What Most Influences COM Students' Completion?

COLLEGE OF MARIN

This study is part of our ongoing research to better understand the institutional and student factors that affect students' success, identify those who are at-risk early in their academic career, and aid in developing programs and interventions to improve college completion rates. In addition, the findings can help determine short-term metrics that may be used as milestones to gauge our progress toward improved student completion. As with our previous analyses (First Term and First Year Crucial to Student Success and A Different Way to Look at Student Groups and Their Success), this research uses the Chancellor's Office Student Success Scorecard data, since these are the student cohorts on which COM's performance is tracked by the State.

Data and Modeling Method Used in This Study

Students included in the Scorecard dataset (N=2,435) are first-time degree and/or transfer-seeking students in the CA CC system who began at COM and completed at least 6 units and attempted any math or English in their first three years of enrollment. These students are tracked over a 6-year period as the basis for the Scorecard metrics. Students are tracked whether they remain at COM or complete at another institution. Completion is defined as earning a degree or certificate, transferring to a four-year institution or earning at least 60 transferrable credits. The most recent completion data available at the time of this study was for the cohort entering COM in the 2008-09 academic year. Cohort years included in this study are 2004-05 through 2008-09.

Based on previous analyses and the student success literature which shows that first term and first year are crucial to long-term success, and the need to use research findings to identify at-risk students and develop early interventions and support programs, in this study we focused our analyses on the first term and first year of enrollment. Further, we restricted the cohorts used in this study to students who consecutively enrolled in their first two terms (N=1,672). Doing so allowed us to include more variables in the model and the statistical technique to include all cases. Students who consecutively enrolled in the first two terms is approximately two-thirds of the students in the entire Scorecard dataset.

The set of variables used in this study are commonly shown in the literature to influence student success. However, the choice of factors that could be examined was constrained by the availability and accuracy of COM data. Variables included in the analyses are students' course success, math and English courses taken, and unit load during the first year of enrollment. GPA was not used in the model because students taking only noncredit courses would have been excluded. Other factors include student demographics (i.e., race/ethnicity, gender, age, economic status), academic preparedness and enrollment patterns over the first 3 years (6 terms) of enrollment.

These factors were analyzed using binary logistic regression to create a model that predicts the likelihood of completion. The dependent variable was coded 1 for Completed and 0 for Did Not Complete. A total of 10 factors were entered into the final model: gender, age at first term, race/ethnicity, economically disadvantaged status, math course level taken in the first year, English course level taken in the first year, college-prepared status, units attempted in first year, percentage of course success in the first year, and total terms enrolled in the first 3 years. Table 1 on page 4 includes descriptive data on all factors that were tested in fitting the model.

Findings

The combined factors in this model accurately predicted 77.9% of students who completed and 71.2% of those who did not. Overall, the model accurately predicted 74.8% of students. The Nagelkerke R^2 was .396 and Cox & Snell R^2 .297. While acceptable, adding other factors in future models likely would improve prediction. (See the model's statistical output on page 5).

For students completing the first two consecutive terms of enrollment, all factors in the final model were influential, though some had a very small effect on completion. The most influential factors were English and Math courses in the first year, being prepared for college, course success during the first year and number of terms enrolled in the first three years. (These results are primarily shown in the column labeled ExpB in the statistical model. The ExpB value is an odds ratio. The odds ratio means that for two students with the same values on every other factor in the model, the likelihood of completion changes by the magnitude of the odds ratio. 1 means equivalence. Numbers below one mean lower odds or a lower likelihood of completing, while numbers above 1 mean a greater likelihood.)

Academic Preparation

English courses during the first year. Students were categorized according to whether they took 1) no English, 2) developmental English only (120 or below), 3) college-level English (150 or higher), or 4) both developmental and college-level English in their first year of enrollment. In logistic regression, categorical variables require designating one group (i.e., category of the variable) as the reference group against which all other groups (i.e., categories) are compared. The reference group to which each of these course-taking categories was compared was students taking no English during their first year. *Students taking both developmental and college-level English during their first year were 3.3 times (3.279) as likely to complete as those taking no English.* The difference in likelihood of completing between students who took only developmental or only college level English in their first year and students who took no English in their first year was in a positive direction but the effect was small and not statistically significant—meaning this small difference may have occurred only by chance.

College-prepared status. All students in the CO Scorecard cohort had attempted an English or math course in the first three years of enrollment. Those whose lowest-level course was college-level (English 150 or Math 103 and higher) are flagged as "prepared" in the Scorecard data. Students whose first English or Math course was pre-college level are considered to be "unprepared" for college. In this study, *prepared students were more than twice as likely (2.188) to complete as those who were "unprepared."*

Math courses during the first year. Few students (5%) took both developmental (101 or below) and college-level (103 or higher) math during their first year. As with the English courses, math was categorized as having taken 1) no math, 2) developmental math only, 3) college-level only, or 4) both developmental and college level. Students taking no math in the first year were the reference group to which all others were compared. *Students taking college math only were twice as likely (2.068) to complete as those taking no math.* The difference in the likelihood of completing between students who took no math in their first year and those who took only developmental math or both developmental and college level math was in a positive direction but the effect was small and not statistically significant; again, meaning this small difference may have occurred by chance.

Academic Success

Course success during the first year. Course success (C grade or higher) was highly predictive of completion. In this study, the course success variable was constructed in percentage-of-courses-completed intervals. (The relationship between number of units enrolled and course success was tested but the interaction was not significant in the model.) Students successfully completing all of their courses were used as the reference group. *Compared to this group, students who successfully completed most of their courses, between 80% and 99%, were about half as likely to complete.* Students who completed a lower percentage of their courses were far less likely to earn a degree/certificate or transfer or to be transfer-prepared (earning at least 60 transferrable units). Those

with 60% to 79% successful course completion were .28 times as likely. Those who successfully completed 20% or less of their first-year courses were just .06 times as likely to complete.

Enrollment Patterns
Number of terms enrolled in first 3 years. Students who completed attended an average of one term more at COM (4.6 terms) than non-completers (3.8 terms) during the first 3 years (See Table 1, page 4). *Each additional term at COM during the first three years increased the odds of completion by 55% (1.554).*

Unit load during the first year. Students who completed attempted more units on average during their first year of enrollment than students who did not. Completers' median unit load was 12 units per semester and a total average of 20.4 units during the first year, compared to non-completers, whose median unit load was 10.3 per semester, and 18.2 units during the first year. (See Table 1, page 4). *For each additional unit attempted, the odds of completion increased by about 3% (1.031).*

Demographic Characteristics
Gender. Males were .62 times as likely as females to complete.

Age. Older students were less likely to complete. The mean age of completers was 20.6, compared to non-completers at 22.5. (See Table 1, pg. 4) Older students are less likely than younger students to complete. With each one-year increase in age, the odds of completing college decrease by about 4%.

Race/Ethnicity. Completion of students from each racial/ethnic background were compared to White students' completion in this regression model. *Hispanic students were less likely (.63 times as likely) than White students to complete.* Differences between other racial/ethnic groups and White students varied in magnitude but were not statistically significant.

Economic disadvantage. The CO definition of "economically disadvantaged" includes students who are eligible for CalWorks and/or WIA; those receiving a BOGW or Pell grant; those with VTEA economically disadvantaged status; and those whose SSN matches with Dept. of Social Services. In this study, *economically disadvantaged students were less likely (.68 times as likely) to complete as students who were not economically disadvantaged.*

Summary and Implications

For students who complete their first two semesters at COM, the factors that most influence earning a degree or certificate, transferring to a four-year institution or earning enough transferrable credits to transfer, are English and math course taking, preparation for college, course success and total number of units enrolled during their first three years.

Students who are prepared for college, who successfully pass all their courses and who enroll in more semesters in a three-year period are, of course, likely to complete. Consequently, initiatives that help prepare more students for college will help to achieve our student success goals, as will academic support and services that assist students' learning substantially enough to pass more of their courses. Additionally, the findings support using course success as a short-term metric, or milestone, and improvement target, to gauge progress toward the longer term goal of improving college completion.

Conclusions from this study about English and math course taking are less straightforward. Therefore, they should be considered along with findings of other analyses to better understand the effects of these

courses and the timing of when students enroll in them on completion. In this research, the only differences were between students who take no English in their first year and those who take both developmental and college-level English during that timeframe. The latter were more likely to complete. However, our recent cluster analysis, using the same student data, identified two distinct groups of students, many of whom took both developmental and college English in their first year. One group completed at a high rate while a majority in the other group dropped out. For math, the only difference was between students who took no math in their first year and those who took college math. The latter were twice as likely to complete. In the dataset used in this study, all students enrolled in math or English within three years as a parameter of inclusion in the dataset (the CO Scorecard data). Therefore, these findings may have implications for deciding whether, and in what ways, it matters if all students take math and English in the first year of enrollment. Discussion and review of this and other analyses will be necessary to draw out such implications, if they exist.

Unit load during the first year makes some difference in likelihood of completion, about 3 percentage points per additional unit enrolled. Therefore, as our previous analysis of first term and first year demonstrated, this early enrollment period is a critical time for intervening to help students succeed. Further, the number of units in which they enroll is a relevant short-term metric to use as an improvement target and early gauge of progress toward improving COM's student completion rate.

While most of the academic and enrollment factors were more important to success than student demographic characteristics, some demographic groups were less likely to succeed. Males were less likely than females to complete college. Economically disadvantaged students were less likely than their more affluent peers to complete. Older students too were less likely than younger students to complete. All racial/ethnic groups except Hispanic students were as likely as White students to succeed. The Hispanic proportion of our student body continues to climb, making this an increasingly important group for which to provide support as well as being an equity issue that is critical to fulfilling College of Marin's mission.

Table 1. Summary of Descriptive Statistics-Students Who Completed vs. Did Not Complete
(Students completing the first two consecutive terms at COM, n=1,672)

Factor	Completed	Did not complete
Cumulative course success†	0.82	0.61
Cumulative GPA†	3.09	2.63
Mean units attempted-First year	20.4	18.2
Median unit load/term	12.0	10.3
Mean number of terms attended-First 3 years	4.6	3.8
Mean age at first term	20.6	22.5
% Males	49.5	50.5
% Females	58.1	41.9
% Asian	61.6	38.4
% Hispanic	39.8	60.2
% Black/African-American	37.5	62.5
% White	58.2	41.8
% Economically disadvantaged*	48.4	51.7
% Not economically disadvantaged	59.2	40.8
% Attended lower-funded Marin high school	53.9	46.1
% Attended highly-funded Marin high school	65.2	34.8
% Took developmental English†	55.8	59.9
% Did not take developmental English†	44.3	40.1
% Took developmental math†	24.2	39.8
% Did not take developmental math†	75.8	60.2
% Took college level English†	51.7	29.4
% Did not take college-level English†	48.3	70.6
% Took college-level math†	46.5	22.9
% Did not take college-level math†	53.5	77.1
% Prepared students**	71.2	28.8
% Unprepared students	49.6	50.4

*CO Definition includes: Students eligible for CalWorks, WIA; those receiving BOGW or Pell grant; those with VTEA economically disadvantaged status; those whose SSN matches with Dept. of Social Services

**CO definition: Lowest attempted English or math course is college-level

Note: This table includes two factors that were not included in the final logistic regression model. The first, attending a higher- or lower-funded Marin high school, was not included because a substantial proportion of students did not have data and would have been eliminated from the analysis. The second, GPA, was tested but did not predict completion as well as course success, and would also have left some students out who had taken courses only on a pass/fail basis during the first two terms.

Logistic Regression Model
Dependent variable: 6-year completion

Study population: Students in the Chancellor's Office completion-oriented cohorts beginning in academic years 2004-05 through 2008-09, who completed the first two consecutive terms from the first Fall or Spring term of enrollment. Valid N=1,610.

Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1657.700[a]	.297	.396

Classification Table

Observed		Predicted		
		Completion Within 6 years		Percentage Correct
		Did not complete	Completed	
Did not complete		533	216	71.2
Completed		190	671	77.9
Overall Percentage				74.8

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Male	-.486	.126	14.837	1	.000	**.615**
Age at first term	-.044	.007	35.386	1	.000	**.957**
Race/Ethnicity-reference is White						
Black/African American	.054	.288	.035	1	.851	**1.056**
Hispanic/Latino	-.461	.170	7.399	1	.007	**.631**
Asian	-.010	.214	.002	1	.963	**.990**
Native American	-.611	.779	.614	1	.433	**.543**
Pacific Islander	-.042	.656	.004	1	.949	**.959**
Economically disadvantaged	-.382	.131	8.437	1	.004	**.683**
English taken in Year 1-reference is no English courses						
Took developmental and college-level English in Year 1	1.188	.238	24.940	1	.000	**3.279**
Took only developmental English in Year 1	.121	.170	.511	1	.475	**1.129**
Took only college English in Year 1	.158	.222	.505	1	.477	**1.171**
Math taken in Year 1-reference is no Math courses						
Took only developmental Math in Year 1	.037	.161	.052	1	.820	**1.037**
Took only college Math in Year 1	.726	.167	19.025	1	.000	**2.068**
Took developmental and college-level Math in Year 1	.125	.281	.199	1	.656	**1.133**
Prepared for college	.783	.215	13.315	1	.000	**2.188**
Units attempted in Year 1	.031	.009	10.795	1	.001	**1.031**
Total terms enrolled in first 3 years	.441	.044	101.005	1	.000	**1.554**
Course Success-reference is 100% in Year 1						
Course Success Year 1 - 0 to <20%	-2.781	.388	51.465	1	.000	**.062**
Course Success Year 1 - 20% to <40%	-1.861	.246	57.045	1	.000	**.155**
Course Success Year 1 - 40% to <60%	-1.835	.205	80.206	1	.000	**.160**
Course Success Year 1 - 60% to <80%	-1.265	.176	51.890	1	.000	**.282**
Course Success Year 1 - 80% to <100%	-.626	.191	10.718	1	.001	**.535**
Constant	-.519	.335	2.401	1	.121	**.595**