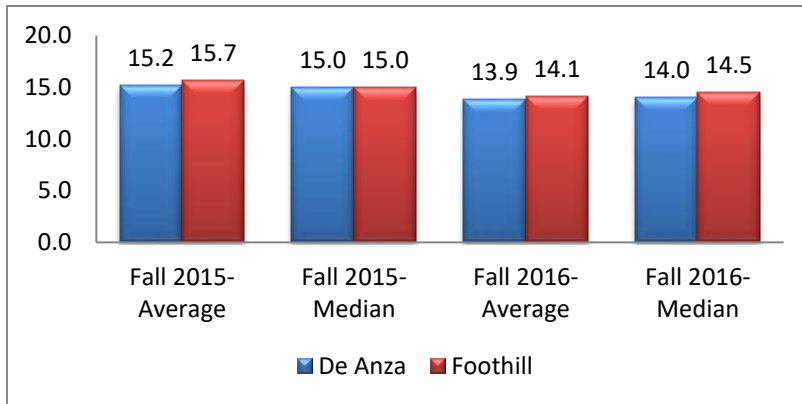
**Notes**

The data only include students who had developed an education plan by the winter term (before events for academic achievement took place, which included cumulative earned units and GPA by spring).

Statistics are for the education plans with the highest number of units developed by each student on each cohort.

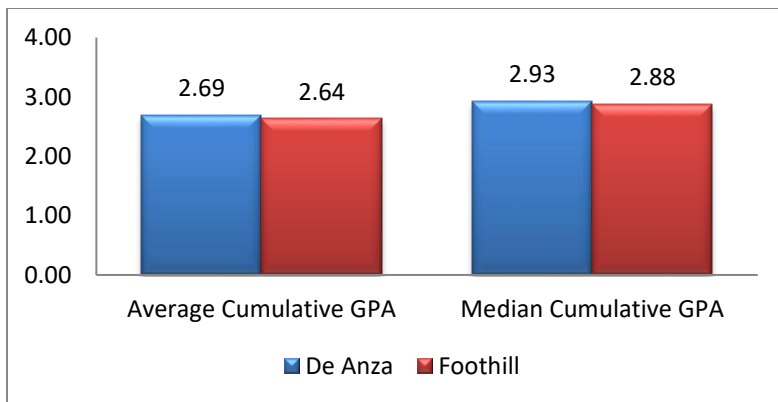
The fall 2015-fall 2016 persistence rate (percentage of students in the cohort who registered in fall 2015 and fall 2016 at the college) for the De Anza cohort was 80% (1,924 out of 2,409 persisted or returned); for the Foothill cohort, 69% (553 out of 773 persisted or returned). Statistics for the average and median number of units in Figure 15 show that students in both cohorts registered for about 15 units in fall 2015. The average and median for fall 2015 units were about 15 in both cohorts, independently of whether the students returned in fall 2016. For students who returned in fall 2016, statistics showed a decline of 1.3 to 1.0 units for the De Anza cohort; for the Foothill cohort, 0.5 to 1.5 units.

*Figure 15. Number of Units Registered by College Cohort and Fall Term*



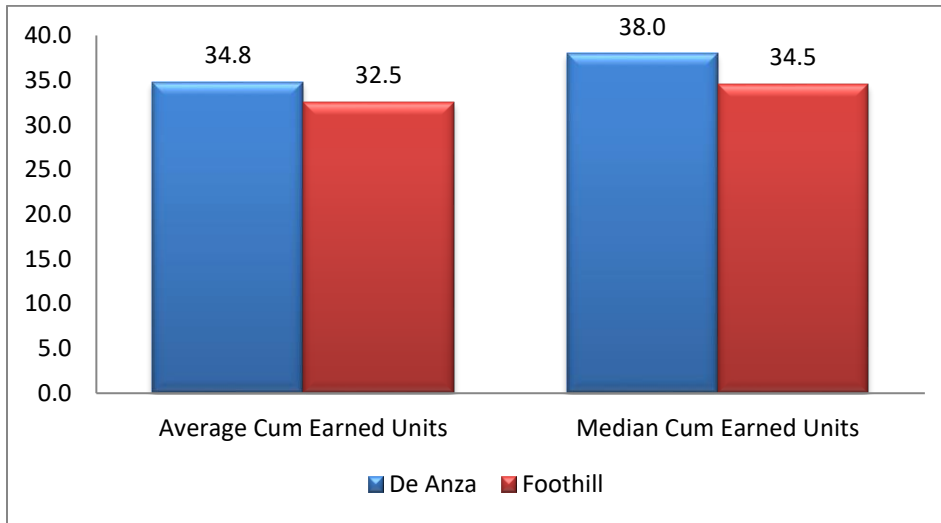
GPA statistics in Figure 16 show that the average and median scores for spring 2016 cumulative GPA for the De Anza cohort were 2.69 and 2.93, respectively. For the Foothill cohort, the average and median cumulative GPA scores for the same term were slightly lower: 2.64 and 2.88. These figures only included students with cumulative attempted units that were also applicable to GPA greater than 0.0 (De Anza cohort: 2,388; Foothill cohort: 766).

*Figure 16. Spring 2016 Cumulative GPA Average and Median Scores by College Cohort*



Statistics for the number of cumulative credit units earned by spring 2016, the last term of the academic year, in Figure 17 showed average and median scores of 34.8 and 32.5, respectively, for the De Anza cohort. The average and median scores for the Foothill cohort were slightly lower: 32.5 and 34.5, respectively.

*Figure 17. Spring 2016 Cumulative Units Earned Average and Median Scores by College Cohort*





## **Correlational Analyses for Time Measures for Initial SSSP Services and Academic Achievement Outcomes**

### **Intercorrelations Between Time Measure for Initial SSSP Services**

Pearson correlation coefficients in Table 2 show that the time when students first received these services tend to correlate (be related). This means that these services were offered or received around the same time—prior or during the academic year. For example, in the De Anza cohort time measures for orientation services and the development of an abbreviated plan show a correlation of 0.61, which means that a significant number of students developed their abbreviated plan around the same time they received orientation services. For the Foothill cohort, the data show a strong relationship between time measures for orientation and two other services: assessment/placement (0.49) and development of a comprehensive plan (0.68). For both cohorts, estimates for the correlation between each SSSP service and the total score for all other services (shown in the diagonal cells of the table), point to the two variables that most relate to all the others: time measure for comprehensive plan and length of the education plan. This means that the earlier in the academic year the students received most SSSP services, the more likely they were to (a) develop a comprehensive plan and (b) have a higher number of units in the plan(s) they developed. For the Foothill cohort, the time measure for orientation services was also strongly related to the other variables, as shown by a correlation coefficient of 0.67.

Table 2. Intercorrelations Between Time Measures for Initial SSSP Services and Number of Units for the Education Plan by College Cohort

De Anza Cohort (n = 2,409)						
	1	2	3	4	5	6
<b>1. Orientation</b>	(0.47)					
<b>2. Assessment/Placement</b>	0.28	(0.30)				
<b>3. Counseling</b>	0.11	0.08	(0.28)			
<b>4. Ed Plan: Abbreviated</b>	0.61	0.30	0.12	(0.42)		
<b>5. Ed Plan: Comprehensive</b>	0.24	0.17	0.31	0.11	(0.49)	
<b>6. Ed Plan: Number of Units</b>	0.25	0.16	0.31	0.21	0.70	(0.53)

Foothill Cohort (n = 773)						
	1	2	3	4	5	6
<b>1. Orientation</b>	(0.67)					
<b>2. Assessment/Placement</b>	0.49	(0.56)				
<b>3. Counseling</b>	0.25	0.36	(0.36)			
<b>4. Ed Plan: Abbreviated</b>	0.34	0.16	0.07	(0.24)		
<b>5. Ed Plan: Comprehensive</b>	0.68	0.50	0.29	0.23	(0.69)	
<b>6. Ed Plan: Number of Units</b>	0.48	0.42	0.32	0.11	0.60	(0.56)

**Notes**

All correlation coefficients (Pearson) were significant at the  $p < 0.001$ .

The correlations between the variable with the total or sum for all other variables appear on the diagonal. Standardized scores are used in the diagonals because of differences in the units of measurement in some of the variables.

For orientation, assessment/placement, abbreviated plan development, and comprehensive plan development: scores represent the term when services were first provided, and a greater weight is given to the earlier terms. Scores range from 0 to 4: prior to or equal to summer 2015, 4; fall 2015, 3; winter 2016, 2; spring 2016, 1; no service or service provided after spring 2016, 0.

For counseling services, the summer and fall were coded as 3 for the following reasons: (a) this service is viewed as one intended for enrolled students, and (b) a significant number of students begin their enrollment for the academic year during the fall.

Ed Plan: Number of Units: Number of credit units for the education plan with the highest number of units developed prior or during winter 2016.

## Intercorrelations Between Academic Achievement Outcomes

Pearson correlation coefficients in Table 3 show that the measures or variables used for academic achievement outcomes are interrelated. The number of credit units earned by spring 2016 is the variable most related or consistent with the other variables, as shown by a correlation coefficient of 0.78 and a 0.80 for the De Anza cohort and Foothill cohort, respectively, between students' scores for this variable and their total score for the other variables shown in the diagonal cells of the table.

*Table 3. Intercorrelations Between Academic Achievement Outcomes*

<b>De Anza Cohort (n = 2,388)</b>			
	1	2	3
<b>1. Cum Earned Units, Spring 2016</b>	(0.78)		
<b>2. Cum GPA, Spring 2016</b>	0.74	(0.65)	
<b>3. Registered Units, Fall 2016</b>	0.57	0.40	(0.52)

<b>Foothill Cohort (n= 766)</b>			
	1	2	3
<b>1. Cum Earned Units, Spring 2016</b>	(0.80)		
<b>2. Cum GPA, Spring 2016</b>	0.73	(0.60)	
<b>3. Register Units, Fall 2016</b>	0.57	0.33	(0.48)

## Intercorrelations Between Time Measures for SSSP Services and Academic Achievement Outcomes

Pearson correlation coefficients in Table 4 show that the time when students receive initial SSSP services tend to be related to measures of their academic achievement. For both cohorts, statistics in Table 4 also show that among the academic achievement variables, time measures for SSSP services are most related to the cumulative number of units students earned by spring 2016, as shown by correlation coefficients of 0.45 and 0.44 (De Anza cohort and Foothill cohort, respectively) between the total score for SSSP services and this variable. For the Foothill cohort, the total score for time measures for SSSP services was also strongly related to number of units registered in fall 2016 (0.47).

*Table 4. Intercorrelations Between Time Measures for SSSP Services and Academic Achievement Outcomes by College Cohort*

<b>De Anza Cohort (n = 2,388)</b>				
	<b>Cum Earned Units, Spring 2016</b>	<b>Cum GPA, Spring 2016</b>	<b>Registered Units, Fall 2016</b>	<b>Correlation with Total, Outcomes</b>
<b>Orientation</b>	0.26	0.21	0.13	0.24
<b>Assessment/Placement</b>	0.20	0.13	0.14	0.19
<b>Counseling</b>	0.26	0.20	0.13	0.23
<b>Ed Plan: Abbreviated</b>	0.21	0.17	0.11	0.19
<b>Ed Plan: Comprehensive</b>	0.38	0.27	0.26	0.36
<b>Ed Plan: Number of Units</b>	0.33	0.25	0.22	0.32
<b>Correlation with Total, SSSP Services</b>	0.45	0.33	0.27	
<b>Foothill Cohort (n= 766)</b>				
	<b>Cum Earned Units, Spring 2016</b>	<b>Cum GPA, Spring 2016</b>	<b>Registered Units, Fall 2016</b>	<b>Correlation with Total, Outcomes</b>
<b>Orientation</b>	0.33	0.18	0.35	0.34
<b>Assessment/Placement</b>	0.29	0.10	0.42	0.32
<b>Counseling</b>	0.22	0.10	0.22	0.22
<b>Ed Plan: Abbreviated</b>	0.13	0.05	0.08	0.10
<b>Ed Plan: Comprehensive</b>	0.39	0.21	0.38	0.39
<b>Ed Plan: Number of Units</b>	0.36	0.19	0.39	0.38
<b>Correlation with Total SSSP Services</b>	0.44	0.21	0.47	

### Notes

Development of an abbreviated education plan was not statistically significant,  $p > 0.01$ , for the Foothill cohort.

## Regression Analyses for Academic Achievement Outcomes Based on Time Measures for SSSP Services

### Predicting Cumulative Number of Units Earned by Spring 2016

Standardized parameter estimates (a measure of the relative importance of each variable in the model) in Table 5 show that in both college cohorts the variable for time of initial service for comprehensive plan development is the strongest predictor for the cumulative number of units students earned by the end of the academic year. For the Foothill cohort, the length or number of units in the education plan is also a strong predictor for this academic achievement outcome. The R-square estimate for both cohorts was about 0.21, which is considered a medium to large side effect in the social sciences.

*Table 5. Summary of Standard Regression Analysis for Variables Predicting Cumulative Number of Units Earned by the End of the Academic Year, Spring 2016, by College Cohort*

De Anza Cohort (n = 2,409)			
Variable	Parameter Estimate	Standard Error	Standardized Estimate
<b>Ed Plan:</b>			
<b>Comprehensive</b>	2.87	0.30	0.25
<b>Counseling</b>	1.53	0.22	0.13
<b>Orientation</b>	1.39	0.29	0.11
<b>Assessment/Placement</b>	1.71	0.42	0.08
<b>Ed Plan: Number of Units</b>			
<b>Ed Plan: Abbreviated</b>	0.03	0.01	0.07
<b>Ed Plan: Abbreviated</b>	0.75	0.27	0.06
Foothill Cohort (n = 773)			
Variable	Parameter Estimate	Standard Error	Standardized Estimate
<b>Ed Plan:</b>			
<b>Comprehensive</b>	2.83	0.69	0.20
<b>Ed Plan: Number of Units</b>			
<b>Assessment/Placement</b>	0.08	0.02	0.18
<b>Counseling</b>	0.77	0.48	0.06
<b>Orientation</b>	0.76	0.42	0.06
<b>Orientation</b>	0.56	0.44	0.06
<b>Ed Plan: Abbreviated</b>	0.65	0.45	0.05

#### Notes

Adjusted R-square for De Anza cohort, 0.21; Foothill cohort, 0.21.

For the De Anza cohort, parameter estimates for all predictors were statistically significant,  $p < .01$ . For the Foothill cohort, only the variables for comprehensive plan development and total number of units in the education plan were significant.

## Predicting Cumulative GPA by Spring 2016

Parameters estimates for variables for SSSP services predicting cumulative GPA by the end of the academic year were marginally statistically significant in the De Anza cohort. The R-square estimate for the De Anza cohort was 0.11, which is considered a small to medium effect in the social sciences. Standardized estimates (a measure of the relative importance of each variable in the model) in Table 6 point to comprehensive plan development as the variable that may predict, to a small degree, students' cumulative GPA by the end of the academic year. No statistically significant results were found for the Foothill cohort.

*Table 6. Summary of Standard Regression Analysis for Variables Predicting Cumulative GPA by the End of the Academic Year, Spring 2016, by College Cohort*

<b>De Anza Cohort (n = 2,388)</b>			
<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Standardized Estimate</b>
<b>Ed Plan: Comprehensive</b>	0.11	0.02	0.15
<b>Counseling</b>	0.08	0.02	0.11
<b>Orientation</b>	0.08	0.02	0.10
<b>Ed Plan: Number of Units</b>	0.00	0.00	0.07
<b>Ed Plan: Abbreviated</b>	0.04	0.02	0.05
<b>Assessment/Placement</b>	0.06	0.03	0.04

<b>Foothill Cohort (N = 766)</b>			
<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Standardized Estimate</b>
<b>Ed Plan: Comprehensive</b>	0.10	0.05	0.12
<b>Ed Plan: Number of Units</b>	0.00	0.00	0.10
<b>Orientation</b>	0.04	0.03	0.06
<b>Counseling</b>	0.03	0.03	0.04
<b>Ed Plan: Abbreviated</b>	0.00	0.03	0.00
<b>Assessment/Placement</b>	-0.03	0.03	-0.04

### Notes

Adjusted R-square for De Anza cohort, 0.11; Foothill cohort, 0.05

For the De Anza cohort, predictor estimates were statistically significant,  $p < .01$ , excluding time measures for development of abbreviated education plan and assessment/placement services. For the Foothill cohort, none of the parameters estimates for the predictors in the equation were statistically significant,  $p < .01$ .

## Predicting Number of Registered Units in Fall 2016

Parameter estimates in Table 7 show differences across college cohorts for variables representing time measures for initial SSSP services when predicting the number of units students registered in fall 2016 at the college. For the De Anza cohort, the variable for comprehensive plan development was the strongest predictor for this academic achievement measure, while at Foothill the strongest predictor was the variable for assessment/placement, followed by the length (based on number of units) of the education plan. The R-square estimate for the De Anza cohort was 0.09, which is considered a small to medium effect in the social sciences; for the Foothill cohort, the R-square was 0.25, which is considered a medium to large effect size.

*Table 7. Summary of Standard Regression Analysis for Variables Predicting Registered Units in Fall 2016, by College Cohort*

<b>De Anza Cohort (n = 2,409)</b>			
<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Standardized Estimate</b>
<b>Ed Plan: Comprehensive</b>	0.97	0.14	0.20
<b>Assessment/Placement</b>	0.72	0.19	0.08
<b>Counseling</b>	0.21	0.10	0.04
<b>Ed Plan: Number of Units</b>	0.01	0.01	0.04
<b>Ed Plan: Abbreviated</b>	0.17	0.12	0.03
<b>Orientation</b>	0.16	0.13	0.03
<b>Foothill Cohort (n = 773)</b>			
<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Standardized Estimate</b>
<b>Assessment/Placement</b>	1.35	0.21	0.25
<b>Ed Plan: Number of Units</b>	0.04	0.01	0.20
<b>Orientation</b>	0.39	0.20	0.09
<b>Ed Plan: Comprehensive</b>	0.54	0.30	0.08
<b>Counseling</b>	0.12	0.19	0.02
<b>Ed Plan: Abbreviated</b>	-0.10	0.20	-0.01

### Notes

Adjusted R-square for De Anza cohort, 0.09; Foothill cohort, 0.25.

## Conclusions

The focus of the study was to assess whether the time when SSSP services are provided to first-time, full-time students may predict their academic performance by the end of their first academic year. First-time students were selected for the study for they are the main target of SSSP core services, such as orientation, assessment for placement, and education plan development. Results from correlational and regression analyses for two cohorts (one for each college) were used to test the degree of the relationship between predictor and outcome variables and to cross-validate or assess the degree to which the findings could be generalized across groups. The main thesis tested in this study was the following: the earlier during the academic year first-time students receive SSSP services, the more likely they are to academically succeed by the end of their first academic year and enroll the following fall at the college. The time of service was defined as the term when the student received the first or initial service. As measures for academic achievement, the study use students' cumulative number of units earned by spring 2016, cumulative GPA by spring 2016, and the number of units registered in fall 2016. As a measure of quality of service, the study also examined whether the length of the student education plan (based on the number of units) may have had any impact on academic achievement. The relative importance for each SSSP service in predicting the outcomes was also examined. Study research questions and related findings are discussed below.

### *Research Question 1.*

To what extent does the time when first-time students receive SSSP core services and the length of their education plan predict each of the following academic achievement outcomes?

- a. Cumulative number of credit units they earned by the end of the academic year
- b. Cumulative GPA by the end of the academic year
- c. Number of units registered in the following fall term

The data showed that the time when first-time students receive SSSP core services can predict to some degree the number of units they will earn by the end of the academic year, or spring term, and the number of units they will register in the fall term of the following year. Related to predicting cumulative GPA by the end of the academic year, the data showed limited support: no statistically significant results for the Foothill cohort and a small effect size (based on R-square) for the De Anza cohort. Results suggest that the earlier students receive SSSP core services, the more likely they are to succeed academically at the college, as measured by the number of credit units earned by the end of the academic year and the number of units they register the fall term for the following academic year.



*Research Question 2.*

What is the relative importance of variables representing the time when first-time students received initial SSSP core services and the length of their education plan when used for predicting each of the following academic achievement outcomes?

- a. Cumulative number of credit units earned by the end of the academic year
- b. Cumulative GPA by the end of the academic year
- c. Number of units registered in the following fall term

For the outcome of number of units earned by the end of the academic year, spring 2016, the data showed that the development of a comprehensive plan was the best predictor in the model. Data for both cohorts showed that students who developed a comprehensive plan (a plan that covers at least three terms) earlier in the academic year were, on average, the ones who earned the higher number of units by the end of the academic year. Another significant predictor in the model was the length of the education plan, which showed a strong correlation with the outcome of cumulative number of units earned by spring in both cohorts and a strong correlation with the outcome of number of units registered in fall in the Foothill cohort.

In the De Anza cohort, the length of the education plan did not seem to be that important in the model for predicting number of credit units earned by the end of the academic year, when compared to results for the Foothill cohort. In essence, length of the education plan did not provide much information beyond that provided by the development of a comprehensive plan in the De Anza cohort. The inconsistency of results for this predictor across groups may be related to the fact that the average length of education plans at De Anza (39 units) was significantly smaller, when compared to that for the Foothill cohort (62 units). In other words, students' education plans in the De Anza cohort were, on average, not long enough to show an effect, as it did for the Foothill cohort.

Although not statistically significant, the development of a comprehensive plan was shown to be the best predictor of cumulative GPA by the end of the academic year among all SSSP core services. Future research should explore whether other factors (such as differences due to student characteristics or program of study) may mediate or moderate the relationship between time when SSSP core services are provided and cumulative GPA.

Regarding the importance of predictors for the outcome of number of units registered in the fall term of the following academic year, findings across cohorts showed mixed results. The development of a comprehensive plan was the strongest predictor for the De Anza cohort, while for the Foothill cohort the stronger predictors were assessment/placement and length of education plan. Similar to findings for predicting the cumulative number of units earned by the end of the academic year discussed previously, these results may reflect difference across cohorts and how these impact the statistical analysis. In sum, differences in the predictors account for differences in results across cohorts.

To better understand differences across cohorts for the relative importance for the predictor of assessment/placement services, student headcounts and mean scores for academic achievement measures were disaggregated by time of service (before or during fall 2015 or after fall 2015) and cohort

group in Table 8. A significant difference across groups shown by statistics in the table is the percentage of students who had received the service by fall at each college: De Anza cohort, 96%; Foothill cohort, 86%. Another significant difference shown in this tables is that, although students who received assessment for placement services before or during fall tend to score higher in all outcome measures for both cohorts, for the Foothill cohort the difference for the number of units registered in fall was about 76% lower for students who registered after fall, when compared to those who received these services earlier in this college (2.59 compared to 10.97). These findings suggest the possibility that the Foothill cohort was able to show the effects of not receiving placement services early in the academic year because this cohort had enough students under this condition (14% of the total headcount, compared to 6% for the De Anza cohort).

*Table 8. Average Scores for Achievement Outcomes Measures by Time of Assessment for Placement Services and College Cohort*

	All Students	Before or during fall 2015	After fall 2015 or no placement	Difference	Percent Difference
<b>De Anza Cohort</b>					
<b>Cum GPA, spring 2016</b>	2.69	2.71	2.13	-0.58	-22%
<b>Cum earned units, spring 2016</b>	34.78	35.25	22.01	-13.24	-38%
<b>Registered units, fall 2016</b>	11.07	11.21	7.36	-3.85	-34%
<b>Total headcount</b>	2,409	2,324	85		
<b>Percent Total</b>	100%	96%	4%		
<b>Foothill Cohort</b>					
<b>Cum GPA, spring 2016</b>	2.64	2.67	2.40	-0.28	-10%
<b>Cum earned units, spring 2016</b>	32.52	34.30	21.67	-12.62	-37%
<b>Registered units, fall 2016</b>	9.79	10.97	2.59	-8.39	-76%
<b>Total headcount</b>	773	664	109		
<b>Percent Total</b>	100%	86%	14%		

**Notes**

For GPA, only students with attempted GPA units at the college were included in the calculation of average figures: De Anza cohort, 2,388; Foothill cohort: 766.

### *Study Limitations*

This is a study about assessing linear relationships between variables, labeled predictors or outcomes, which are based on observations documented in the data used for the study. Because this study does not involve an experimental design (participants are not randomly assigned to experimental or control groups), no causal inferences can be made based on the results. This means that finding support for a significant relationship in this study does not necessarily imply that the predictor (time of SSSP services) causes the outcome (academic achievement). Given that conducting an experiment would be impractical, the most reasonable step forward is to account for any rival explanation to the results.

Possible explanations to the findings include the following:

- The main hypothesis in the study: The earlier first-time students receive SSSP core services, the more likely they are to academically succeed during their first year at the college and return the next fall.
- Rival hypothesis 1: Findings for a positive and significant relationship between the time when first-time students receive SSSP services and their academic achievement can be better explained by confounding factors, such as student differences regarding their motivational attitudes and behaviors in academic settings. In specific, students who succeed academically tend to be the ones who actively seek and receive support services whenever they become available. In this study, the time for SSSP services works as a marker or identifier for motivated students—the ones most likely to succeed.
- Rival hypothesis 2: In complex environments, such as a community college, multiple factors may contribute to students' success, including personal (for example, academic aptitude and motivation) and institutional variables (for example, quality of instruction and support services). Depending on the students' specific needs, some factors may play a more significant role than others. The need for providing SSSP core services early in the academic year for all first-time students is not based on the thesis that such practice is a requirement for successful academic achievement for all students for groups within the student population may already have or be able to acquire on their own the skills and knowledge these resources provide. The need for providing these services early in the academic year to these students is to guarantee that all students, especially those who need these services the most, have had the opportunity to acquire, or begin acquiring, these skills and knowledge.

## Recommendations

Based on results for this study, the following is recommended:

- 1) Unless exempted, all first-time students must receive orientation, placement (English, Math, and ESL, if applicable), and comprehensive education planning services before they are allowed to register in their second primary term (fall, winter, spring) of attendance at the college. This will ensure that all students, especially those who may need these services the most, are exposed to activities and material designed to help them develop skills and knowledge to support their academic success.
- 2) Comprehensive education plans should include all courses necessary to achieve the student's education goal for enrollment at the college. To facilitate this, the degree audit system at the college should have templates for all degrees and certificates offered, including certificates for transfer to the University of California and the California State University systems. (Transfer to a four-year institution is the education goal for most first-time students at both colleges.) The comprehensive plan should be students' road map to achieve their education goal, and it should help identify ahead of time any problems that may delay or impede their academic progress.
- 3) Further research or evaluation regarding the quality of SSSP services provided is needed to make sure these services provide students with the opportunity to acquire the intended skills and knowledge. Special emphasis should be given to examine if there is a need to offer or require different types of services to different student populations.

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