

Unit Completion and Graduation

Office of Institutional Research

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The Graduation Initiative Committee is exploring the idea of pre-enrolling new freshmen with 15 units before they arrive for orientation. Per a request from one of the Committee Chairs, the OIR developed this report to provide a comparison analysis of the GPAs and 6-year graduation rates of groups which completed different amounts of units in their first semester, as well as by the end of their first year.

Native freshmen cohorts from 2005-2007 (N=7,647) were selected for use in this study due to the fact that they had passed the 6-year graduation mark at this university. All freshmen were divided by their unit completions in the first and second semesters. In terms of units completed by the end of the first semester, the threshold was as follows: students who completed 15+ units, those who completed 12-14 units, and those who completed fewer than 12. In terms of units completed by the end of the first year, the threshold was as follows: students who completed 30+ units, those who completed 24-29 units, and those who completed fewer than 24 units. With respect to further analysis, those sub-groups represent the high-unit group, medium-unit group, and low-unit group, respectively. Moreover, two tracking groups were formed based upon units completed in the first and second semesters, which may or may not consist of the same students due to overlapping.

Several comparison analyses were conducted in this study: the first compared the overall GPA from the first and second semesters with respect to the high, medium and low unit groups. The second compared the 1-year retention and 6-year graduation rates of those sub-groups. All units were based on units completed at Sacramento State, which may or may not count towards earning a degree. One-way ANOVA was used to insure that any differences, in terms of overall GPA, 1-year retention rate, and 6-year graduation rate among the sub-groups, did not occur by chance. In addition, a background comparison was also conducted among the sub-groups to provide comparative profiles of each sub-group.

Furthermore, two regression models were developed to review the prediction power of all relevant factors, including unit completion. By using a logistic regression model, the prediction power of each factor can be examined when holding other factors as constant. After a selection process (stepwise variable selection), factors which showed little prediction power on 6-year graduation were excluded from this model. However, some of these factors have been identified as being contributors to graduation when examined individually.

1. Trends of Unit Completion

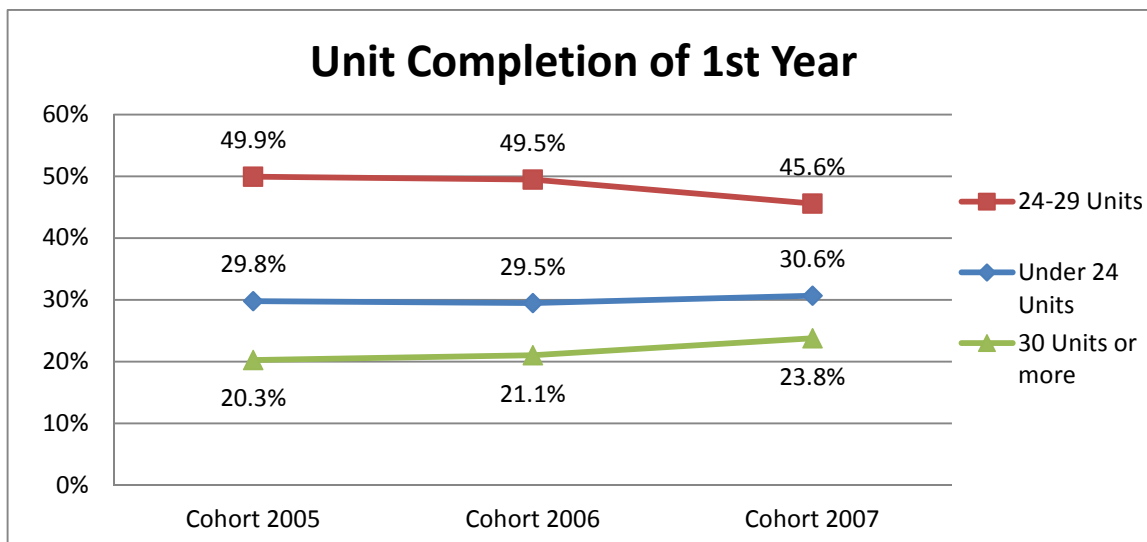
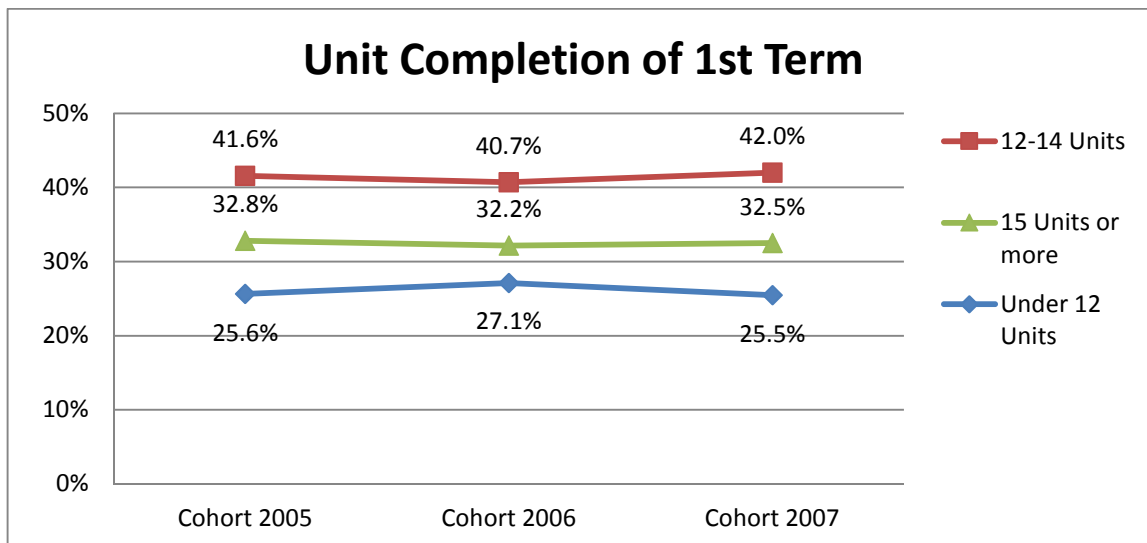
The following tables and graphs display the trend of unit completion by the three freshmen cohorts by the end of their first semester and by the end of their first year.

Table 1 Unit Completion by the End of the First Semester

	Under 12 Units		12-14 Units		15 Units or more		Total Count
	Count	%	Count	%	Count	%	
Cohort 2005	621	25.6%	1,007	41.6%	794	32.8%	2,422
Cohort 2006	692	27.1%	1,039	40.7%	821	32.2%	2,552
Cohort 2007	605	25.5%	998	42.0%	772	32.5%	2,375
<i>Three Cohorts</i>	<i>1,918</i>	<i>26.1%</i>	<i>3,044</i>	<i>41.4%</i>	<i>2,387</i>	<i>32.5%</i>	<i>7,349</i>

Table 2 Unit Completion by the End of the First Year

	Under 24 Units		24-29 Units		30 Units or more		Total Count
	Count	%	Count	%	Count	%	
Cohort 2005	688	29.8%	1,153	49.9%	468	20.3%	2,309
Cohort 2006	718	29.5%	1,206	49.5%	513	21.1%	2,437
Cohort 2007	695	30.6%	1,034	45.6%	539	23.8%	2,268
<i>Three Cohorts</i>	<i>2,101</i>	<i>30.0%</i>	<i>3,393</i>	<i>48.4%</i>	<i>1,520</i>	<i>21.7%</i>	<i>7,014</i>



According to the trends illustrated above, approximately 41% of the students completed 12-14 units in their first semester, with 48% completing between 24-29 units by the end of their first year. 33% of the students completed 15 or more units in their first semester, with 22% completing 30 units or more and progressing from freshmen to sophomores at the end of their first year in this university. It is worth noting, however, that students who completed 15+ units in their first semester may not have carried another 15+ unit load in their second semester. Thus, the proportion of students within the 30+

sub-group decreased by the end of the second semester compared to the proportion of students within the 15+ sub-group at the first semester. In addition, the proportion of students in the 15+ unit sub-group basically remained the unchanged from fall 2005 to fall 2007 while the proportion of students in the 30+ unit sub-group reflected a slight increase during the same time period (20% to 24%).

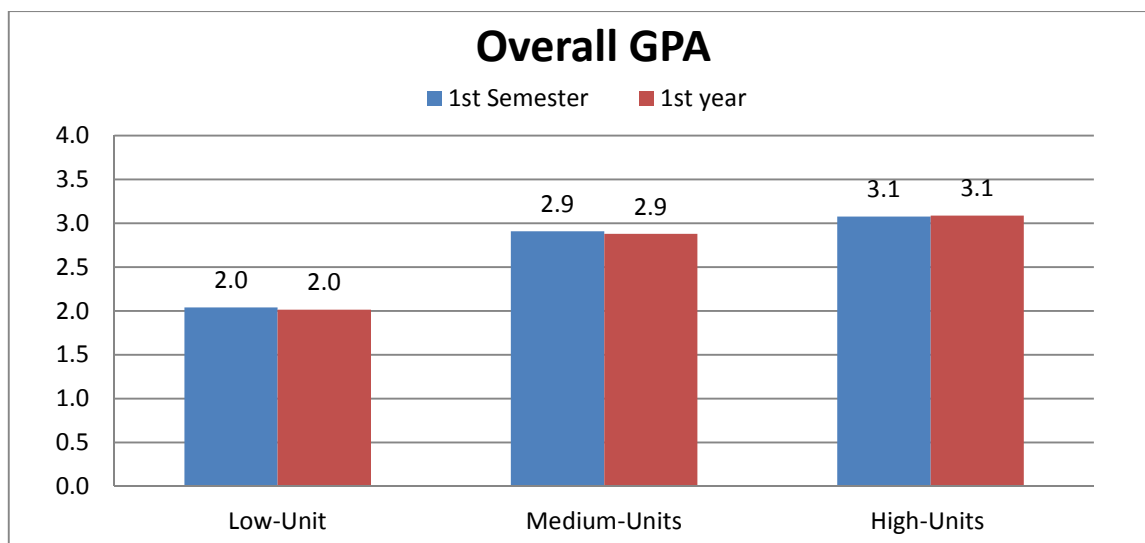
1. Comparison of Overall GPA

To address the concern that increasing the number of units taken could negatively impact academic performance, it was necessary to compare the overall GPA among the sub-groups (See Table 3 and graph below).

Table 3 Comparison of Overall GPA

First Tracking Group	Under 12 Units		12-14 Units		15 Units or more		Statistical Significance*
	Count	Mean	Count	Mean	Count	Mean	
By End of 1st Term	1,918	2.0	3,044	2.9	2,387	3.1	Yes (p<.001)
Gap				0.9		0.2	
Second Tracking Group	Under 24 Units		24-29 Units		30 Units or more		Statistical Significance
	Count	Mean	Count	Mean	Count	Mean	
By End of 2nd Term	2,101	2.0	3,393	2.9	1,520	3.1	Yes (p<.001)
Gap				0.9		0.2	

* ANOVA, $p < .001$, higher value is highlighted in yellow.



When comparing overall GPA within the first tracking group, students who completed between 12-14 units or 15+ units achieved significantly higher GPAs than those who completed fewer than 12 units in their first semester.

When comparing overall GPA within the second tracking group, students who completed between 24-29 units or 30+ units achieved significantly higher GPAs than those who completed fewer than 24 units by the end of their second semester.

According to these findings, it appears as though an increased unit load had a positive impact on the overall GPA of students within the two tracking groups. However, it is necessary to review the academic backgrounds of students within these sub-groups before drawing conclusions.

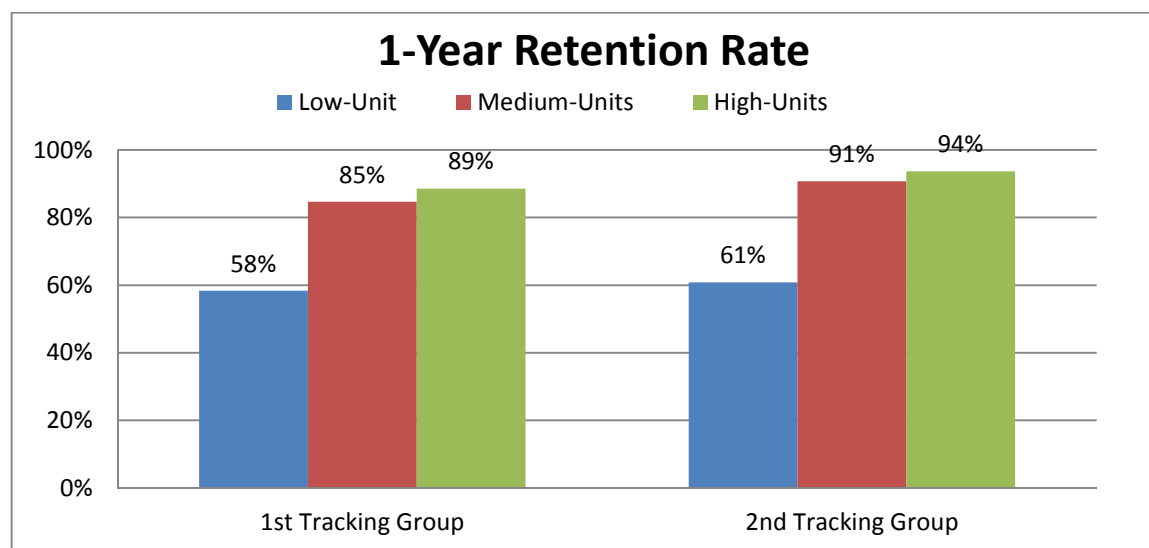
2. Comparison of Retention and Graduation

Does the number of units completed have impact on retention and/or graduation? According to this study, students who completed 15+ units in their first semester achieved a 1-year retention rate of 89% and a 6-year graduation rate of 55%. Students who completed 30+ units by the end of their first year achieved a 1-year retention rate of 94% and a 6-year graduation rate of 65%. Both of these rates are above the average rates of retention and graduation for the three cohorts as a whole (79% and 42%, respectively). The following tables and graphs display the retention and graduation rates:

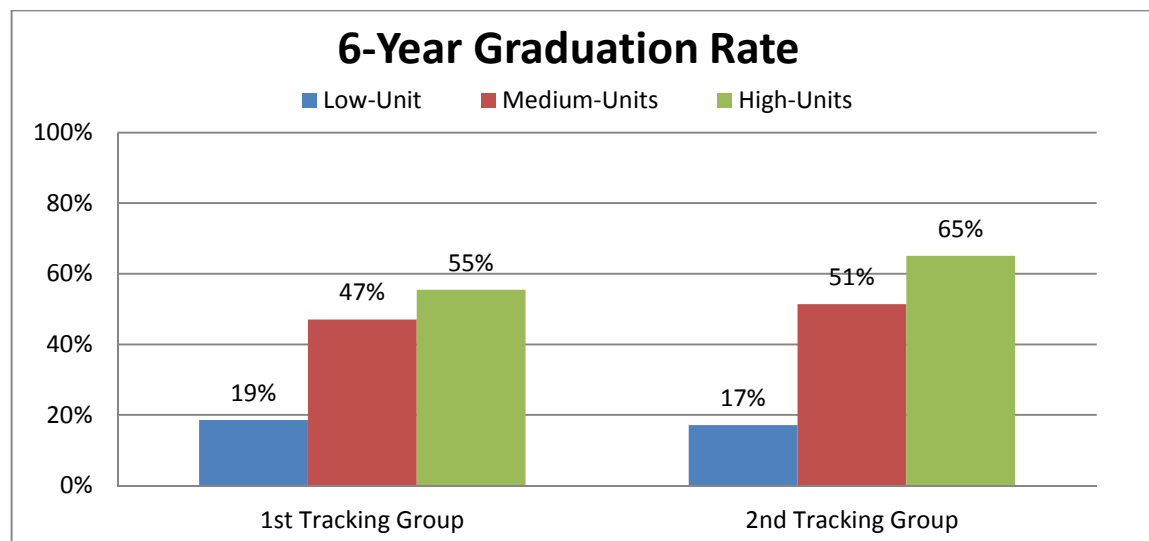
Table 4 Comparison of 1-Year Retention and 6-Year Graduation Rate

First Tracking Group	Under 12 Units		12-14 Units		15 Units or more		Statistical Significance
	Count	Rate	Count	Rate	Count	Rate	
1-Year Retention Rate	1,119	58.3%	2,576	84.6%	2,114	88.6%	Yes ($p < .001$)
Gap				26.3%		3.9%	
6-Year Graduation Rate	356	18.6%	1,431	47.0%	1,324	55.5%	Yes ($p < .001$)
Gap				28.4%		8.5%	
Second Tracking Group	Under 24 Units		24-29 Units		30 Units or more		Statistical Significance
	Count	Rate	Count	Rate	Count	Rate	
1-Year Retention Rate	1,278	60.8%	3,079	90.7%	1,424	93.7%	Yes ($p < .001$)
Gap				29.9%		2.9%	
6-Year Graduation Rate	361	17.2%	1,744	51.4%	989	65.1%	Yes ($p < .001$)
Gap				34.2%		13.7%	

* ANOVA, $p < .001$, higher value is highlighted in yellow.



It is worth noting that even though the gap between the medium-unit and high-unit group was smaller than that of the low-unit group, it was still statistically significant ($p < .01$ or $p < .05$) in terms of 1-year retention rate.



The results show that students who completed 15+ units in their first semester achieved a 6-year graduation rate that was three times higher than that of their peers who completed fewer than 12 units in the same period (55% vs. 19%). Remarkably, students who completed 30+ units in their first year achieved a 6-year graduations rate that was almost 4 times higher than that of their peers who completed fewer than 24 units in the same period (65% vs. 17%).

Furthermore, students who completed 12-14 units also achieved a higher 6-year graduation rate than those who completed fewer than 12 units in their first semester (47% vs. 19%). In addition, students who completed 24-29 units achieved a higher 6-year graduation rate than those who completed fewer than 24 units by the end of their first year (51% vs. 17%).

3. Comparison of Student Backgrounds

By comparing the backgrounds of students defined as being in the high, medium and low unit groups, this study not only created academic profiles for each group but also identified groups which may need additional support when promoting the 15 units per semester policy at this university.

The results show that students within the high unit and medium unit group came from better academic backgrounds in terms of high school GPA and SAT scores. Furthermore, the low unit group consisted of a higher proportion of underrepresented minority students, students in need of remediation, and students from low income families. The differences found between the three sub-groups were deemed to be statistically significant. Therefore, although it seems feasible for students who were college ready to take 15 units each semester, it could prove to be difficult for URM students, those in need of remediation, and/or those from low income families unless additional support mechanisms are put in place.

Table 5 displays the comparison of the academic backgrounds of students within the three sub-groups.

Table 5 Background Comparison

First Tracking Group	Under 12 Units		12-14 Units		15 Units or more		Statistical Significance*
	Count	Mean/%	Count	Mean/%	Count	Mean/%	
High School GPA	1,916	3.0	3,043	3.2	2,384	3.3	Yes
Gap				0.2		0.1	
SAT Verbal	1,459	450	2,372	483	1,871	476	Yes
Gap				33		-6	
SAT Math	1,459	470	2,372	497	1,871	499	Yes
Gap				27		2	
Need Remediation	1,493	77.8%	1,957	64.3%	1,475	61.8%	Yes
Gap				-13.6%		-2.5%	
URM	687	35.8%	838	27.5%	688	28.8%	Yes
Gap				-8.3%		1.3%	
Pell Grant Recipients	1,057	55.1%	1,536	50.5%	1,279	53.6%	Yes
Gap				-4.6%		3.1%	
Second Tracking Group	Under 24 Units		24-29 Units		30 Units or more		Statistical Significance
	Count	Mean	Count	Mean	Count	Mean	
High School GPA	2,100	3.0	3,391	3.3	1,517	3.3	Yes
Gap				0.2		0.1	
SAT Verbal	1,626	458	2,617	477	1,211	479	Yes
Gap				19		2	
SAT Math	1,626	476	2,617	495	1,211	502	Yes
Gap				18.4		7.4	
Need Remediation	1,562	74.3%	2,190	64.5%	952	62.6%	Yes
Gap				-9.8%		-1.9%	
URM	734	34.9%	952	28.1%	410	27.0%	Yes
Gap				-6.9%		-1.1%	
Pell Grant Recipients	1,162	55.3%	1,752	51.6%	818	53.8%	Yes
Gap				-3.7%		2.2%	

Note: T-test, $p < .001$, higher value is highlighted in yellow; $p < .01$, higher value is highlighted in green. $p < .05$, higher value is highlighted in blue.

4. Regression Models for Predicting 6-Year Graduation

To reveal the impact of unit completion it was necessary to incorporate this factor, as well as others which might have impact on 6-year graduation, into a logistic regression model. Other factors include demographic characteristics, academic background, first year intervention programs, and overall GPA in the first and second semester. After a selection process (stepwise variable selection), only 6 of the 15 factors remained in the two models. The tables on following page demonstrate the prediction power of each factor after the selection process, as well as the overall reliability of the models.

Table 6 Regression Model 1 (15 Unit Completion at the First Term)

Predict Variables	B	S.E.	Wald	df	Sig.	Exp(B)	Odds Ratio	Rank
Gender (1)	-.227	.061	13.912	1	.000	.797	1.3	5
HS GPA	.371	.071	27.041	1	.000	1.449	1.4	4
EOP L Community(1)	.493	.091	29.347	1	.000	1.637	1.6	2
L Community(1)	-.188	.070	7.166	1	.007	.829	1.2	6
15+ units at 1st term (1)	-.468	.064	54.307	1	.000	.626	1.6	2
Overall GPA (1st term)	.950	.047	408.435	1	.000	2.585	2.6	1
Constant	-4.024	.254	250.792	1	.000	.018		
Model Indicators								
Baseline P*	42.3%		Chi-Square (df)		1018.333 (6)			
Model N	5,696		Pseudo R ²		.141-.189			
-2log L	6770.851		% Correctly predicted (graduated)		71.3%			

* Refers to 6-year graduation rate.

Table 7 Regression Model 2 (30 Unit Completion within the First Year)

Predict Variables	B	S.E.	Wald	df	Sig.	Exp(B)	Odds Ratio	Rank
Gender (1)	-.204	.063	10.347	1	.001	.816	1.2	4
HS GPA	.205	.075	7.508	1	.006	1.227	1.2	4
EOP L Community(1)	-.172	.074	5.393	1	.020	.842	1.2	4
L Community(1)	.370	.084	19.170	1	.000	1.447	1.4	3
30+ units in 1 st year (1)	-.619	.075	67.374	1	.000	.538	1.9	2
Overall GPA (2nd term)	1.309	.057	523.409	1	.000	3.702	3.7	1
Constant	-4.053	.269	226.321	1	.000	.017		
Model Indicators								
Baseline P*	44.1%		Chi-Square (df)		1278.16 (6)			
Model N	5,449		Pseudo R ²		.209-.280			
-2log L	6220.351		% Correctly predicted (graduated)		73.7%			

* Refers to 6-year graduation rate.

According to both regression models, unit completion (15 units in the first semester or 30 units in the first year) is the second most powerful predictor for 6-year graduation when holding other factors constant. Specifically, students who completed 15 units in their first semester were 1.6 times more likely to graduate within 6 years than those who did not do so during the same time period (odds ratio = 1.6:1). Students who completed 30 units within their first year were 2 times more likely to graduate within 6 years than those who did not do so during the same time period (odds ratio = 1.9:1).

These results are consistent with findings from previous studies pertaining to graduation that were conducted by the OIR. These studies revealed that full-time status (12+ unit loads) in the first semester or number of unit completion in the first year were powerful predictors of 6-year graduation (based on data concerning the 2002-2004 cohorts).

Summary:

This study revealed that unit completion had a very positive impact on retention and graduation. Students who completed 15+ units during their first semester or completed 30+ units within their first year achieved significantly higher 1-year retention and 6-year graduation rates than their peers who did not complete such units during the same time period. Moreover, students who completed 12-14 units in their first semester or completed 24-29 units within their first year also achieved significantly higher retention and graduation rates than their peers who completed fewer units (below 12 or below 24) in the same time period.

This study also demonstrated the positive correlation between unit completion and overall GPA among the three sub-groups, including low units (below 12 semester units or 24 end of year units), medium units (12-14 semester units or 24-29 end of year units) and high units (15+ semester units or 30+ end of year units). According to this study, the more units the students completed, the higher overall GPA they achieved during their first year.

However, it is important to note that the three sub-groups came from very different backgrounds in terms of college readiness (high school GPA, SAT scores, and remediation need), and demographic characteristics (URM and low income families). Therefore, more support would need to be provided to those students who came from disadvantaged backgrounds in relation to promoting 15 unit completion in the first semester or 30 unit completion during the first year.

According to a trend analysis of 7,647 native freshmen, it would require substantial effort to promote a shift to 15-unit completion in the first term due to the fact that 67% of those students did not reach that threshold. It could also prove difficult to promote 30-unit completion within the first year since 78% of the students in the trend analysis did not reach that threshold.