INSTITUTE FOR HIGHER EDUCATION
LEADERSHIP & POLICY

STUDENT FLOW ANALYSIS:
CSU Student Progress Toward Graduation

Report to the California State University
As part of the *Making Opportunity Affordable* Planning Year

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Purpose of the Research on Student Flow toward Graduation

The CSU Chancellor's Office received a grant from the Lumina Foundation to engage in a year of planning activities to increase productivity within the CSU system. The grant is part of the Making Opportunity Affordable (MOA) initiative of the Lumina Foundation that is aimed at improving higher education productivity nationally. There have been several foundation initiatives in recent years that have focused on degree completion, college readiness, and developmental education. MOA encompasses all of those concerns but with the additional focus of increasing productivity. Much is known about how to increase student success but many of those strategies are prohibitively expensive, e.g., personalized support services and widespread supplemental instruction. The challenge, particularly with sharply reduced campus budgets, is to increase graduation rates while reducing the cost of producing each degree.

Our charge, as subcontractors for this MOA planning year, was twofold:

(1) Analyze the patterns by which students either proceed through stages toward degree completion or get off track – in order to determine what institutional efforts would have the biggest return in getting students on track and increasing instructional productivity.

(2) Conduct an in-depth analysis of CSU Campuses' Actions to Facilitate Graduation (CAFG) to determine which of the many individual campus initiatives offer the greatest promise to the CSU system to increase graduation rates and numbers of graduates.

This work was intended to inform CSU efforts as the system works to improve graduation rates and productivity. The nation's declining competitive position in educational attainment and the severe economic downturn create an imperative for finding ways to educate more students at less cost. The problem is acute in California. According to a recent analysis by the Public Policy Institute of California, the state will need to produce an additional one million college graduates with a bachelor's degree between 2005 and 2025 to meet projected employment demand.[1] Currently, the CSU awards about 46% of the bachelor's degrees in the state, making its share of the degrees needed to close the expected gap 460,000.[2] To meet this goal, the CSU would have to award 28,750 additional degrees *each year* between 2010 and 2025—39% more than the number of degrees awarded in the 2007/2008 academic year.[3] Now facing severe budgetary constraints, it is vital to find strategies that lower the costs of producing each graduate.

This excerpt of the full report provided to the CSU contains the student flow analysis - part 1 of the charge detailed above. While the specific analysis of the CAFG initiative is of interest primarily to the CSU, the student flow analysis has widespread application to other higher

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[1] Johnson, H. & Sengupta, R. (2009). *Closing the Gap. Meeting California's need for college graduates.* San Francisco, CA: Public Policy Institute of California. The report acknowledges the difficulty of closing the full gap and includes a "moderate" scenario for closing half of the gap, in part by increasing the CSU graduation rate from 50% to 62%.

[2] Between 2003 and 2007, the CSU awarded an average of 46% of the bachelor degrees awarded in California. Source: California Postsecondary Education Commission's Custom Data Reports.

[3] 73,132 undergraduate degrees were awarded in 2007/08. Source: CSU Analytic Studies http://www.calstate.edu/as/stat_reports/2007-2008/deg01.htm

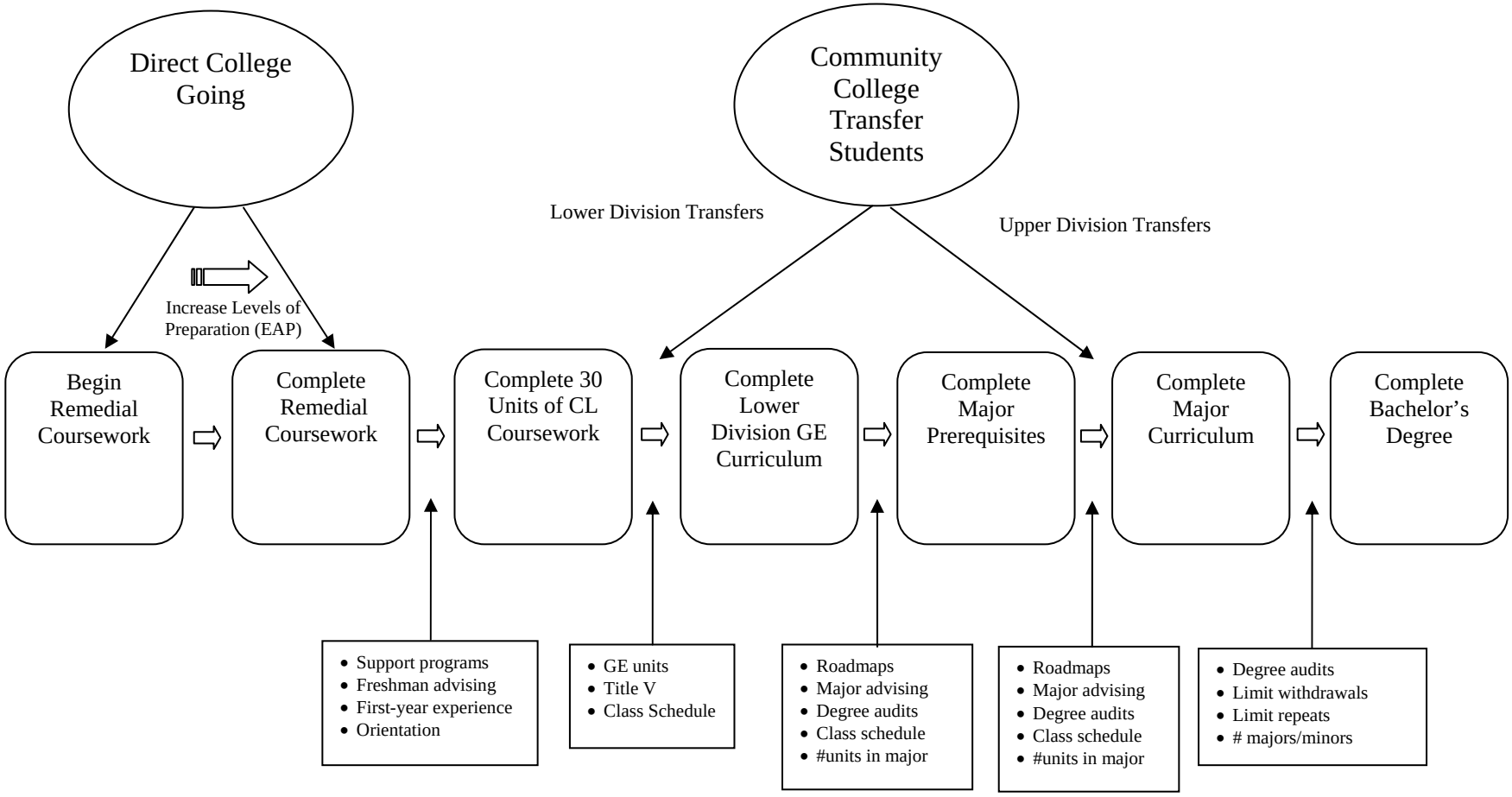
education systems engaged in tracking student progress and success as a basis for optimally targeting intervention strategies to improve graduation rates.

Framework for the Analysis

We used an organizing framework to guide this study that is based on the concept of *milestones*, defined as intermediate outcomes that students achieve on the route to degree completion. Monitoring student progression through milestones is an emerging technique across the country that can provide institutional leaders with information about where to target interventions to help students succeed. If only graduation rates are monitored it is difficult to know why students are not graduating and, thus, what should be done to help more students graduate. Tracking the patterns by which students reach, or fail to reach, milestones can help institutions understand the barriers different students encounter at different points in their academic careers.

The second part of the framework (the details of which are not included in this report excerpt) involves locating various aspects of the CSU systemwide Campus Actions to Facilitate Graduation (CAFG) initiative along the milestone framework. The CAFG initiative includes 22 individual actions that can be clustered into certain categories of intervention, e.g., first year student support programs, curricular streamlining, major advising. Each category of initiatives can be understood to be targeted primarily at certain points in the continuum from initial enrollment to graduation. Flowchart 1 depicts student flow through milestones and indicates where various CAFG initiatives hope to intervene and reduce leaks in the pipeline to graduation. For example, some CAFG items are aimed at helping students to complete their general education requirements (by streamlining the curriculum) and others are aimed at reducing the "super senior" problem by restricting the number of units students can accumulate through course repeats.

Flowchart 1
Framework for Analysis: Milestones and Campus Actions to Facilitate Graduation (CAFG)



Methods

The research involved the analysis of student data to document patterns of student flow to graduation and to identify barriers to graduation. We analyzed a cohort of entering students in Fall 2002, supplied by the CSU Office of Analytic Studies, to document the flow of students across the various milestones – to the extent possible given certain data limitations (discussed later). This allowed us to quantify the student flow across the milestones and to make a number of useful observations about where different groups of students face obstacles. In addition to tracking student progress along milestones, we analyzed the student academic behaviors (e.g., part-time enrollment) that have been shown to predict degree completion.

The absence of actual transcript data required us to approximate several of the milestone measures and to forgo analyzing some of the academic behavioral variables that we have used elsewhere to predict degree completion.[4] Nevertheless, we were able to produce useful results from this analysis that will serve as a sound basis for this report. The analysis that follows shows how students, overall and for certain subgroups, move through various milestones and the relationships between successful progression toward the degree and certain academic behaviors. From the analysis of the cohort data we were able to fill in actual percentages in the model displayed in Flowchart 1. These percentages guided the analysis of the CAFG initiative by allowing us to relate what we learned from interviews and reviews of campus CAFG documents to the data about where students encounter obstacles in moving through to the degree.

[4] Shulock, N., Moore, C. & Offenstein, J. (2009, forthcoming). *Advancing by degrees: A framework for increasing college completion*. Sacramento, CA: Institute for Higher Education Leadership & Policy.

Student Flow Analysis

Graduation Rates in the CSU

Table 1 shows the six-year graduation rate for first-time freshmen and CCC transfers in the CSU, for the entering cohorts beginning in 1995 and 2002.[5] Approximately half of first-time freshmen graduate within six years across the CSU system, up from 40% for the 1995 cohort. Freshman graduation rates increased between the two cohorts for all campuses except Los Angeles, with increases of 10 or more percentage points at Chico, Long Beach, Northridge, Pomona, San Diego, San Francisco, and San Marcos.

Over two-thirds of CCC transfer students across the CSU system graduate within six years (note that freshman and transfer graduation rates are not comparable; CCC transfers come in to CSU with up to two years of accumulated credits toward the degree, and have had the opportunity to develop and use skills necessary for success in college). The most recent graduation rate also represents an increase over the 1995 cohort. Graduation rates for CCC transfers increased on all campuses except Humboldt and Los Angeles, with increases of 10 or more percentage points at Long Beach, Monterey Bay, Northridge, San Bernardino, San Diego, San Francisco, and San Marcos.

Table 1
CSU Graduation Rate within 6 Years

	Freshmen		**CCC Transfers**	
Campus	**1995-2001**	**2002-2008**	**1995-2001**	**2002-2008**
Systemwide	39.6%	48.9%	62.9%	70.1%
Bakersfield	41.3%	44.5%	65.4%	67.6%
Chico	42.8%	55.7%	64.8%	72.5%
Dominguez Hills	31.3%	34.0%	64.9%	67.4%
East Bay	36.2%	44.4%	61.1%	68.1%
Fresno	41.7%	48.0%	66.9%	71.4%
Fullerton	43.0%	49.0%	70.8%	73.5%
Humboldt	37.8%	42.2%	71.5%	68.6%
Long Beach	33.6%	55.4%	59.1%	69.9%
Los Angeles	32.2%	30.6%	57.5%	55.5%
Maritime Acad.	NA	62.0%	NA	93.3%
Monterey Bay	37.9%	38.7%	47.5%	64.5%
Northridge	25.6%	41.1%	56.2%	71.5%
Pomona	38.9%	50.4%	62.1%	71.9%
Sacramento	40.0%	41.6%	63.8%	69.1%
San Bernardino	38.2%	43.7%	65.3%	77.2%

[5] The Consortium for Student Retention Data Exchange (CSRDE) graduation rates are available on the Chancellor's Office website at http://www.asd.calstate.edu/csrde/index.shtml#ccct. The Channel Islands campus is not included in the table since it did not open as a separate university until 2003.

San Diego	36.2%	61.3%	64.1%	75.4%
San Francisco	33.3%	43.7%	59.7%	70.1%
San Jose	36.7%	41.4%	59.4%	64.8%
San Luis Obispo	65.9%	69.4%	74.8%	77.6%
San Marcos	27.1%	45.1%	52.2%	65.3%
Sonoma	46.4%	49.6%	69.7%	70.4%
Stanislaus	47.6%	52.7%	65.5%	71.4%

What the Research Literature Tells Us Contributes to Degree Completion

There is a general consensus among researchers that college students are more likely to complete a degree if they come from higher-income families, have parents who went to college, have stronger academic preparation in high school, enroll in college shortly after high school graduation, are committed to a goal of completing a degree, and attend college full time without interruption. In other words, "traditional" students are more successful, perhaps because our postsecondary institutions were designed at a time when most students fit that profile. A growing part of the literature is identifying patterns that characterize successful student outcomes, providing useful information to institutions for developing policies and procedures to increase rates of degree completion.[6]

Course-Taking and Academic Behaviors

Much research has emphasized the importance of early accumulation of college credits as a means of providing momentum toward degree completion. Specific behaviors that are related to credit accumulation and increase the likelihood of degree completion include taking a full-time courseload, completing courses (i.e., avoiding course dropping and failure), avoiding stop-outs, and enrolling in summer terms. Many studies also suggest the importance of completing certain gateway courses, especially math, early in the college career. Taking an orientation or "college success" course has also been shown to contribute to degree completion, especially among older students and those from under-represented minority groups. While research on the effectiveness of remedial education for under-prepared students yields inconsistent results, several studies have demonstrated that students who enroll in remedial coursework immediately upon entering college have better outcomes than those who delay remediation.

Student Support

Research suggests that students who more frequently utilize student support services and counseling are better adjusted to college life, more likely to be committed to the goal of a college degree, and more likely to persist toward earning that degree. One recent study found that institutional expenditures on student services had a greater positive impact on graduation rate than expenditures on instruction, especially for institutions serving large numbers of disadvantaged students. Some studies have found that "intensive" or "intrusive" advising is particularly effective in improving outcomes among disadvantaged minority and other at-risk students. Support services are most effective when they are comprehensive, addressing the full range of academic, personal, and financial problems common to at-risk students. Bringing a

[6] For a review of the research literature on factors related to student success and graduation, see Moore, C. & Shulock, N. (2009, forthcoming). *Student progress toward degree completion: Lessons from the research literature*. Sacramento, CA: Institute for Higher Education Leadership & Policy.

variety of types of services together under one roof, and bundling services together in programs aimed at specific groups of non-traditional students may be especially effective. First-year experience programs are a particular kind of support service that has been found to increase persistence and success by emphasizing social integration with faculty and peers and by offering academic help and advising to new students.

Structure and Pathways

Some research points to the value of providing students with a highly structured plan for earning a degree in a specified time frame which, while sacrificing some amount of student choice, may increase degree completion by making the pathway clear. Along with a structured pathway, institutions that assume greater responsibility for informing students, guiding their choices, and preventing mistakes through frequent mandatory advising, group advising, peer cohorts, and use of student information systems may see increases in degree completion. Recent state reform efforts in the area of community college transfer are also beginning to show benefits of clear pathways. A number of states are developing statewide transfer pathways, both for general education and selected majors, and documenting better outcomes for those students who follow the structured pathways.[7] In addition, a number of states are demonstrating that structured career pathways are helping students earn certificates and degrees in two-year institutions.[8] While structured pathways may be more important for the under-prepared student populations who predominate in community colleges, four-year institutions that serve large numbers of under-prepared students, like the CSU, could also benefit from more structured curricula.

Milestones and Success Indicators: A Framework for Understanding and Improving Student Progress to Degree

There is a growing recognition across public higher education of the need to improve graduation rates in order to get the numbers of college graduates needed to maintain economic competitiveness. But the commitment of postsecondary leaders to improve graduation rates needs to be supported with better information about student progress than is provided by traditional measures, which:

- are generally limited to retention and graduation rates
- ignore the intermediate outcomes that students must achieve on the path to degree completion
- provide no information on students' patterns of enrollment and success, which can indicate whether or not students are gaining momentum on the path to a college degree
- offer no guidance on diagnosing where and why students fall off the pathway to graduation, or how changes in policy and practice might be used to increase degree completion.

[7] Moore, C., Shulock, N., & Jensen, C. (2009). *Crafting a student-centered transfer process in California: Lessons from other states.* Sacramento, CA: Institute for Higher Education Leadership & Policy.

[8] See career pathways toolkit from the Ford Foundation's *Bridges to Opportunity* program: http://www.communitycollegecentral.org/careerpathways/index.html.

Some researchers have begun to analyze intermediate student outcomes, and the enrollment patterns that predict reaching those milestones and ultimately completing a degree.[9] In this section of the report, we use a framework along with student-level data obtained from the CSU Chancellor's Office to examine progress toward the baccalaureate for a cohort of students across the system. The framework consists of two components:

1. **Milestones** – measurable educational achievements that students reach along the path to degree completion
2. **Indicators of success** – measurable academic patterns that students follow (in addition to continued progression along milestones) that predict the likelihood they will reach milestones and ultimately earn a degree.

Table 2 displays the two components of the framework, based on the research literature on student success. The success indicators are grouped into three categories of student enrollment behaviors:

1. **Remediation** – the importance of addressing any remedial needs immediately on enrollment
2. **Gateway courses** – the benefit of early enrollment in and completion of certain gateway courses
3. **Credit accumulation and related academic behaviors** – the importance of building academic momentum through behaviors that lead to the timely earning of college credits.

[9] See, for example: Shulock, N., Moore, C., & Offenstein, J. (2009, forthcoming). *Advancing by degrees: A framework for increasing college completion.* Sacramento, CA: Institute for Higher Education Leadership & Policy; Leinbach, D.T. & Jenkins, D. (2008). *Using longitudinal data to increase community college student success: A guide to measuring milestone and momentum point attainment*. New York: Community College Research Center; Achieving the Dream Cross-State Data Workgroup (2008). *Test drive: Six states pilot better ways to measure and compare community college performance*. Boston, MA: Jobs for the Future.

Table 2
Milestones and Success Indicators

Milestones	Success Indicators

▪ Retention
▪ Complete needed remediation
▪ Transition to college-level coursework
▪ Earn one year of college-level credits
▪ Complete general education (GE) coursework
▪ Complete community college transfer curriculum
▪ Transfer from community college to a university
  o without completing transfer curriculum
  o after completing transfer curriculum
▪ Complete certificate or degree
	Remediation:
	▪ Begin remedial coursework in first term, if needed
	Gateway Courses:
	▪ Complete college-level math/English in the first year or two
	▪ Complete a college success course or first-year experience program
	Credit Accumulation and Related Academic Behaviors:
	▪ High ratio of course completion (low rate of course dropping and failure)
	▪ Complete 20-30 credits in the first year
	▪ Earn summer credits
	▪ Enroll full time
	▪ Enroll continuously, without stop-outs
	▪ On-time registration for courses
	▪ Maintain adequate academic performance

The framework is intended to help campus and system leaders diagnose where and why students fail to make progress and target their responses accordingly. In the remainder of this section of the report, we describe how we applied the framework to the CSU in order to see how many students achieve milestones and to what extent students are not exhibiting what have been shown to be successful enrollment patterns and behaviors.

The student-level data we used had several weaknesses that limited our ability to measure achievement of milestones and the degree to which students demonstrated the enrollment patterns and behaviors that can serve as indicators of success. In particular, the system does not collect records of students' individual course enrollments in each term. The lack of course data meant that we could not determine whether students enrolled in and completed gateway courses, whether they dropped courses, or the timeliness of their registration for courses. The way data are collected on units completed made it difficult to match units completed to a particular term,[10] resulting in some uncertainty about measures related to credits completed in the first year and the first-year credit completion ratio. The data set did not include grade point average by term, so we could not measure academic performance in a particular period or changes in academic performance over time. Also, while results of assessment tests made it possible to identify

[10] There are data on units attempted in each term, making the number of units attempted in a specific term easy to identify. However, the term variables for units completed are cumulative, and are lagged by at least one term. If a student is not enrolled in a term, the cumulative units completed up to that term does not show up until the next time the student enrolls.

students who entered with remedial needs, there were no data on the actual enrollment in or outcome of remedial coursework.[11]

Data and Methods

Data Source: CSU Chancellor's Office
We obtained student record data for the cohort of undergraduate students initially enrolling in the CSU system in Fall 2002, including both freshmen and transfer students. The data include demographic information, results of assessment testing, units attempted by term, units completed, and records of degrees earned. The data tracked the students through Fall 2008. The primary limitations of the data result from a lack of course-taking records, which constrained our development of milestones and success indicators for analysis. Our analyses focus on freshmen and transfer students from the California Community Colleges (but not transfers from other institutions). We excluded the records for 38 students who were noted as having earned a master's degree rather than a bachelor's degree despite their classification as undergraduate students (consultation with Chancellor's Office staff indicated that there were likely errors in the data). The final data set included 40,582 freshmen and 33,151 CCC transfers.

Methods
We calculated the percent of students who reached milestones, and the rates of milestone achievement for different groups of students. We examined the probability of degree completion by whether or not students met the success indicators. We used regression analysis to test whether the success indicators predicted completion after controlling for other factors, and whether the relationships held across different groups of students. For simplicity, details about the statistical analyses are described in the appendix.

[11] CSU system policy requires students with remedial needs to enroll in remedial courses beginning in the first term, and to successfully complete required remedial courses within one year. However, we could not assume that remedial students who enrolled the following year had completed remediation because exceptions are made to the one-year limit. And we could not assume that remedial students who did not enroll the following year had been disallowed from re-enrolling due to failing to complete remediation, as it is possible they did complete it but did not enroll again for some other reason.

Too Few CSU Students Reach Milestones on the Road to Degree Completion

Milestone Achievement for Freshmen

Figure 1 shows the percent of entering freshmen in the cohort that achieved different milestones within six years.[12] The results show that:

- about 8 in 10 students were retained to the second year
- 72% completed at least 30 semester credits, or one year's worth of coursework, the level often associated with wage gains in the research literature[13]
- about two-thirds of freshmen completed 45 semester credits at the lower-division level,[14] intended as a proxy for completing general education
- about half of freshmen earned a bachelor's degree.

About 60% of entering freshmen needed remediation in math or English (or both). These students were less likely to reach each of the milestones than students who were proficient at entry.

Black and Latino(a) students were as likely to be retained to the second term as white students, but their rates of achieving other milestones lagged behind, and were especially low for black students (Figure 2). Only about one-third of black freshmen and 43% of Latino(a) freshmen earned a bachelor's degree within six years of entry compared to nearly 60% of white students. Asian students were as likely as white students to be retained to the second term and the second year, and were slightly more likely to complete 30 credits, but were less likely to graduate (51% vs 59%).

Figure 3 shows the percent of CSU freshmen completing a bachelor's degree by year. The largest number of completions occurred in year 5.

[12] The time period students were tracked was Fall 2002 through Fall 2008. This represents 6.5 academic years for campuses using a semester schedule, and 6.33 academic years for campuses on the quarter system, rather than exactly 6 years.

[13] Ideally, we would have measured completion of 30 *college-level* credits (i.e., excluding any non-degree-applicable remedial credits), but the data did not allow for the distinction. Note that all data on credits attempted and completed were converted into semester equivalents for the campuses using a quarter schedule.

[14] Due to data limitations, we had to estimate the number of lower division credits earned. While the data set included the number of lower-division credits attempted, the variables for credits earned did not distinguish lower-division and upper-division. We multiplied the number of lower-division credits attempted by the first-year credit completion rate to estimate the number of lower-division credits earned.

Figure 1:
Milestone Achievement among Freshmen

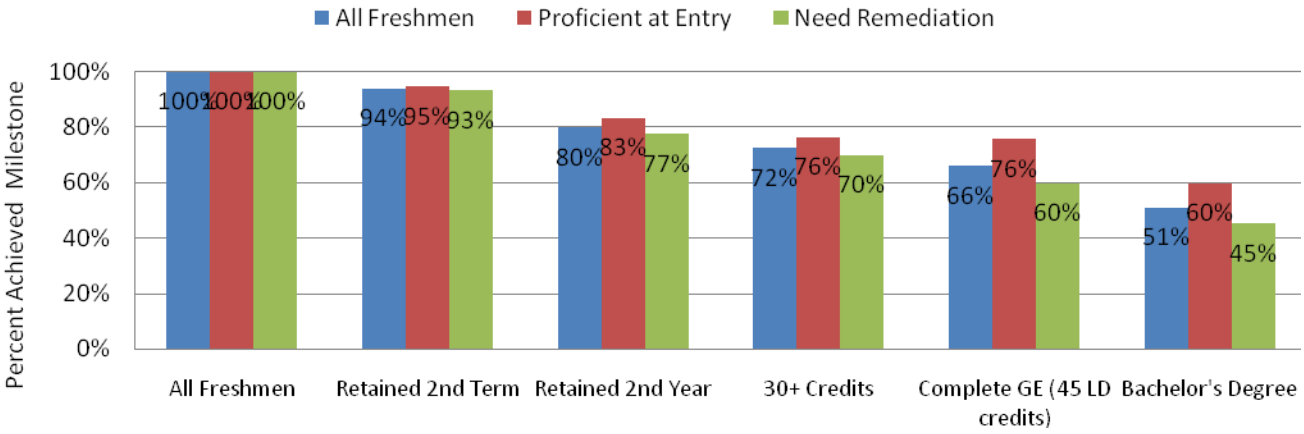


Figure 2:
Milestone Achievement by Race/Ethnicity among Freshmen

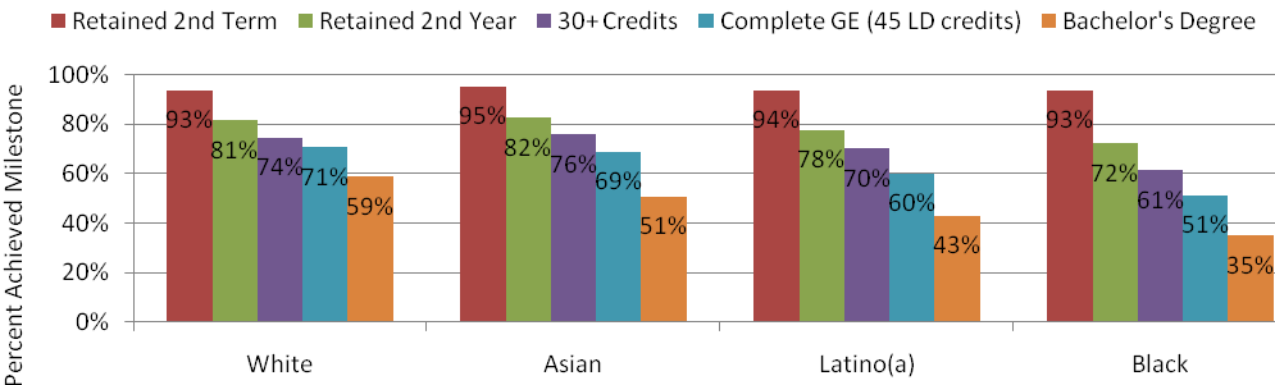
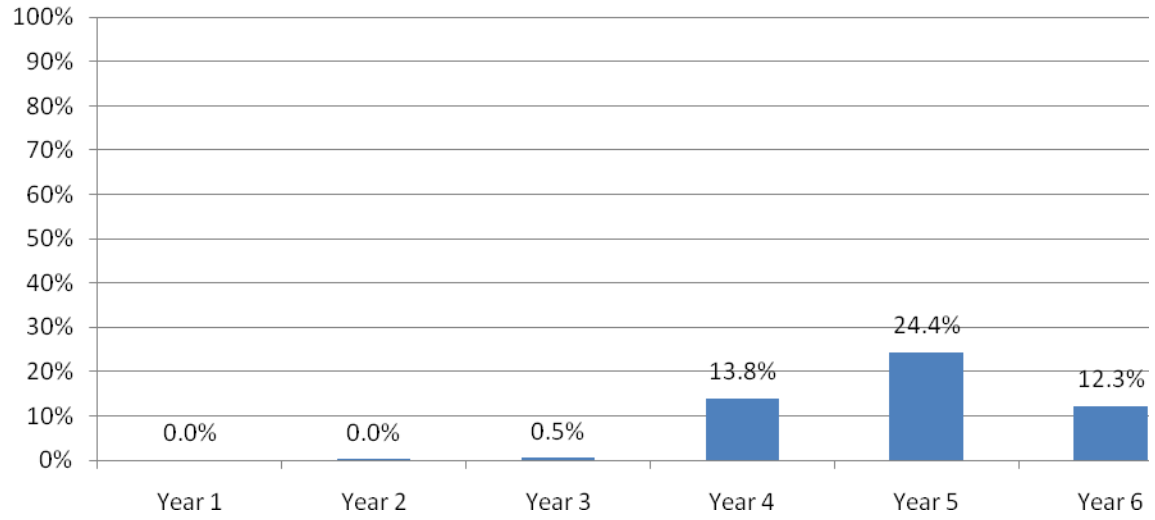


Figure 3:
Percent of Freshmen Receiving a Bachelor's Degree by Year



Milestone Achievement for CCC Transfers

Figure 4 shows milestone achievement for transfer students from the California Community Colleges.[15] We did not include the milestones for earning 30 or more credits or completing GE since most CCC students enter as upper division students with 60 or more credits and at least most GE requirements completed. Eighty-five percent of CCC transfers returned the second year and 72% earned a bachelor's degree within six years of enrolling in the CSU.

More than 80% of students from all racial/ethnic groups were retained to the second year, but degree completion was higher for white students (75%) than for Asian (71%), Latino(a) (70%) and, especially, black (61%) students (Figure 5).

Figure 6 shows the percent of CCC transfers completing a bachelor's degree by year. The largest number of completions occurred in year 3, and about two-thirds of those who finished within the six-year tracking period had graduated by the end of the third year.

[15] We did not include transfers from other colleges and universities, like in-state 4-year or out-of-state institutions, in our analyses. Transfers from the CCC system represented 85% of all transfer students in the data set.

Figure 4:
Milestone Achievement among CCC Transfers

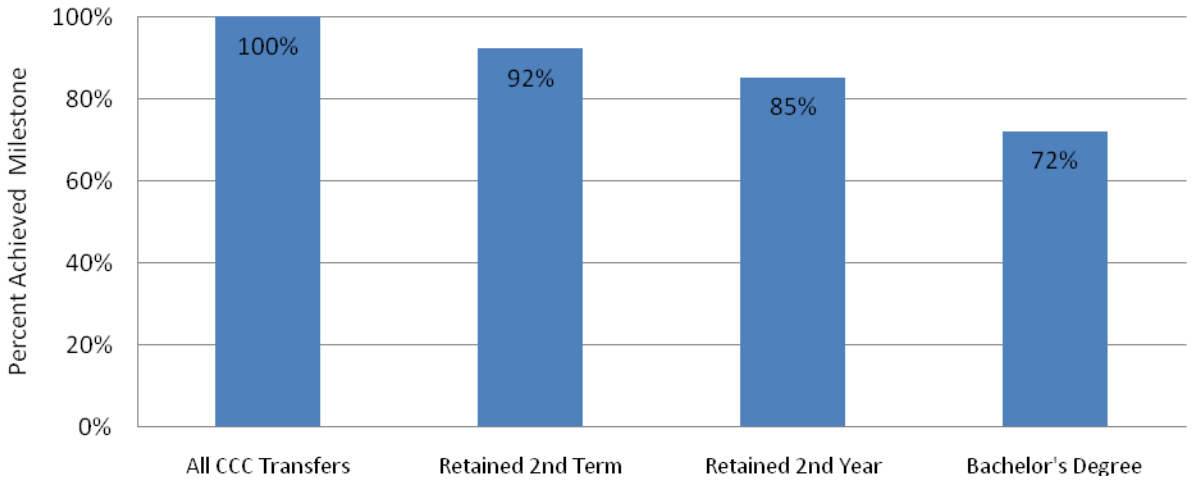


Figure 5:
Milestone Achievement by Race/Ethnicity among CCC Transfers

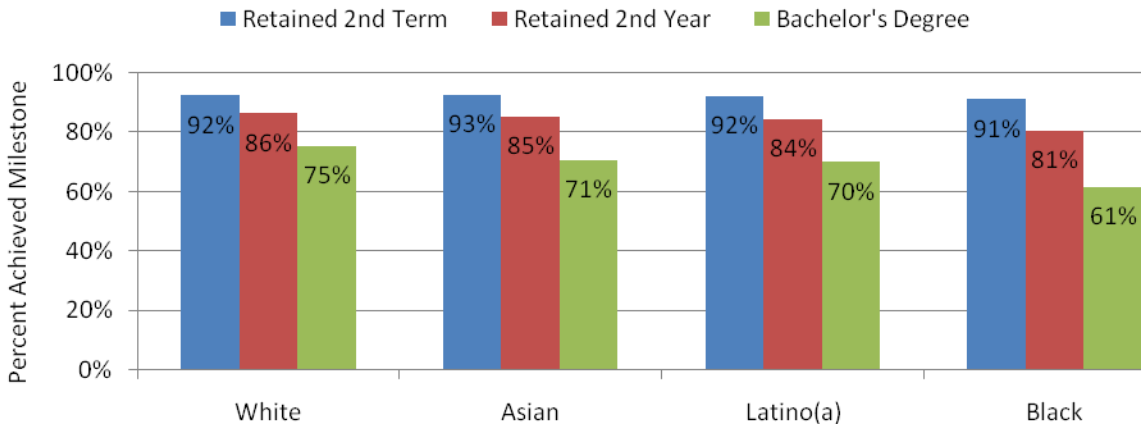
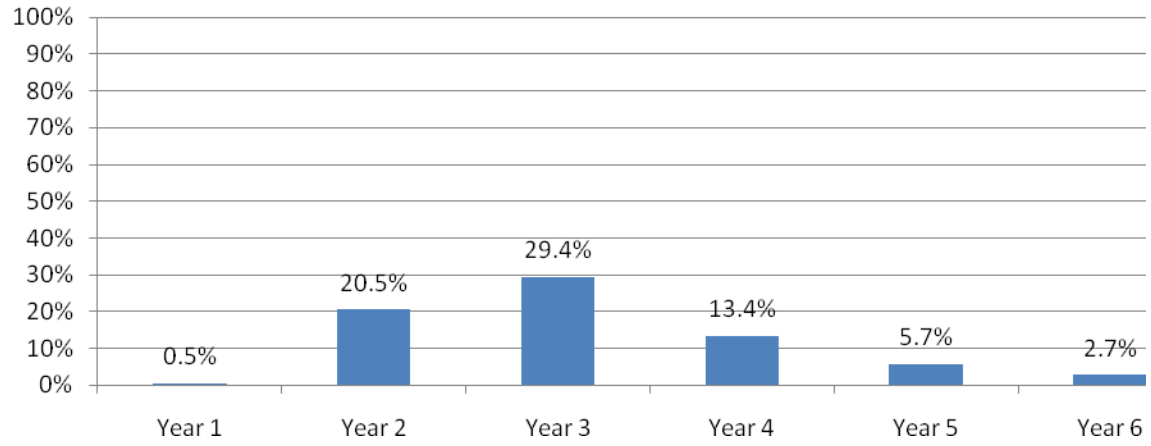


Figure 6:
Percent of CCC Transfers Receiving a Bachelor's Degree by Year



Credit Accumulation Provides Momentum

We created several success indicators related to early accumulation of credits. The first is an indicator of whether students earned 20 or more credits during the first year (2002-03). The 20-credit threshold is somewhat arbitrary, as researchers have generally used thresholds between 20 and 30 semester credits, and our own research has not found a specific credit threshold associated with a substantial jump in the graduation rate. Rather, we have found a fairly linear relationship between the number of credits earned and the probability of graduation – the more credits earned in the first year, the higher the chance of graduating. Another indicator related to credit accumulation is the credit completion ratio in the first year, calculated as the number of credits earned divided by the number of credits attempted, so that either failing or withdrawing from a course led to non-completion of credits. Earning credits in summer terms is another success indicator related to credit accumulation.[16] Finally, students who enroll continuously without stopping out are more likely to accumulate credits, as are students who enroll full time.[17] These success indicators represent those among the list of indicators in Table 1 that we could create given the limitations of the data. As noted earlier, we could not measure completion of gateway courses.

Patterns Related to Credit Accumulation among Freshmen

Figure 7 shows the probability of graduation associated with each of the success indicators related to credit accumulation. About two-thirds of freshmen who completed 20 or more credits in their first year of enrollment at CSU completed a bachelor's degree, more than three times the

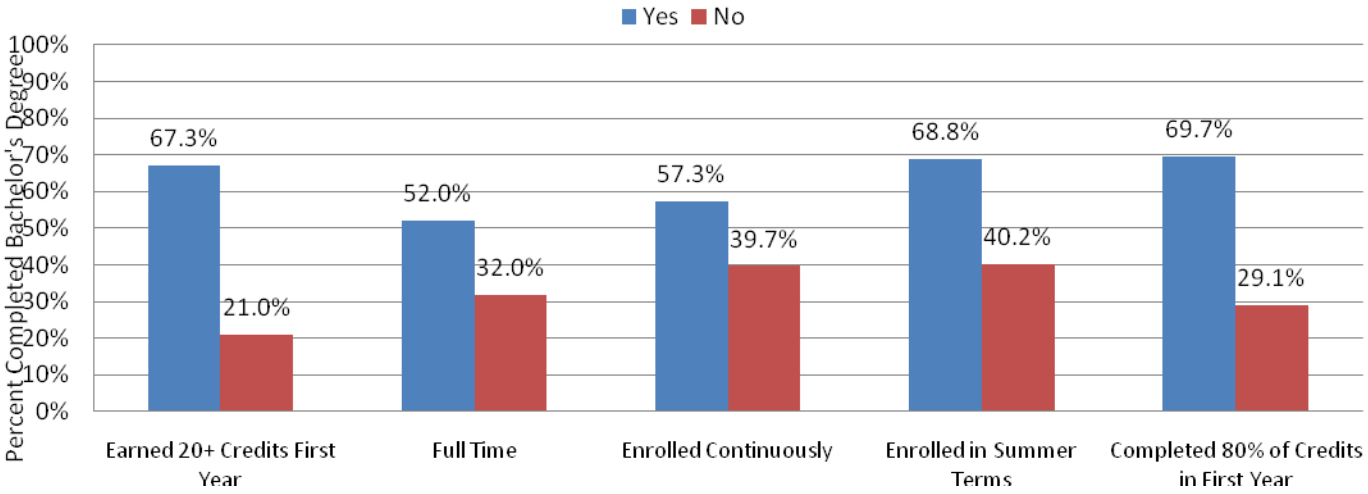
[16] Due to data limitations, we measured enrollment in summer terms rather than completion of summer credits.
[17] We defined full time enrollment as attempting 12 or more credits during the first fall term (Fall 2002), matching the federal definition for a full-time course load for financial aid purposes. In other research, we have used alternative definitions of full-time, such as enrolling in 12+ credits in a majority of terms attended, and have found very similar relationships with milestone achievement regardless of the specific method for defining full-time enrollment.

rate for students who did not meet that threshold. To accumulate credits and build momentum toward degree completion, students need to complete their courses. The rate of earning a bachelor's degree was 40 percentage points higher for students who completed at least 80% of the credits they enrolled in during the first year compared to those who completed a smaller percentage of first-year credits by withdrawing from or failing courses.

Students who enroll full-time and continuously can accumulate credits faster than students who enroll part time and stop out. Ninety-five percent of freshmen in the cohort enrolled full time (12+ credits) in the first term, and those students had a probability of graduation that was 20 percentage points higher than freshmen who enrolled only part time in Fall 2002. Freshmen who enrolled continuously (not counting summer terms) for whatever portion of the six years they attended were substantially more likely to graduate than those who stopped out for one or more terms, with graduation rates of 57% and 40% respectively. Enrolling in summer terms was also associated with a substantially higher graduation rate. Students who attend regularly and persist over a number of years are more likely to take summer classes, so summer enrollment is in part just an indicator that students are being retained and consistently enrolling in classes, but summer terms also provide students with an opportunity to build and sustain progress by earning additional credits.

Freshmen who entered CSU with remedial needs were about as likely as college-ready freshmen to enroll full time in the first term, to attend continuously for whatever period of time they were enrolled, and to enroll in summer terms. But they were considerably less likely to earn a threshold level of credits in the first year or to complete the credits they attempted in the first year. Only 55% of remedial students completed 20 or more credits in the first year and only 40% completed at least 80% of the credits attempted, compared to 80% and 76%, respectively, among college-ready freshmen. The average first-year credit completion ratio was 70% among remedial students compared to 90% for freshmen entering with college-level English and math skills.

Figure 7:
Probability of Graduation for Freshmen based on Meeting Credit Accumulation Indicators

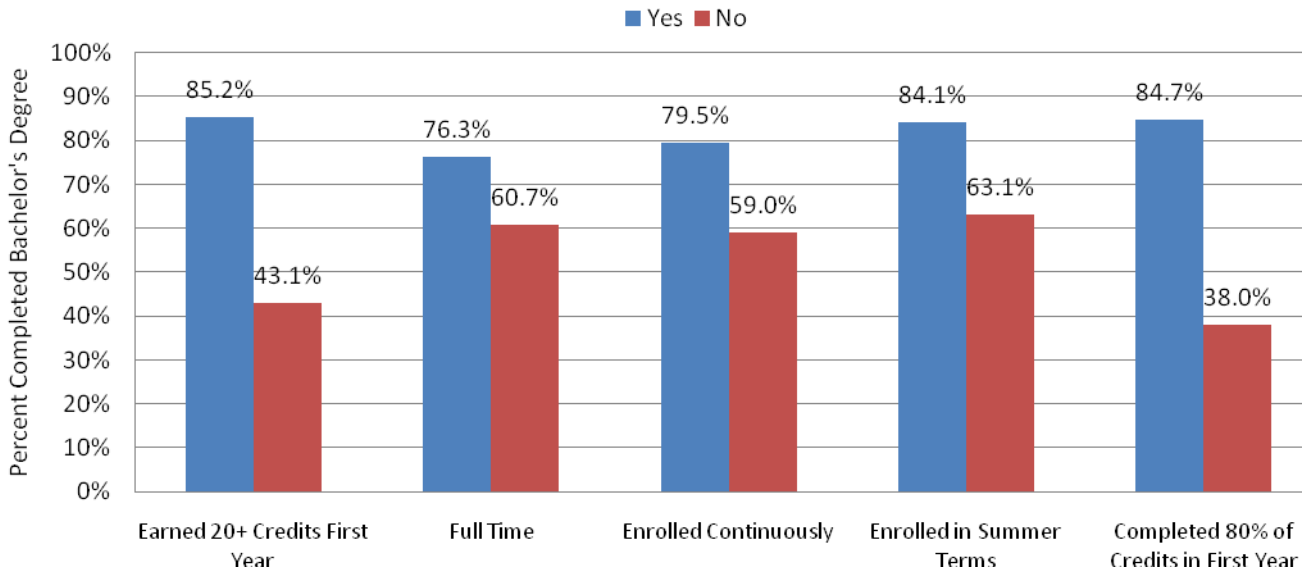


Patterns Related to Credit Accumulation among CCC Transfers

Research on intermediate milestones and success indicators has focused on beginning college students, both in community colleges and universities. We are not aware of any prior attempts to apply analyses related to milestones and indicators of success to transfer students who have already completed substantial college credits in other institutions. Our analysis of data for CSU students suggests that the indicators related to credit accumulation are also predictive of graduation for CCC transfers.

Transfer students who earned at least 20 credits in their first year at CSU were twice as likely to graduate as those who earned fewer credits, and about 85% of transfers who completed 80% or more of credits during the first year graduated within six years, compared to only 38% of transfers who dropped or failed a higher share of their first-year courses. Attending full time and continuously, and enrolling in summer terms, were also related to a higher probability of graduation for CCC transfer students.

Figure 8:
Probability of Graduation for CCC Transfers based on Meeting Credit Accumulation Indicators



Choosing a Major by End of Sophomore Year may Help Students Stay on Track

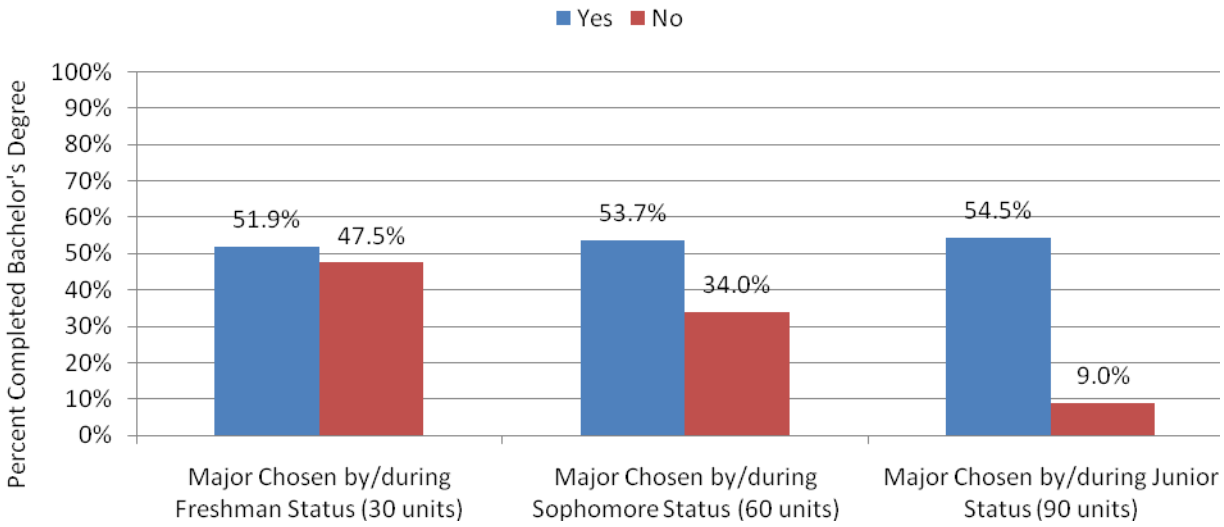
We examined whether student outcomes are related to the timing of major choice or the number of changes in major. The data set contained information on a student's major field of study for each term of enrollment. Nearly three-quarters (73%) of freshmen in the cohort had a major indicated in the first term of enrollment, representing the intended major students put on their application for admission. Students can choose to apply and be admitted to most campuses without indicating a major ("undeclared").[18] In the case of impacted majors, students are designated as "pre-majors" based on the major indicated on the admission application, and must complete lower division prerequisite courses and meet whatever additional criteria apply to the specific program before they can officially be a major. The major codes in the data files for each term, therefore, do not necessarily reflect a student's status in terms of being a formally accepted major in a particular field.

Figure 9 shows the probability of graduation by the timing of the first indication of major choice. Students who indicated a major choice while in freshman status (up to 30 semester credits) were not much more likely to graduate than those who did not choose a major as a freshman. There was a more substantial difference in the likelihood of graduation based on whether or not an indication of major choice was made before or during the time a student was in sophomore status (up to 60 semester credits). A third of students who had not chosen a major by or during sophomore status graduated, compared to 54% of students who had chosen a major within that

[18] Cal Poly San Luis Obispo and the Maritime Academy do not allow students to apply as "undeclared" majors, so all freshmen at those campuses had a major code in the first term of enrollment.

period. Only nine percent of students who had no indication of major choice by the end of junior status (90 credits) graduated within the six-year period.

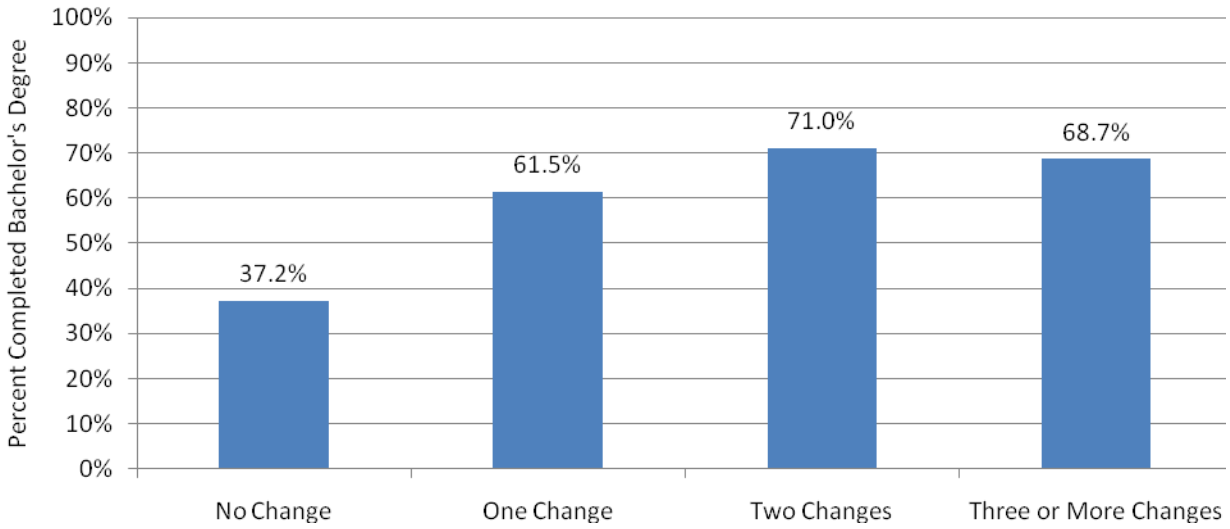
Figure 9:
Probability of Graduation among Freshmen by Timing of Major Choice



About 63% of incoming freshmen changed majors at least once over the course of their enrollment.[19] The likelihood of graduation was higher among students who changed majors than among those who did not (Figure 10). This counter-intuitive finding suggests that more (and better) data are needed, but we can speculate on the reasons for the findings. The rate of retention to the second year for freshmen with no changes in major was only 64% compared to 91% for freshmen with one or more changes in major. This could mean that many students who never change their major simply dropped out before getting very far. Likewise, they could be students who gave little thought to the initial major designation – also an indicator of under-preparedness for college success. Another possibility is that many of the students who had no change in major received less in the way of counseling and advising services, as those often come as part of the process of making a formal declaration or change of major. Many of the students may have indicated a major on their application, but may not have connected with a department and its faculty and other students majoring in the same field, never developing the level of engagement with the campus that is associated with those connections.

[19] This excludes the 6.6% of incoming freshmen who had no major code indicated in any of the terms they were enrolled.

Figure 10:
Probability of Graduation among Freshmen by Number of Major Changes



More than 92% of CCC transfer students enrolled with a major indicated in the first term, as many campuses require all transfer students to apply for admission to specific majors. As shown in Figure 11, there was a similar relationship between changing majors and the likelihood of graduation as we found for freshmen, although there was not as much difference between students who had never changed majors and those who had.

Table 3 shows that, among students who graduated, the total number of units earned at the time of graduation increases with the number of major changes, although there is only a small difference for freshmen. The number of years enrolled reflects the students' actual attendance rather than the elapsed time between initial enrollment and graduation.[20] The amount of time enrolled in college also increases with the number of major changes.

[20] Each fall or spring term enrolled in a campus on the semester system counts as .5 years, and each fall, winter, or spring term enrolled in a campus on the quarter system counts as .33 years. Summer terms are not included.

Figure 11:
Probability of Graduation among CCC Transfers by Number of Major Changes

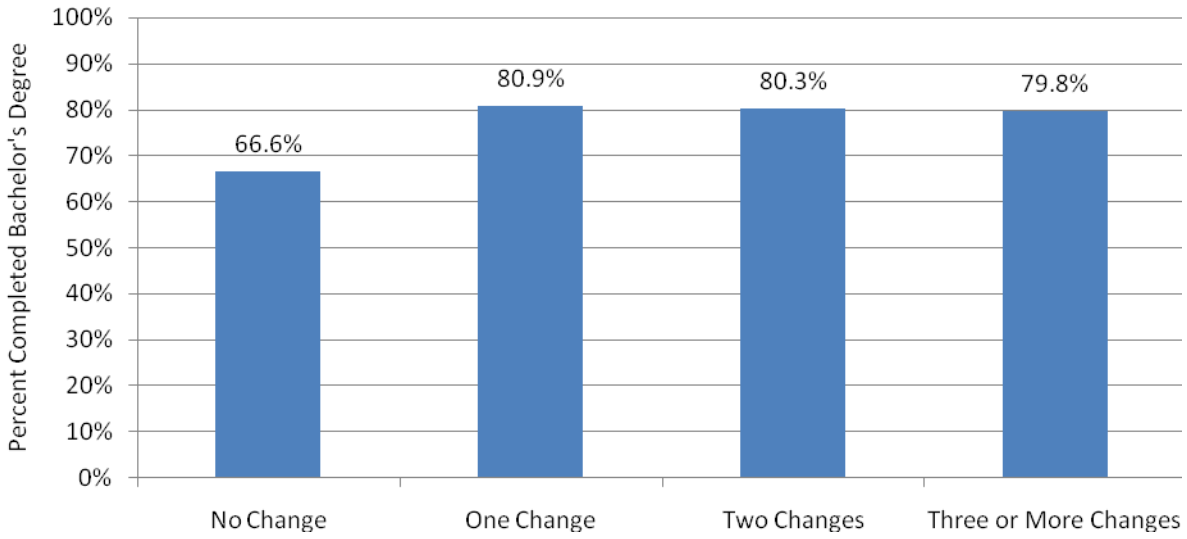


Table 3
Average Time Enrolled and Units Accumulated by Number of Major Changes among Students Completing a Bachelor's Degree

	Freshmen		CCC Transfers	
Number of Major Changes	Avg Total Credits	Avg Time Enrolled	Avg Total Credits	Avg Time Enrolled
None	138	4.6 years	140	2.8 years
One	137	4.7 years	141	3.3 years
Two	137	4.9 years	145	3.8 years
Three or more	140	5.1 years	147	4.2 years

Lessons from the Data Can Inform Efforts to Increase Graduation Rates

Several conclusions can be drawn from the analyses of student progress and outcomes that can inform campus efforts to increase graduation rates:

1. *Getting non-proficient students to successfully complete remedial courses is not enough to ensure their success at rates comparable to proficient students*
   Students entering CSU with remedial needs lag behind college-ready students at each milestone along the pathway to a degree. We could expect lower rates of retention to the second year given the system's one-year limit on remediation. The fact that remedial students who were retained to the second year were less likely to meet the

later milestones or to earn a bachelor's degree suggests that these students need other support beyond remedial courses to help them succeed in college. In particular, given the substantially lower rate of course completion and credit accumulation in the first year for remedial students, additional counseling and tutoring services may be needed to help them complete more of their courses and earn the credits that provide early momentum. The important lesson is that campuses would be wise to continue to monitor the progress of these students as a separate group.

2. *Students need to understand the importance of attendance patterns*
   Campus efforts should focus on encouraging full-time, continuous enrollment and ensuring that students steadily accumulate credits toward a degree. Policies around early advising, orientation, freshman experience programs, and learning communities are important to ensure that students understand the relationship between their attendance patterns and their likelihood of success. Financial aid counseling is also critical to ensure that students are aware of all opportunities for the aid that could help them work fewer hours and focus on their courses. Just as CAFG asked campuses to stress the importance of graduation in orientation and other early contacts with students, campuses should also stress the importance of successful attendance patterns.

3. *It's not just about orientation and the first year*
   More students are lost *after* returning for the second year, than are lost from the first to the second years, indicating the importance of on-going support services and academic advising. Early alert systems may help to connect students with academic support services before they fall too far behind and either drop or fail courses. Policies limiting course withdrawals and repeats can encourage students to complete their courses and accumulate credits. Getting students connected to a department may increase opportunities for advising and for the kinds of connections to faculty and other students that lead to greater engagement with the campus and the college experience.

4. *Early enrollment in gateway courses is important*
   While data limitations prevented analyses on this issue, our research using data from both the CCC system and the State University of Florida system indicates the importance of taking gateway courses in English and math early. Campuses should focus on managing course schedules to ensure adequate course sections in these subjects and implement policies requiring or at least advising students to enroll in these courses beginning their first semester.

5. *Monitoring progress by race/ethnicity is important*

   Most student support programs that serve Latino and black students are aimed at the early stages of a student's academic career and many do show good outcomes in second term and second year retention. Figure 2 shows that all groups have near identical second-term retention rates and, with the exception of blacks, fairly equal second-year retention rates. However, gaps start to widen across groups for completing 30 units and GE and, as we know, for ultimate graduation rates. This suggests that student support programs and other efforts to close the gap across racial/ethnic groups must sustain these efforts far beyond the first year. It also suggests that there are reasons to carefully track movement by group along these milestones to try to understand, for example, why Asians match whites in performance through the completion of GE but then drop considerably in degree completion.

6. *Stepped-up efforts to retain transfer students may be warranted*

   More attention typically is given to improving retention rates of native freshmen than of transfers perhaps because of an assumption that transfer students are better equipped to persist by the time they enroll in the CSU. However, a comparison of figures 1 and 4 shows this may not be true: a higher percentage of transfer students than freshmen are lost after one term and second-year transfer student retention is hardly better than that of proficient freshmen. Considering that transfer students are already a select population of those who have succeeded at community college and are probably more certain of major and career directions, this is a discomforting finding.

The above analysis and this set of six implications do not exhaust the range of possibilities in using the milestone/success indicator framework to diagnose barriers to graduation and help target institutional responses. But even with the data limitations we faced, we believe the findings are powerful and instructive. CSU data collection efforts have not been planned around this kind of analysis. We hope that some consideration will be given to expanding the capacity for more refined analyses of this type, both at the systemwide and campus levels.

NOTE: Part 2 of the report to the CSU Chancellor's Office, which is not included in this excerpt, contained a comprehensive review and analysis of implementation of the CSU's Campus Actions to Facilitate Graduation (CAFG) initiative and offered recommendations to the CSU Chancellor's Office for future directions for that or other systemwide initiatives to improve graduation rates.