

Leading Indicators: First year student behaviors that influence the likelihood of success

The current report follows closely the methodology from a 2010 Education Trust study (*Advancing Degrees: A Framework for Increasing College Completion*) by examining both cohort demographics and leading indicators of progress toward first-year retention as well as eventual graduation. The findings are of interest because, as the Higher Education Research Institute stated in 2011, “if institutions are to improve their degree completion rates they must first be able to assess how effective they are in moving students they enroll toward graduation”.

All new freshmen who entered CSU in the fall semesters between 2002 and 2010 are included in the current study population. Cohort representation and retention rates across each leading indicator are displayed in table 1.

Table 1.

Table 1: Retention and Graduation Rates by Group (FA02 through FA10)					
	N	Freshman Retention	4-YR Grad.	5-YR Grad.	6-YR Grad.
Registering for 15 credits first semester					
Yes (55.97%)	20,847	85.5%	42.7%	64.5%	68.6%
No (44.02%)	16,394	78.9%	27.8%	51.2%	57.2%
Completing 24 credits first year (fall and spring)					
Yes (89.16%)	33,205	88.8%	40.1%	64.3%	69.3%
No (10.83%)	4,036	31.2%	3.9%	12.4%	16.9%
Completing 30 credits first year (fall and spring)					
Yes (39.46%)	14,697	92.6%	53.8%	75.8%	79.1%
No (60.53%)	22,544	76.1%	24.7%	47.5%	53.6%
First term GPA 2.42 or higher*					
Yes (70.37%)	25,920	88.71%	46.18%	70.12%	74.05%
No (29.62%)	10,912	70.41%	13.46%	32.41%	38.97%
Continuous enrollment over 2 years					
Yes (75.22%)	24,649	100.0%	46.7%	75.1%	80.3%
No (24.77%)	8,120	29.6%	4.7%	9.5%	12.3%
Continuous enrollment over 4 years					
Yes (52.05%)	12,535	100.0%	52.1%	87.1%	92.8%
No (47.94%)	11,546	63.2%	18.6%	28.1%	31.8%
Large amount of unmet need in the first year**					
Yes (17.81%)	5,954	74.0%	29.8%	48.1%	54.1%
No (82.18%)	27,459	84.5%	37.5%	60.9%	65.6%
Enroll full-time first semester					
Yes (97.74%)	36,401	83.5%	36.8%	59.5%	64.4%
No (2.25%)	840	42.0%	5.5%	17.9%	22.3%
Reporting satisfied with college choice and educational experience***					
Yes (52.74%)	950	95.9%	48.3%	76.8%	79.1%
No (47.25%)	851	85.9%	37.2%	61.2%	64.5%
Completing 90% of courses attempted					
Yes (86.32%)	32,149	85.0%	39.8%	62.9%	67.7%
No (13.67%)	5,092	67.1%	14.3%	34.0%	40.6%
Enrolling or transferring in college level math in the first year					
Yes (76.83%)	28,613	87.1%	41.5%	65.3%	70.2%
No (23.16%)	8,628	67.6%	20.0%	39.8%	45.2%
Enrolling or transferring in college level composition in the first year					
Yes (79.72%)	29,689	86.6%	38.9%	62.2%	66.8%
No (20.27%)	7,552	66.6%	22.7%	39.7%	44.8%

*75th GPA quartile

**Unmet need greater than the median of students with need. Non-FAFSA filers are considered not to have need.

***NSSE results (03', 05', 07', 08', 09')

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The remaining tables present logistic regression results. This analysis allows the association between indicators and outcomes to be explored while controlling for academic and demographic variables that are known to influence student success. These associations are displayed as odds ratios. An odds ratio greater than one indicates higher odds of the event occurring and an odds ratio less than one indicates lower odds of the event occurring. Odds ratios that are not statistically different than one are not presented in the tables.

As table 2 displays, there appears to be a strong positive association between credits completed and student graduation. Students who complete at least 30 credits in their first fall and spring have 88% higher odds of graduating in 6 years compared to students who only complete 24 to 29 credits in their first year. Another way of way of measuring this association is to treat credits as continuous, for every additional 3 credits completed in the first year a student has 73% higher odds of graduating in 6 years.

There also appears to be a strong positive association between completing/transferring a college level math or composition class in the first year and student success. A student who completes college level math in their first year has 146% higher odds of graduating in 6 years compared to students who do not complete a college level math course in their first year. The relationship for composition appears to be even stronger. A student who completes a college composition course in their first year has 181% higher odds of graduating in 6 years compared to students who do not complete a college level composition course their first year.

Additionally, students who reported they were satisfied with CSU on the NSSE have higher odds of persisting and graduating when compared to NSSE respondents who were dissatisfied. Due to small sample size for earlier cohorts (that have a 6 year graduation rate), the NSSE variable cannot be used with 6 year graduation as an outcome.

Table 2.

Table 2: Odds Ratios for Leading Indicators (All Students)				
All Students	Freshman Retention	Four Year Graduation	Five Year Graduation	Six Year Graduation
Demographic Characteristics				
Asian (white)	1.25	0.79	0.79	NS
Black (white)	1.42	NS	NS	NS
Hispanic/Latino (white)	NS	0.86	0.84	NS
Other (white)	NS	0.80	0.87	NS
Female (male)	0.94	1.96	1.38	1.16
Nonresident (resident)	0.67	0.87	0.77	0.75
Pell (Non-Pell)	NS	0.80	0.84	0.86
First generation (non-first generation)	0.76	0.86	0.78	0.74
Large unmet need	0.60	0.82	0.70	0.74
Index	1.03	1.05	1.04	1.04
Leading Indicators				
Complete 30 credits in first year (compared to 24-30)	1.85	2.06	1.96	1.88
Credit completion first year (divided by 3)	1.98	1.81	1.77	1.73
Register for 15 credits or more in first fall	1.46	1.51	1.44	1.41
first year GPA (divided by .1)	1.08	1.11	1.11	1.11
Complete college level math in first year	2.89	2.42	2.47	2.46
Complete college level composition in first year	3.31	2.50	2.75	2.81
Continuous enrollment for 2 years		16.74	27.56	27.30
Continuous enrollment for 4 years		5.22	21.21	31.85
First year course completion rate of at least 90%	2.66	3.42	2.91	2.73
Reporting satisfied with CSU in first year	4.39	1.53	1.74	

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Tables 3 through 6 display the same information for specific sub-populations (first generation, Pell recipients, students with large unmet need, and minority students). Generally, when the leading indicators' logistic regressions are run on sub-populations the odds ratios for most of the indicators increased indicating that the positive association between the indicator and student success is stronger for the subgroup than the overall population. In contrast, the odds ratio for first year GPA is very stable across all of the sub groups indicating that the positive association between GPA and student success outcomes does not interact with the sub-population variables.

First-Generation:

As table 3 displays, the leading indicators maintain their positive association with retention and graduation when the regression models are run on the sub-population of first generation students. In fact, the magnitude of the odds ratios are larger for the first generation sub-population compared to the entire population for all of the indicators except registering for 15 credits, reporting satisfied with CSU in the first year, and completing 90% or more of attempted courses.

It is interesting to note that completing a college level math or composition class in the first year has a stronger association with 6 year graduation for first-generation students then it does for the entire population. This seems to indicate that first-generation students benefit more from this first-year achievement then the overall population does.

There is also a strong association between completing at least 30 credits in the first year and student success. First generation students who complete 30 credits in their first year have 108% higher odds of graduating in 6 years than the first generation students who complete 24 to 29 credits in their first year.

Table 3.

Table 3: Odds Ratios for Leading Indicators (First Generation Students)				
First Generation	Freshman Retention	Four Year Graduation	Five Year Graduation	Six Year Graduation
Demographic Characteristics				
Asian (white)	1.69	0.67	NS	NS
Black (white)	NS	NS	NS	NS
Hispanic/Latino (white)	NS	NS	NS	NS
Other (white)	NS	NS	NS	NS
Female (male)	0.89	2.13	1.39	1.18
Nonresident (resident)	0.70	0.80	0.76	0.75
Pell (Non-Pell)	1.13	0.82	0.83	NS
First generation (non-first generation)				
Large unmet need	0.55	0.75	0.65	0.71
Index	1.03	1.06	1.05	1.04
Leading Indicators				
Complete 30 credits in first year (compared to 24-30)	2.13	2.16	2.20	2.08
Credit completion first year (divided by 3)	2.08	1.87	1.90	1.79
Register for 15 credits or more in first fall	1.56	1.53	1.42	1.28
first year GPA (divided by .1)	1.09	1.12	1.12	1.12
Complete college level math in first year	2.85	2.75	2.63	2.70
Complete college level composition in first year	3.52	2.60	3.26	3.49
Continuous enrollment for 2 years		25.58	37.74	37.38
Continuous enrollment for 4 years		7.37	30.77	47.97
First year course completion rate of at least 90%	2.76	4.04	3.05	2.71
Reporting satisfied with CSU in first year	3.98	NS	NS	

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Pell Grant Recipient:

The leading indicators' odds ratios for the Pell grant sub-population are larger than the odds ratios from the overall population models except for registering for 15+ in the first fall, completing a college level composition course in the first year, and completing at least 90% of attempted courses.

The strong positive association of completing 30 credits or more in the first year remains and has an even stronger association for Pell recipients than it did for the first generation sub-population. In fact, out of all of the subgroups this indicator's odds ratio for six year graduation is the largest.

The increased odds for Pell grant recipients who complete college math in their first year and six year graduation are slightly lower than the increased odds that were seen for first generation students.

Table 4.

Table 4: Odds Ratios for Leading Indicators (Pell Grant Recipients)				
Pell Recipients	Freshman Retention	Four Year Graduation	Five Year Graduation	Six Year Graduation
Demographic Characteristics				
Asian (white)	2.092	NS	NS	NS
Black (white)	NS	NS	NS	NS
Hispanic/Latino (white)	NS	0.742	0.716	NS
Other (white)	NS	NS	0.612	NS
Female (male)	NS	2.013	1.524	1.364
Nonresident (resident)	0.665	NS	NS	NS
Pell (Non-Pell)				
First generation (non-first generation)	0.827	NS	0.768	0.766
Large unmet need	0.406	0.814	0.637	0.691
Index	1.029	1.050	1.038	1.036
Leading Indicators				
Complete 30 credits in first year (compared to 24-30)	1.98	2.05	2.22	2.25
Credit completion first year (divided by 3)	2.11	1.94	1.84	1.81
Register for 15 credits or more in first fall	1.64	1.47	1.43	1.38
first year GPA (divided by .1)	1.10	1.11	1.11	1.11
Complete college level math in first year	2.60	2.63	2.42	2.62
Complete college level composition in first year	3.15	2.93	2.81	2.79
Continuous enrollment for 2 years		20.22	30.18	32.85
Continuous enrollment for 4 years		5.56	21.16	42.47
First year course completion rate of at least 90%	2.85	3.27	2.25	2.31
Reporting satisfied with CSU in first year	5.74	NS	NS	

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Large Unmet Need:

As Table 5 displays, students with large amounts of unmet need in their first year have leading indicator odds ratios that are larger than the odds ratios produced by the entire sample, except in the case of the completing 90% or more of the attempted credits and reporting that they are satisfied with CSU.

There is a strong positive association with credit completion and all the outcomes for students with large unmet need. The increased odds for students with large amounts of unmet need who complete 30 or more credits their first year compared to students with large unmet need who complete 24 to 29 credits is comparable to the increased odds Pell recipients experienced and is greater than the increase in odds for first generation students.

The increased odds associated with completing college level math or composition in the first year (compared those who did not complete) for students with large unmet need is very similar to the increase in odds that first generation students experienced and is greater than the increase in odds that Pell recipients experienced.

Table 5.

Table 5: Odds Ratios for Leading Indicators (Large Unmet Need)				
Large Unmet Need (N)	Freshman Retention	Four Year Graduation	Five Year Graduation	Six Year Graduation
Demographic Characteristics				
Asian (white)	1.70	NS	NS	NS
Black (white)	NS	NS	NS	NS
Hispanic/Latino (white)	NS	NS	NS	NS
Other (white)	NS	NS	NS	NS
Female (male)	NS	2.06	1.53	1.29
Nonresident (resident)	0.65	0.80	0.70	0.74
Pell (Non-Pell)	0.77	0.83	0.79	NS
First generation (non-first generation)	0.74	0.75	0.70	0.71
Large unmet need				
Index	1.02	1.05	1.04	1.03
Leading Indicators				
Complete 30 credits in first year (compared to 24-30)	1.98	2.42	2.34	2.14
Credit completion first year (divided by 3)	2.08	2.05	1.93	1.87
Register for 15 credits or more in first fall	1.55	1.64	1.61	1.46
first year GPA (divided by .1)	1.09	1.11	1.11	1.11
Complete college level math in first year	2.84	2.47	2.55	2.71
Complete college level composition in first year	3.64	3.79	3.42	3.20
Continuous enrollment for 2 years		25.50	36.75	36.25
Continuous enrollment for 4 years		8.97	34.47	55.86
First year course completion rate of at least 90%	2.79	3.37	2.62	2.44
Reporting satisfied with CSU in first year	3.80	NS	3.49	

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Minority:

Out of all of the sub-populations the minority students have leading indicator odds ratios that are closest to the odds ratios seen for the entire population. This might indicate that there is little interaction between minority status and the positive impact of the indicators.

The minority sub-population is also unique compared to the other sub-populations in that the odds ratio associated with completing 90% or more of attempted credits and graduation is larger than the overall population's odds ratio. In all of the sub-populations this odds ratio was one of the few leading indicator odds ratios that was smaller than the overall population's odds ratio.

Table 6.

Table 6: Odds Ratios for Leading Indicators (Minority)				
Minority	Freshman Retention	Four Year Graduation	Five Year Graduation	Six Year Graduation
Demographic Characteristics				
Asian (white)				
Black (white)				
Hispanic/Latino (white)				
Other (white)				
Female (male)	NS	1.86	1.37	1.26
Nonresident (resident)	0.75	NS	NS	0.75
Pell (Non-Pell)	NS	0.81	NS	NS
First generation (non-first generation)	0.84	0.83	NS	NS
Large unmet need	0.47	NS	0.73	0.76
Index	1.03	1.05	1.04	1.03
Leading Indicators				
Complete 30 credits in first year (compared to 24-30)	1.91	2.05	2.13	1.89
Credit completion first year (divided by 3)	1.89	1.88	1.87	1.80
Register for 15 credits or more in first fall	1.54	1.50	1.38	NS
first year GPA (divided by .1)	1.09	1.11	1.12	1.11
Complete college level math in first year	2.67	2.31	2.26	2.41
Complete college level composition in first year	2.91	2.37	2.64	2.68
Continuous enrollment for 2 years		24.59	34.11	30.82
Continuous enrollment for 4 years		6.82	22.38	33.96
First year course completion rate of at least 90%	2.43	3.55	3.15	3.01
Reporting satisfied with CSU in first year	2.94	NS	NS	

General Conclusion:

There are strong positive associations between leading indicators and student success.

When the leading indicators' logistic regressions are run on sub-populations the odds ratios for most of the indicators increased indicating that the positive association between the indicator and student success is stronger for the subgroup than the overall population.

Arguably, the most compelling indicator is the completion of 30 credits in the first year and the inclusion of college level math and composition within those 30 credits.