Factors of one-year college retention in a public state college system

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ABSTRACT

This paper explores the factors of freshman year college retention by using a unique data set tracking the participation of a cohort of 1,800 students in a public state college system through 2011 from their freshman enrollment at a community college in 2006. The focus is on prevalent factors in the college retention literature, including demographics, high school characteristics, placement test scores, freshman year performance and remedial course work. The results in this paper add to the understanding of how these factors help predict freshman year retention in order to aid administrators and legislative policy makers interested in affecting college retention. The results indicate that while action can be taken to affect retention once students arrive in their freshman year, some obstacles towards retention must be addressed while the students are still in high school.

Keywords: College Retention, College Persistence, High School Preparation, Freshman-Year Success, Remediation

INTRODUCTION

This paper contributes to the college retention literature by exploring the factors affecting freshman year retention using new data from a public state college system.[1] The data follows a cohort of 1,800 students beginning with their freshman enrollment in a community college during the fall of 2006 and tracking their participation in the public state college system through the fall of 2011.With the empirical literature showing that the likelihood of dropping out of the system after the first year decreases rapidly, the focus here is on first-year college retention of freshman in this state school system. A student is considered retained if they are enrolled in any of the public state schools in the fall of 2007. Using contemporary literature as a guide, this paper focuses on five different categories of independent variables. Using a logistic regression model, the investigation begins with demographic variables and continues to build with variables addressing high school characteristics, placement test scores, freshman year academic performance and remedial course work. Each section begins with a review of the literature, followed by a discussion of the findings and how they contribute to the current understanding of college retention. The findings are applicable to college administrators and legislative policy makers concerned with college retention.

The investigation begins in Section 2 examining the correlations between freshman retention and the demographic variables of race and gender. The results show that only the race variable representing Hispanic students has a statistically significant coefficient, meaning Hispanic students are less likely to be retained than white students.[2] Section 3 continues by focusing on the statistical relationship between college retention and the characteristics of the students' sending high school, including behavioral characteristics, graduation rates, dropout rates, attendance rates and incidents of suspensions per student. There is also an examination of the impact of academic performance characteristics, including proficiency rates in Math, English & Language Arts, and Writing. The results show that both behavioral and academic proficiency characteristics of a student's high school are strong predictors of freshman year retention. Section 4 examines the role of college placement exams, specifically Accuplacer and a college specific writing exam. The different categories of testing include Arithmetic, Elementary Algebra, Reading, English Sentence and Writing. All of the standardized testing variables except Arithmetic are statistically significant and positively correlated predictors of freshman retention. The logistic regression model builds in Section 5 with the inclusion of freshman year academic performance, investigating the statistical link between college retention and both freshman GPA and freshman year earned credits. The results show that both variables are statistically significant predictors of college retention. Section 6 completes the investigation by examining the relationship between remedial coursework and college retention. No relationship is found between the number of developmental credits a student enrolls in and the probability of retention. Section 7 concludes the paper.

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[1] This study was performed on behalf of the state college system as a tool to enhance the knowledge of administrators in their policy decisions. *The schools and the state had to be de-identified in order to publish this paper.

[2] The result quickly weakens and disappears with the inclusion of measures of the characteristic of the high schools these students attended, including a school's dropout rate and graduation rate.

DEMOGRAPHICS

This section examines the relationship in this sample between demographics and college retention. These variables are used throughout the paper as controls in the logistic regression models. There is no reason to think there is an intrinsic relationship between gender or race and college retention. However, controlling for these demographic characteristics allows the ability to show that correlations between certain groups and college retention may be symptomatic of other variables of interest, including measures of shared socioeconomic backgrounds. With regard to gender, the empirical literature is ultimately inconclusive. Dickson (2011), Astin and Oseguera (2005), Laden et al. (1999), Tinto (1987), Reason (2003), Astin et al. (1987) and Astin (1975), all find women have a higher probability of retention than men. However, Aughinbaugh (2008) and Harrington and Fogg (2009) find gender is unrelated to college retention.

Table 1 (Appendix) shows a breakdown of this sample group by gender. Of the 1,800 students included in the data, 901 are male and 899 are female, with a 61.8 % retention rate for women and 63.2 % for men. While the summary data shows slightly higher retention rates for males, it is necessary to formally test the statistical relationship between retention and gender. Table 2 presents the results for the logistic regression model, represented in Equation 1. The dependent variable is retained, which is a binary variable equal to 1 if the student is retained in the public state college system into a second year and equal to 0 if the student is not. The independent variables include a constant and male. Male is another binary variable equal to 1 if the student is male and equal to 0 if the student is female. This makes females the reference group, and the coefficient for the male variable is interpreted relative to females.

$$(1)\ retained = \alpha + \beta male + \varepsilon$$

The results reveal that the coefficient for male is positive, reflecting the higher retention rate of males compared to females in the summary table. Using a 10% threshold, the results are similar to Aughinbaugh (2008) and Harrington and Fogg (2009). There is no statistically significant relationship in this data sample between one-year college retention and gender.

The summary data in Table 3 shows there are larger differences in retention rates between race and ethnic groups than between genders. Of the 1,800 students in the sample, the majority of students at 1,356 are white, non-Hispanic with a retention rate of 63%. There are 179 Hispanics with the lowest retention rate of all groups at 53%. There are 87 African-Americans in the sample with a retention rate of 59%, 37 Asian or Pacific Islanders with a retention rate of 70%, 10 American Indians/Alaskan Natives with a retention rate of 80% and 49 classified as Other/Race-Ethnicity with a retention rate of 57%. The race and ethnicity variables are now built into the logistic regression model to test the statistical relationship between college retention and race. Since the large majority of students are white, they will serve as the reference group. The dependent variable is retained and is regressed on the binary variables of Hispanic, African American, Asian or Pacific Islander, American Indian/Alaskan Native and Other. The independent variable is equal to 1 if the student is of that race and equal to 0 if not.

The results for the regression are in Table 4. Only Hispanic has a statistically significant difference from white. Interpreting the meaning of statistically significant variables in a logistic regression is not straightforward. In order to better understand the magnitude of the finding, the percent effect, or marginal effect, of a change in the variable is estimated in the column labeled

"Marginal Effect."[3] For example the findings on the Hispanic variable show a -13.0% lower probability of retention among Hispanic students compared to white students. Other than Hispanic, the demographic variables in this sample play little role in predicting one-year college retention.[4]

HIGH SCHOOL CHARACTERISTICS

This section investigates the relationship between the characteristics of a student's sending high school and the probability of freshman year retention. There have been numerous studies done showing a link between a student's academic performance in high school and college success. However, going back to Tinto (1975) and continuing through ACT (2010), there has been greater focus on the behavioral traits that students develop in high school. ACT (2007) and Fredricks, Blumenfield, and Paris (2004) find the persistence and commitment to academics that a student learns in high school follows through to college and increases the probability of retention. Harrington and Fogg (2009) find high school behavioral traits, represented through attendance and suspension records, are strongly correlated to college retention.

Going forward, this analysis is restricted to only students who graduated from high schools in the state of interest for this paper. This allows an investigation into the relationship between college retention and seven different high school characteristics, including both measures of the sending high school's academic performance and its behavioral traits.[5] Those seven characteristics include graduation rates, dropout rates, incidents of suspensions per student, attendance rates and proficiency rates in Math, English & Language Arts, and Writing in our regression model. Ideally, it would be possible to also follow the previously discussed literature using micro data on each student as opposed to school wide measures, but that level of data is not available in this sample.

Using high school wide measures changes the interpretation of the regression results compared to micro level data. Instead of finding the predictive power of individual student academic performance and behavioral traits, this paper finds the power of the sending high school's performance and behavior measures in predicting college retention. The regressions thus estimate how the environment in which the students went to high school relates to college retention.

Table 5 provides a summary of the academic performance and behavioral outcomes relative to one-year retention. The data reveal that compared to students who were not retained, retained students on average went high schools with 1.8% higher graduation rates, 1.9% lower dropout rates, 1% higher attendance rates, 0.36 lower incidents of suspension per student, 3.3% higher proficiency rates in English & Language Arts, 2.1% higher proficiency rates in Math and 1.9% higher proficiency rates in Writing. The summary results support the empirical literature showing high school standardized testing and behavior characteristics are strong indicators that a

[3] For discrete variables, the marginal effect shows the change from 0 to 1. In this case 0 means not Hispanic and 1 means Hispanic. For continuous variables it shows a 1 unit increase above the mean.

[4] Both the gender and race variables are used throughout the rest of this paper as control variables.

[5] A subset of the sample is used that includes students from the state of interest in this paper for consistency with standardized testing. This still includes 1638 of the 1800 in the sample.

student will be retained in college. However, in order to more formally test the relationship between high school characteristics and college retention, it is necessary to incorporate these factors into the regression model, while controlling for demographic variables.

Table 6 shows the results from the logistic regression for the marginal effects of the high school characteristic variables.[6] The results show the increased probability of retention with a one-point increase above the independent variable's mean value. In the model, all of the high school characteristics variables are significant predictors of college retention except for proficiency rates in the English. When high school characteristics are included in most cases, the statistical significance on the coefficient for Hispanic is weakened or lost all together. This is due to the correlation between Hispanic and these high school characteristic variables. Hispanic students appear to have lower retention rates due in part to the shared characteristics of their high schools. Lower academic performance is often linked to the socioeconomic traits of the student body.

These findings go beyond prior empirical evidence and suggest that not only do individual high school academic performance and behavioral traits influence the chance that a student is retained, but broader characteristics of the sending high schools do as well. As an open enrollment institution, this community college does not have the luxury of selecting students for enrollment in their entering freshman class. Indeed, the regressions indicate that if they were to adopt a strategy of selectivity solely based on sending high schools, the college's one-year retention rate would rise sharply. Since this community college is an open enrollment institution, it relies much more heavily on the sending secondary schools to insure that the entering freshman class possesses the academic performance and behavioral traits that are required to successfully negotiate the rigors of a college level academic program. This finding has implications for legislative policy makers, indicating the need to concentrate on policies that address high school performance and behavior to improve college retention.

STANDARDIZED TESTING

There are a number of papers that investigate various types of standardized testing as predictors of college retention, and most of the papers agree that students with higher measures of academic proficiency are more likely to be retained. Astin and Oseguera (2005), Lotkowski, Noeth and Robbins (2004), Kahn and Nauta (2001), and Reason (2003) all find higher retention rates are positively correlated with college admission test scores. This section examines the ability of the Accuplacer test to predict the likelihood of freshman year retention.

Accuplacer is a computer-based placement test specifically designed for use at the two-year college level that assesses the skills of incoming freshman in the areas of Reading, Writing, and Math. The findings from the Accuplacer testing system are used to guide students in their decisions about enrolling in remedial courses. The analysis begins by examining average Accuplacer scores in different subject areas as well as measures derived from the community college's writing test, which is also administered as part of the testing program for new students.

The findings provided in Table 7 reveal that in all subject areas the average test score is higher for students who have been retained in college after their freshman year. Retained students have a higher average by 2.38 points in Arithmetic, 5.36 points in College Math, 5.34

[6] The constant is left out of the results table, but it was included in the regression model. This is done throughout the paper to save room in the tables.

points in Elementary Algebra, 2.76 points in Reading, 4.94 points in English Sentence, and 0.14 points in Writing. The first five categories are on a 0-120 scale, while the writing test has three different scores of 1, 5, and 9. The summary data on Accuplacer scores seems to find agreement with the majority of the literature showing that higher academic proficiency at the time of entrance to college will lead to higher rates of retention. In order to test the statistical significance of the findings observed in the summary data table, it is necessary to build on the paper' regression model including Accuplacer scores while controlling for demographic traits and the sending high school's dropout rate, which is a control for environment in which the student was prepared for college.[7]

The results in Table 8 reveal that both English Sentence and Writing are significant at the 1 percent threshold, while Reading is only weakly and insignificantly connected to retention outcomes. Arithmetic does not have a significant relationship to first year retention in this model. However, Elementary Algebra has a positive and significant relationship with first-year retention rates. The results generally concur with the literature showing standardized testing is a significant predictor of college retention. More specifically, the results indicate that students who perform better on the placement tests used in the state college system have a higher probability of retention.

FRESHMAN PERFORMANCE

Recent empirical literature suggests that freshman performance has predictive power for freshman retention. Makuakane-Drechsel and Hagedorn (2000) found that freshman year GPA was the most significant predictor of college retention for their sample of students. Also, a number of studies, including Kiser and Price (2008) and Makuakane-Drechsel (2000), have found that the numbers of credit hours taken and earned are significant predictors of college retention. This section investigates whether freshman year performance has predictive power for freshman retention in this sample. Summary evidence in Table 9 and Table 10 suggests that it does. Table 9 separates students into four categories based on GPA and shows that as GPAs rise, so do retention rates. Table 10 separates students into quintiles based on the number of GPA credits they have earned and shows that retention rates also rise as the number of credits earned rises. GPA earned credits are credits for college level courses that count towards a student's GPA and degree completion. By incorporating the two different measures of freshman performance, the logistic regression model formally tests to find if the suggestions of the summary evidence are corroborated.

The results in Table 11 show the marginal effects of the logistic regression model. Both measures of freshman performance are significant predictors of freshman retention. Unlike Makuakane-Drechsel and Hagedorn (2000), however, the number of credits a student earns in their freshman year is the more powerful of the two. When the freshman year GPA and the number of GPA earned credits in the freshman year are included individually, they are both

[7] Due to the strong collinearity of the high school characteristic variables only the dropout rate was included due to the significance and size of the coefficient. The College Math test findings are excluded from the analysis because of the small number of observations. The Accuplacer math exam is progressive in nature, so only a relatively small proportion of all Accuplacer test takers in the study were able to achieve scores in Arithmetic and Elementary Algebra that would permit them to also take the College Math test.

statistically significant predictors of freshman retention. A one point increase in a freshman's GPA above the mean GPA for all freshmen reported correlates to a 9.7% increase in the likelihood of retention. Earning one credit more than the average earned credits for all freshman reported increases the probability of retention by 1.9%. However when both measures of freshman year performance are included, the coefficient for the variable representing freshman year GPA loses statistical significance. The results also show that the variables representing demographics, high school characteristics and standardized testing lose statistical significance when either measure of freshman year performance is included. The evidence supports that progress towards a degree or towards accumulating enough credits to transfer to another institution is the most significant predictor of freshman year retention in this sample. The evidence suggests other variables in the model are predictors for the number of GPA earned credits in the freshman year.

One explanation for the reason that Freshman Cumulative GPA Credits and Freshman Cumulative GPA are stronger predictors than Accuplacer scores is because earning high grades and attaining credits are end goals for students, while Accuplacer are just predictions of students' chances of achieving their end goals. High grades could be an end goal for students in order to get an edge in the job market or if transferring. However, when both variables are included, Freshman Cumulative GPA Credits seems to dominate. Freshman Cumulative GPA Credits is identifying the more persistent or able students just like Freshman Cumulative GPA, but it may have a larger effect in changing the cost benefit analysis of students going forward. The more credits earned in the freshman year, regardless of GPA, the closer one is to attaining a degree and the more worthwhile it is to continue a college education into a second year. Also, if a student has the credits, he can work on improving the GPA in the second year, while students with high GPAs but a low number of earned credits may have scheduling and work load constraints on the amount of credits that can be taken. A student with a 2.0 GPA can graduate in the same amount of time as a student with a 4.0 GPA if they have earned the same amount of credits.

REMEDIATION

Using remedial, or developmental, classes is a tool for many colleges and universities trying to rectify academic deficiencies in students coming out of high school. This paper finds no discernible statistical relationship between remedial coursework and retention. This result is in line with recent literature, including Roska et al. (2009) and Scott-Clayton and Rodriguez (2012). Roska et al. (2009) conducted a study that consisted of 23 colleges and followed a cohort of 24,140 students for four years from their initial enrollment in 2004. The study examined the relationship between developmental courses and outcomes in introductory courses for credit. They found no significant differences in the probability of passing, depending on whether the student took developmental course work. In fact, they found negative consequences of enrollment in developmental courses on the probability of earning a certificate or degree. Students who took developmental courses attempted and completed fewer courses for credit, and students who were recommended to take remedial courses and did, fared no better in introductory courses for credit than students who were recommended to take remedial courses and did not.

Clayton and Rodriguez (2012) used data from six urban community colleges in same community college system from 2001 to 2007 and also found little evidence of the effectiveness of developmental coursework. They found developmental courses do not adequately address

students' skill deficiencies and have no positive effects on any of the college outcomes tested, including retention. They also found developmental coursework to be diversionary. They find students are taking remedial courses instead of credit earning courses, with little or no benefit. If the most important factor in freshman retention is the number of credits earned, then diverting students away from that could actually harm their chances of retention.

Table 12 breaks the freshman year up into semesters and shows the average number of hours students take for credit towards a degree and the average number of credit hours earned towards a degree, depending on the number of developmental credit hours taken. As a logistical matter, the more developmental credits taken, the less opportunity there is to take and complete credit hours that advance a student towards a degree or fulfilling requirements necessary to transfer to another institution. If taking developmental credits lengthens the time students need to spend in college, it may discourage students and adversely affect retention. Table 13 supports this theory, showing retention rates by the number of developmental credit hours taken. There is a spike in retention rates going from 12 to 15 developmental credits, however there is only a very small sample of 37 students with 15 developmental credits. Furthermore, simple correlations tests fail to show a significant relationship between retention rates and developmental credits. This paper finds no credible evidence that placing students in remedial classes increases retention rates.

CONCLUSION AND DISCUSSION

This paper explores the various factors that are most prevalent in the college retention literature today using a unique dataset following a 2006 cohort of freshman in a public state college system. The predictive power of gender, race, high school characteristics, placement test scores, freshman year performance and remedial course work on freshman retention are tested using a logistic regression model. The results in this sample show that freshman year performance is the strongest predictor of freshman retention. In agreement with Makuakane-Drechsel and Hagedorn (2000), this paper finds both freshman year GPA and the number of credits earned in the freshman year are statistically significant predictors of freshman year retention. Unlike that paper, this one finds that the number of earned credits is the stronger of the two predictors. This result may indicate that in this sample the most important influence on college retention is a student's progress towards an end goal of earning enough credits to either receive a degree or transfer to another institution.

Throughout the paper other variables of interest are found to have significant predictive power for freshman retention. However, when these variables are included in the model with the freshman year performance variables they no longer have significant coefficients. This result indicates these other variables are helping to predict freshman year performance and therefore indirectly predicting retention. In agreement with Roska et al. (2009) and Clayton and Rodriguez (2012), this paper finds that the number of remedial credit hours a student takes does not have significant predictive power for freshman retention. Like those papers, this one finds that remedial coursework may be diversionary in that it decreases the number of credits a student can take that count towards a degree or fulfilling requirements necessary to transfer to another institution. If the most important factor in freshman retention is progress in accumulating credits towards those goals, then courses that detract from those goals are counterproductive.

This paper serves as a useful tool to administrators and legislative policy makers looking to improve retention rates. For college administrators, the results in this paper suggest that

instead of placing students in remedial courses, they might want to encourage professors to review the preemptory skills necessary for the subject matter in their courses. This may take away from time for the actual subject, but it may be well worth it if it encourages students to continue their education. The rest of the results in this paper suggest that by the time students are done with high school, there is little that can be done to improve retention rates other than denying admission to students who performed poorly in high school and on placement exams. For an open admission college like the community college in our sample, that course of action is not possible. In order to increase the likelihood of a student's retention, it may be necessary to shift the focus to college preparation during the high school years, which is beyond the scope of college administrators. This course of action falls to legislative policy makers who can influence high school curriculum.

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APPENDIX

Table 1. Retention by Gender			
Sample	**Registered Fall 2006**	**Registered Fall 2007**	**Percent Retained**
Total	1800	1127	62.6%
Male	901	571	63.4%
Female	899	556	61.9%

Table 2. Gender Regression				
Retained	**Coefficient**	**Std. Err.**	**[95% Conf. Interval]**	
Male	0.0653	0.0974	-0.1257	0.2562
Constant	0.4830	0.0687	0.3485	0.6176

Table 3. Race by Retention Status			
Sample	**Registered Fall 2006**	**Registered Fall 2007**	**Percent Retained**
Total	1800	1127	62.6%
White	1356	881	65.0%
Hispanic	179	94	52.5%
African American	87	51	58.6%
Asian or Pacific Islander	37	26	70.3%
American Indian/Alaskan Native	10	8	80.0%
Other	49	28	57.1%

Table 4. Race Regression		
Retained	Coefficient	Marginal Effect
African American	-0.3134	-7.5%
Hispanic	-0.5363***	-13.0%
Asian or Pacific Islander	0.1195	2.7%
American Indian / Alaskan Native	0.2328	5.2%
Other	-0.4097	-9.9%
constant	0.6145	NA
* indicates the coefficient is significant to a 10% threshold, ** indicates the coefficient is significant to a 5% threshold, *** indicates the coefficient is significant to a 1% threshold.		

Table 5. High School Characteristics by Retention Status			
Sample Average	**Average for Retained**	**Average for Not Retained**	**Absolute Difference**
Graduation Rate	86.70%	84.90%	1.8%***
Dropout Rate	13.00%	14.90%	1.9%***
Attendance Rate	90.70%	89.70%	1%***
Incidents of Suspensions Per Student	0.54	0.58	0.36*
NECAP English & Language Arts Proficiency	63.10%	59.80%	3.3%***
NECAP Math Proficiency	22.70%	20.60%	2.1%***
NECAP Writing Proficiency	37.40%	35.50%	1.9%**
*'s represent significance using a two-tailed t-test. * indicates the coefficient is significant to a 10% threshold, ** indicates the coefficient is significant to a 5% threshold, *** indicates the coefficient is significant to a 1% threshold			

Table 6. Marginal Effects for High School Characteristics							
Regression	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Male	0.9%	1.0%	1.4%	1.3%	1.2%	1.3%	1.5%
African American	-2.8%	-2.9%	-3.4%	-7.1%	-0.7%	-4.2%	-5.3%
Hispanic	-8.5%*	-8.4%*	-8.6%*	-12.8%***	-7.3%	-9.7%**	-10.7%**
Asian or Pacific Islander	8.8%	9.0%	8.5%	8.1%	8.3%	7.7%	7.4%
AI/AK	7.4%	7.6%	7.9%	4.1%	8.4%	6.5%	5.9%
Other	-7.9%	-7.7%	-8.2%	-9.5%	-6.8%	-8.4%	-8.9%
Graduation Rate	33.1%**						
Dropout Rate		-35.8%**					
Attendance Rate			61.6%*				
Suspensions Per Student				-5.7%*			
NECAP English & Language Arts					0.3%***		
NECAP Math						0.3%***	
NECAP Writing							0.2%
indicates the coefficient is significant to a 10% threshold, ** indicates the coefficient is significant to a 5% threshold, *** indicates the coefficient is significant to a1% threshold.							

Table 7. Accuplacer and Writing Test Average Scores, by Retention Status						
Sample Average	**Arithmetic (0-120)**	**College Math (0-120)**	**Elementary Algebra (0-120)**	**Reading (0-120)**	**English Sentence (0-120)**	**In-House Writing (1,5,9)**
Average For Retained	58.7	41.6	51.5	69.9	78.2	5.3
Average For Not Retained	56.3	36.3	46.1	67.1	73.2	5.2
Absolute Difference	2.4*	5.4**	5.3***	2.8***	4.9***	0.1***
*'s represent significance using a two-tailed t-test. * indicates the coefficient is significant to a 10% threshold, ** indicates the coefficient is significant to a 5% threshold, *** indicates the coefficient is significant to a 1% threshold.						

Table 8. Marginal Effects for Accuplacer Scores						
Regression	**1**	**2**	**3**	**4**	**5**	**6**
male	0.7%	0.9%	0.2%	0.3%	1.4%	1.2%
High School Dropout Rate	-109.9%**	-103.1%*	-81.4%	-89.8%	-75.7%	-99.1%
African American	-4.0%	-2.9%	-2.0%	-0.8%	2.2%	-1.7%
Hispanic	-9.06%*	-8.5%*	-7.7%	-7.5%	-6.5%	-6.4%
Asian or Pacific Islander	4.2%	3.8%	2.0%	3.3%	3.6%	4.9%
AI/AK	6.5%	6.1%	6.9%	6.3%	6.4%	7.0%
Other	-10.6%	-12.2%	-11.4%	-11.9%	-11.6%	-10.1%
Arithmetic		0.0%				
Elementary Algebra			0.2%***			
Reading Score				0.1%		
English Sentence					0.2%***	
In-House Writing						1.1%**
h.s. d.o. = high school dropout, PI = Pacific , AI/AK = American Indian/ Alaskan Native * indicates the coefficient is significant to a 10% threshold, ** indicates the coefficient is significant to a 5% threshold, *** indicates the coefficient is significant to a 1% threshold.						

Table 9. Retention Rates by Cumulative Grade Point Averages			
Grade Point Average	**Total**	**Retained**	**Retention Rate**
3.0 - <4.0	**406**	**328**	**80.8%**
2.0 - <3.0	**643**	**499**	**77.6%**
1.0 - <2.0	**257**	**168**	**65.4%**
0.0 - <1.0	**30**	**15**	**50.0%**

Table 10. Retention Rates by Cumulative GPA Earned Credits			
Quintile: Credits	**Total**	**Retained**	**Retention Rate**
1st: 22-67	273	241	88.3%
2nd: 18-21	287	241	84.0%
3rd: 13-17	202	165	81.7%
4th: 7-12	338	238	70.4%
5th: 0-6	315	157	49.8%

Table 11. Percent Changes: Marginal Effects for Freshman Performance			
Regression	**1**	**2**	**3**
Male	3.1%	2.8%	2.1%
High School Dropout Rate	-6.0%	0.0%	10.6%
African American	6.0%	3.9%	6.2%
Hispanic	-5.8%	-5.5%	-5.6%
Asian or Pacific Islander	-2.6%	-1.1%	-3.1%
AI/AK	-9.3%	-1.5%	-2.6%
Other	-13.4%	-11.8%	-11.0%
Elementary Algebra	0.0%	-0.1%	-0.1%
English Sentence	0.0%	-0.1%	-0.1%
Freshman Cumulative GPA	9.7%***		2.7%
Freshman Cumulative GPA Earned Credits		1.9%***	1.7%***

PI = Pacific , AI/AK = American Indian/ Alaskan Native *s represent significance using a two- tailed t-test.* indicates the coefficient is significant to a 10% threshold, ** indicates the coefficient is significant to a 5% threshold, *** indicates the coefficient is significant to a 1% threshold.

Table 12. Developmental Credits, Enrolled GPA Credits, and Earned GPA Credits					
Fall Semester			**Spring Semester**		
Developmental Credits	**Enrolled GPA Earned Credits**	**Earned GPA Credits**	**Developmental Credits**	**Enrolled GPA Earned Credits**	**Earned GPA Credits**
0	11.5	8.2	**0**	11.7	8.1
3	8.9	6.3	**3**	8.4	5.4
6	5.6	4.0	**6**	5.6	3.7
9	3.1	2.4	**9**	2.6	1.4

Table 13. Retention Rates by the Number of Total Freshman Enrolled Developmental Credits			
Credits	**Total**	**Retained**	**Retention rate**
0	488	361	**73.9%**
3	348	266	**76.4%**
6	305	224	**73.4%**
9	140	96	**68.6%**
12	81	58	**71.6%**
15	37	35	**94.6%**