Matriculation Services and Student Success: A Comparison of Student Outcomes for Students Receiving and Not Receiving Matriculation Services (2005 Update)

Introduction

The goal of this study was to compare the educational outcomes of students who receive matriculation services with the outcomes of students who do not receive matriculation services. The results show that students who receive matriculation services are more successful—by a variety of measures including GPA, units completed, course success, and completion of transfer-level English and Math—than students who do not receive matriculation services.

The design of the study is based on Design 1 of the Matriculation Local Research Options Project from 1989. It is a retrospective study comparing outcomes for students who choose whether or not to receive matriculation services. The study is subject to the self-selection problem in that students who choose to receive matriculation services may be more conscientious than those who choose not to receive services. Therefore, because of its design, the study cannot demonstrate that matriculation services cause improved student outcomes. However, it does show that matriculation services are associated with more positive student outcomes.

An additional study seeking to minimize the self-selection problem is also included in this report. Self-selection is a problem because of the possibility that students who take advantage of matriculation services are more motivated and/or more prepared for college-level work than students who do not take advantage of matriculation services. The second study uses first-term units attempted and first-term Grade Point Average to estimate student motivation and preparation. Matriculation services are related to long-term success measures (in particular, persistence measures) even when these variables are taken into account statistically.

Method

Three matriculation-related services were studied: assessment, orientation, and student educational plan (SEP). For assessment and orientation, three levels of participation were identified. The levels of participation correspond to *no service received*, partial service received, and full service received. For SEP participation, only two levels were used: no service received and full service received. During the time of the study, matriculation services were not mandatory, but all students were encouraged to take advantage of the services available.

Students entering Glendale Community College in Fall 1999, Spring 2000, Fall 2000, Spring 2001, Fall 2001, or Spring 2001 were tracked from their entering semester through Spring 2005. Only students entering with a goal of transfer or AA completion were tracked. The total number of students tracked was 7,803.

The following outcome measures were compared for students in each of the service level groups:

- **Cumulative GPA:** student Grade Point Average in all graded classes from entering semester through Spring 2005
- Cumulative units completed: the total number of units completed in all credit classes from entering semester through Spring 2005
- Overall course success rate: the percentage of all credit classes taken from entering semester through Spring 2005 resulting in a grade of A, B, C, or Credit
- Overall course retention rate: the percentage of all credit classes taken from entering semester through Spring 2005 resulting in a grade other than W
- **Terms enrolled:** the total number of terms (including summer and winter sessions) in which the student was enrolled, from entering semester through Spring 2005
- Next-semester persistence: the percentage of students persisting from their entering semester to the next full (Spring or Fall) semester
- Next-year persistence: the percentage of students persisting from their entering semester to the same semester in the next academic year
- Completion of transfer English: the percentage of students successfully completing any transfer-level English course
- Completion of transfer Math: the percentage of students successfully completing any transfer-level Math course
- **AA/AS completion:** the percentage of students completing an AA or AS degree at Glendale Community College

Results

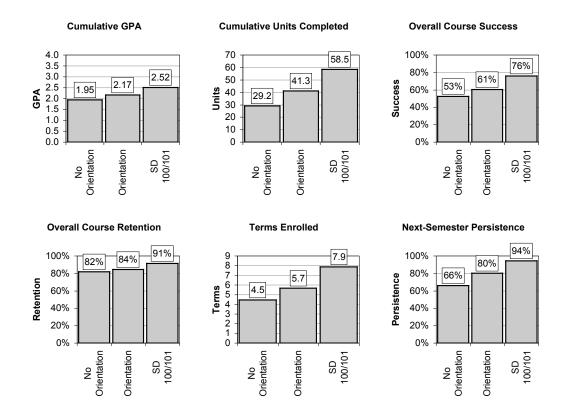
Orientation

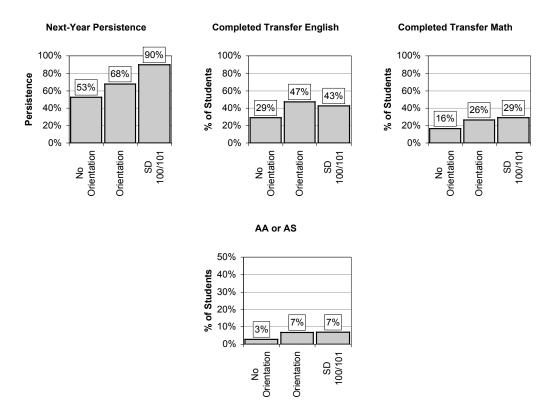
Students were classified into three groups defined by orientation services received. The no service provided group did not attend an orientation and received no orientation services. The partial service provided group attended an orientation session, either online or at a workshop. The full service provided group enrolled in Student Development 100 or Student Development 101, variable unit college orientation courses. The following table shows student outcomes for the three groups. The last row, labeled "Statistically Significant Difference," indicates whether there was a statistically significant difference among the three groups for each outcome measure. (For the first five measures listed in the table, the statistical test used was analysis of variance. For the next four measures, chi-square tests were used.) Statistical significance indicates that group differences are probably not due to chance.

Table 1. Student outcomes for orientation services

			Student	Statistically
	No		Development	Significant
	Orientation	Orientation	100/101	Difference?
Number of students	4,086	1,473	2,244	
Cumulative GPA	1.95	2.17	2.52	yes
Cumulative units completed	29.2	41.3	58.5	yes
Overall course success rate	53%	61%	76%	yes
Overall course retention rate	82%	84%	91%	yes
Average terms enrolled	4.5	5.7	7.9	yes
Next-semester persistence	66%	80%	94%	yes
Next-year persistence	53%	68%	90%	yes
Completion of transfer English	29%	47%	43%	yes
Completion of transfer Math	16%	26%	29%	yes
Completion of AA or AS	3%	7%	7%	yes

For each measure, students with some form of orientation were more successful than students who did not complete any orientation services. The largest differences were for cumulative units completed, transfer Math completion, terms enrolled, and next-year persistence. These differences are shown in the graphs below.





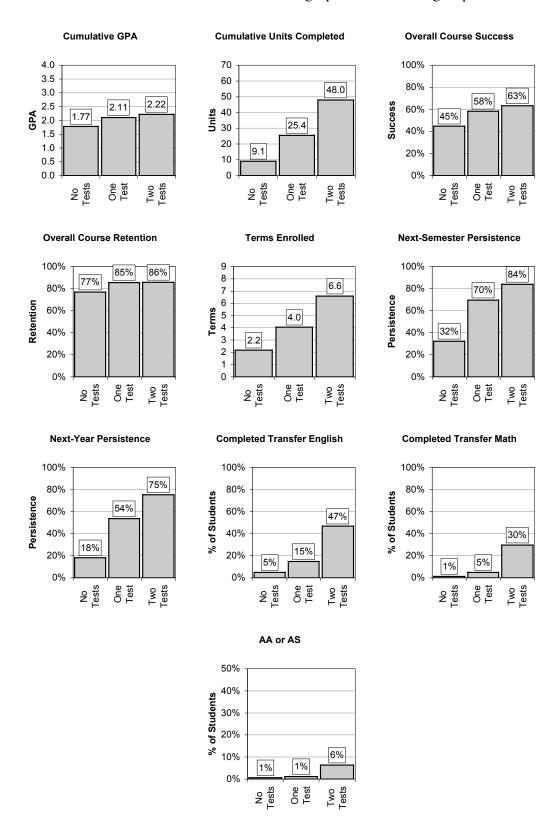
Assessment

Students were classified into three groups defined by assessment services received. The *no service provided* group did not take the English, ESL or math placement tests. The *partial service provided* group consisted of students who were placed in either English/ESL or math, but not both subjects. The *full service provided* group consisted of students who were placed into both English/ESL and math. The following table shows student outcomes for the three groups. The last row, labeled "Statistically Significant Difference," indicates whether there was a statistically significant difference among the three groups for each outcome measure.

Table 2. Student outcomes for assessment services

	No	One	Two	Statistically Significant
	Assessment	Assessment	Assessments	Difference?
Number of students	536	1,877	5,390	
Cumulative GPA	1.77	2.11	2.22	yes
Cumulative units completed	9.1	25.4	48.0	yes
Overall course success rate	45%	58%	63%	yes
Overall course retention rate	77%	85%	86%	yes
Average terms enrolled	2.2	4.0	6.6	yes
Next-semester persistence	32%	70%	84%	yes
Next-year persistence	18%	54%	75%	yes
Completion of transfer English	5%	15%	47%	yes
Completion of transfer Math	1%	5%	30%	yes
Completion of AA or AS	1%	1%	6%	yes

For all measures, students who did not take assessment tests were less successful than students who took one or two assessment tests. The graphs below show group differences.



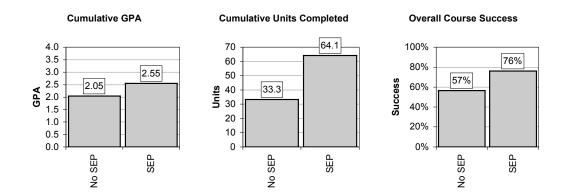
Student Educational Plan (SEP)

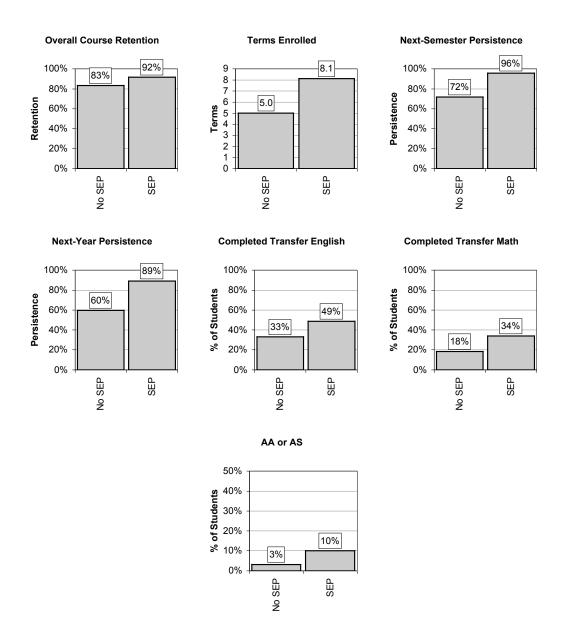
Students were classified into two groups defined by whether or not they had created a student educational plan with a counselor. Outcomes are shown in the following table.

Table 3. Student outcomes for SEP services

			Statistically
	No SEP	SEP	Significant
	Completed	Completed	Difference?
Number of students	6,120	1,683	
Cumulative GPA	2.05	2.55	yes
Cumulative units completed	33.3	64.1	yes
Overall course success rate	57%	76%	yes
Overall course retention rate	83%	92%	yes
Average terms enrolled	5.0	8.1	yes
Next-semester persistence	72%	96%	yes
Next-year persistence	60%	89%	yes
Completion of transfer English	33%	49%	yes
Completion of transfer Math	18%	34%	yes
Completion of AA or AS	3%	10%	yes

Students who completed an SEP were more successful by all of these measures than students who did not complete an SEP. The largest differences were for AA/AS completion, cumulative units completed, and completion of transfer Math. The graphs below show the group differences.





Correction for Self-Selection

Matriculation services were clearly associated with positive student outcomes, as measured by traditional outcome measures such as Grade Point Average. However, it is possible that the relationship between matriculation services and student success was not directly causal. Other factors not accounted for in the previous study—such as motivation, ability, or preparation for college-level work—might have contributed to student success and to a student's probability of seeking out matriculation services. In other words, prepared and motivated students might have succeeded at higher rates than other students whether or not they received matriculation services.

In the second study designed to minimize the self-selection problem, motivation, ability, and preparation were not assessed directly. Instead, two variables were used as proxy variables:

units attempted in the first semester at Glendale Community College and GPA in the first semester at Glendale Community College. A range of factors probably contributed to these two variables, including motivation, ability, preparation, study skills, attitudes toward college, hours worked, and extracurricular activities. The results reported in this section took these two variables into account.

The following table shows a matrix of *partial correlations*. Partial correlation is a statistical method of determining what the correlation of two variables would be if a third variable were held constant. The table shows partial correlations between outcome measures and orientation (coded as 0 or 1, meaning either orientation or SD 100/101 completion), assessment (coded as the number of Math and English assessment tests taken: 0, 1, or 2), and SEP completion (coded as 0 or 1). First-term units attempted and first-term GPA are "partialled out," or statistically controlled for. A high partial correlation indicates a strong positive relationship between variables.

Table 4. Partial correlations of outcome measures with matriculation services, controlling for first-term units attempted and first-term GPA

	Orientation	Assessment	SEP
Cumulative GPA	.07	.05	.08
Cumulative units completed	.23	.33	.26
Overall course success rate	.14	.08	.14
Overall course retention rate	.04	.04	.08
Average terms enrolled	.26	.35	.25
Next-semester persistence	.18	.27	.13
Next-year persistence	.22	.29	.17
Completion of transfer English	.08	.29	.02
Completion of transfer Math	.06	.23	.05
Completion of AA or AS	.07	.08	.08

Only one partial correlation listed in the table was not statistically significant: the correlation between completion of transfer English and SEP completion (0.02, shown in italic type in the table). The partial correlation coefficients of all other relationships were statistically significant. This result is not surprising because the data were obtained from 6,050 students for whom all the data were available, and statistical significance is more likely when sample size is large. However, some of the partial correlation coefficients were quite large, indicating fairly strong relationships between services and outcomes.

The strongest relationships were found between matriculation services and outcomes related to student persistence. Correlations with cumulative units completed, average terms enrolled, next-semester persistence, and next-year persistence showed the strongest correlations. Additionally, assessment was fairly highly correlated with completion of transfer English and Math, but students would be expected to take placement tests before attempting transfer level English and Math so these relationships were not analyzed further.

In order to investigate the relationships further, regression equations were calculated to estimate how matriculation services contributed to student persistence beyond the factors represented by first-term units attempted and GPA. First, a multiple regression equation was

calculated with cumulative units completed as the dependent variable. A two-step process was used. First-term units attempted and GPA were entered into the equation first, resulting in a regression equation with an R-squared of 0.306. This R-squared value indicates that these two variables explained about 31% of the variability in cumulative units attempted. Next, matriculation services were entered into the equation. The final regression model with five variables explained 44% of the total variability in cumulative units attempted. Most of this increase was due to assessment, whose inclusion in the model accounted for an additional 7% of the variability (over and above the variability accounted for by first-term units attempted and GPA). When SEP completion was added to the model, it accounted for an additional 4% of the variability. Orientation added a small but statistically significant 1%. In summary, even after first-term units attempted and GPA were taken into account, assessment and SEP completion were predictive of cumulative units completed.

A second multiple regression model was calculated to predict the number of terms a student enrolled at Glendale Community College. A two-step model was used here as well. After the first step, in which first-term units attempted and GPA were entered, the model explained 14% of the variability in total terms enrolled. After matriculation services were included in the model, it explained 30% of the variability in terms enrolled. Again, assessment was the strongest predictor of terms enrolled, explaining an additional 11% of the variability. The model adding SEP completion explained an additional 4% of the variability, and again orientation added a small but statistically significant 1%. In summary, even after first-term units attempted and GPA were controlled for, assessment and SEP completion were predictive of total terms enrolled.

In order to predict next-semester persistence, a different statistical technique was used. Logistic regression predicts discrete outcomes, such as whether a student persisted to the next semester or not. One outcome of such a logistic regression analysis is a formula estimating the probability of a student persisting to the next semester, given the student's first-term units attempted, GPA, and matriculation services. Using this formula, students can be classified as likely to persist or not persist. According to the logistic regression predicting persistence to the next semester using only first-term units attempted and GPA, the formula would classify 84.3% of students correctly. Adding orientation, assessment, and SEP into the formula would classify 85.5% students correctly, a small increase of 1.2%.

A second logistic regression analysis looked at next-year persistence. The formula including only first-term units attempted and GPA classified 75.7% of students correctly. When orientation, SEP, and assessment were added, the formula classified 78.2% of students correctly, a small increase of 2.5%.

In summary, matriculation services were associated with persistence measures even after first-term units attempted and GPA were controlled for. Assessment showed the strongest relationship with cumulative units completed, total terms enrolled, next-semester persistence, and next-year persistence. SEP completion was fairly strongly associated with cumulative units completed and total terms enrolled. When assessment and SEP completion were included in statistical models, orientation did not add much information toward predicting success. However, orientation had fairly high partial correlations with cumulative units completed, total terms enrolled, and next-year persistence.

A strong conclusion about a causal relationship between matriculation services and long-term outcomes is not warranted. However, these studies provide evidence that a correlational relationship exists, and the second study suggests that matriculation services contribute to student success even when first-term units attempted and GPA are controlled for statistically.

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