

Reducing Time to Undergraduate Degree: Targeted Intervention Strategies

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Abstract

Attainment of an undergraduate degree is traditionally a four-year endeavor, but completion often extends beyond this timeframe. For the California State University System, the cost of undergraduate, full-time tuition has increased drastically. Given the increase in fees and the potential economic contribution of our alumni to the local community, the importance of graduating students in a timely fashion has become an area of emphasis for California State University San Bernardino. The purpose of this study was to identify predictors of time-to-degree with high intervention potential. Strategies to reduce the time required to complete an undergraduate degree will be discussed.

Key Findings

1. Total time to undergraduate degree was strongly predicted by remediation status (yes/no), the total number of terms required to complete the lower division English and math GE requirements, completion of the upper-division writing requirement by the end of the third year of enrollment (yes/no), and the number of times students changed major. On average:
 - Students who needed remediation graduated a half year later than did students who didn't need remediation.
 - Students who completed their English and math GE requirements in their first year graduated a half year earlier than did students who completed these requirements in their second year.
 - Students who completed their upper division writing requirement by the end of their third year graduated three-fourths of a year earlier than did students who completed this requirement after the end of their third year.
 - Students who never changed major graduated a half year earlier than did students who changed major twice.
2. Based on the findings of the time-to-degree model, the following targeted interventions could greatly reduce total time to undergraduate degree:
 - Verbally communicate the importance of achieving certain course milestones during students' SOAR orientation.
 - Use the Degree Audit Reporting System (DARS) to track completion of these milestones and contact students who do not complete the requirements during the proposed timeframe so as to get them back on track.
 - Remind students to adjust their schedules using notifications through email and MyCoyote.
 - Provide information about course milestones to peer advisors so they can help guide students' choice of courses as well as to monitor and discourage unnecessary major changes.

Introduction

California State University San Bernardino (CSUSB) is a public, four-year university and post-baccalaureate degree awarding institution located at the foothills of the San Bernardino Mountains in Southern California. It primarily serves San Bernardino and Riverside counties, an area collectively referred to as the Inland Empire. CSUSB, established in 1965, is one of 23 campuses in the California State University (CSU) System. First-to-second year retention rate for CSUSB is 88% (fall 2011) which surpasses the CSU system wide retention rate of 84%. Second-to-third year retention for CSUSB is 79% (fall 2010) which also surpasses the CSU system wide retention rate of 75%. However, despite high retention, CSUSB is less successful graduating students in a timely fashion. The current four-year graduation rate for CSUSB is 11% (fall 2008) which is lower than the CSU system wide graduation rate of 16%. The six-year graduation rate for CSUSB is 43% (fall 2006) which is lower than the CSU system wide graduation rate of 51%. On average, students entering as first-time, full-time freshmen graduate from CSUSB in 5.3 years. Given the increase in tuition and student fees and the potential economic contribution of our alumni to the local community, the importance of graduating students in a timely manner has become an area of emphasis for CSUSB.

To provide guidance for timely graduation, the purpose of this study was to identify predictors of time-to-degree with high intervention potential. Thus, we avoided previously identified predictors of time-to-degree such as gender, financial support, pre-college academic achievement, and college major (DesJardins, Kim, & Rzonca, 2002/2003; Winter & Bowers, 2007) in favor of course-related variables. First, we identified remediation status (i.e., educational deficiencies in English or math) based on the fact that students entering CSUSB requiring remediation need from one to three additional terms of enrollment than students not requiring remediation. For example, of the fall 2011 cohort, 48% needed English remediation and 41% needed math remediation. Additionally, previous studies, including one conducted at CSUSB (Carollo & Shindledecker, 2012), have found that taking remedial classes extends the time-to-degree at a four-year university (Attewell, Heil, & Reisel, 2010; Attewell, Lavin, Domina, & Domina, 2006; Calcagno, Crosta, Bailey, & Jenkins, 2007). Second, we examined gatekeeper courses (e.g. common prerequisite or mandatory classes) that would likely affect course scheduling and, thus, time-to-degree. Specifically, we selected the lower division English and math General Education (GE) requirements and the upper-division writing requirement. These were chosen based on (a) CSUSB's undergraduate degree requirements and (b) results from previous research that students who pass their first math or English class were more likely to graduate (Calcagno et al., 2007). Lastly, we identified the number of times that undergraduates officially changed majors as a third predictor of time-to-degree. Previous studies have found mixed results, with number of major changes either having no influence or a negative influence on time-to-degree (Barak & Rabbi, 1982; Micceri, 2001; Mitchell, Goldman, & Smith, 1999). Thus, we were uncertain as to the effects of this predictor on time-to-degree at CSUSB.

Data Collection and Sampling

Archival data from CSUSB were gathered for 2,346 students who enrolled as first-time, full-time freshman in the fall terms of 2004, 2005, and 2006 and who graduated by spring of 2013. See Figure 1 for cumulative graduation rates for this sample. The sample consisted of 31% males and 69% females with an average age of 18 at the start of the fall term. The majority, 42% of students, identified as Hispanic, 25% as Caucasian, 11% as African American, 9% as Asian/Pacific Islander, 9% as Unknown, 3.4% as Non-Resident International, and 0.6% as Native American.

Cumulative Graduation Rates for CSUSB Fall Cohorts 2004-2006

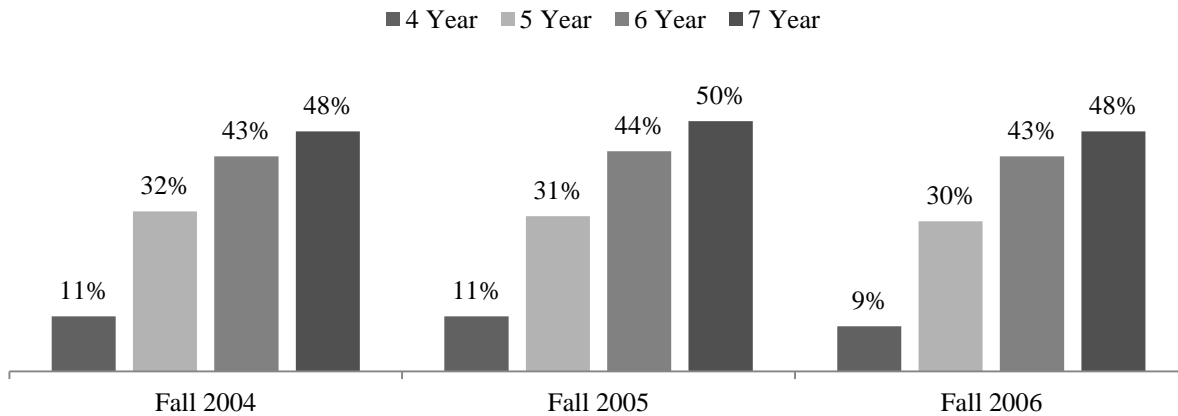


Figure 1: Cumulative graduation rates for CSUSB fall cohorts 2004-2006.

Statistical Methodology

Basic data screening procedures were followed. Using a z-score criterion of $p < .001$, univariate outliers were identified and extreme values were recoded to reduce their undue effect on the data. Multivariate outliers were identified and excluded using Mahalanobis distance set at $p < .001$.

Preliminary analyses of the fall 2004 and 2005 data were conducted on the relationship between each predictor and time-to-degree. Results showed that remediation status (yes/no), the total number of terms required to complete the lower division English and math GE requirements, completion of the upper-division writing requirement by the end of the third year of enrollment (yes/no), and the number of times students changed major were each independently correlated with, and predicted, time-to-degree. There was a half year difference in time-to-degree between students who required remediation ($\bar{x} = 5.4$ years) and students who required no remediation ($\bar{x} = 4.9$ years), as well as between students who completed their lower division English and math GE requirements in their first year ($\bar{x} = 5.0$ years) rather than in their second year ($\bar{x} = 5.4$ years). This increased to nearly a full year difference in time-to-degree for students completing their English and math GE requirements in their fourth year or later ($\bar{x} = 5.9$ years). Similarly, students who did not complete the upper-division writing requirement by the end of their third year of enrollment graduated an average three-fourths of a year later ($\bar{x} = 5.54$ years) than did students who did complete this requirement by the end of their third year ($\bar{x} = 4.85$ years). Students who never changed major ($\bar{x} = 4.9$ years) graduated an average half year earlier than students who changed major

twice ($\bar{x} = 5.4$ years) and a year earlier than students who changed major five or more times ($\bar{x} = 6.0$ years).

Further analysis of the 2004 and 2005 data employed a sequential regression to determine if the addition of terms required to complete the lower division English and math GE requirements, completion of the upper-division writing requirement by the end of the third year of enrollment, and the number of times students changed major improved prediction of time-to-degree above and beyond that afforded by remediation status. Results from the model suggest that all four predictors significantly influence the time-to-degree, and terms to complete lower division English and math GE requirements, completion of the upper-division writing requirement, and the number of times students changed major reliably improved the model above remediation status. Overall, the final model accounted for 23% of variance explained (adjusted R^2). See Table 1 for model results.

Model Results

Table 1

Sequential Regression of Course Predictors on Time-to-Degree

Variables	Time-to-Degree (DV)	Remediation status	Terms to comp. math & Eng.	Completed UL writing course	Num. times changed major	<i>b</i>	<i>S.E.</i>	β	ΔR^2
Step 1									.06***
Remediation status	.24***					0.21***	0.05	0.10	
Step 2									.18***
Remediation status	-					0.21***	0.05	0.10	
Terms to comp. math & Eng.	.28***	.46***				0.06***	0.009	0.17	
Completed UL writing course	-.36***	-.17***	-.23***			-0.56***	0.04	-0.29	
Num. times changed major	.26***	.05*	.001	-.05*		0.21***	0.02	0.24	
Intercept						4.90***	0.05		
Means	5.25	-	3.02	-	1.24				
SD	0.96	-	2.67	-	1.11				
									$R^2 = .24$
									Adj. $R^2 = .23$
									$R = .49***$

Note. UL = upper level. Remediation status: 0 = no remediation needed, 1 = needs remediation. Completed UL writing course: 0 = did not complete before end of 3rd year, 1 = did complete before end of 3rd year. Terms to comp. math & Eng. indicates number of terms taken to complete both lower division GE math and English. $N = 1586$.

* $p < .05$, *** $p < .001$.

Validation of the Model

The saved fall 2004 and fall 2005 model was validated on the fall 2006 cohort. A Fisher's r -to- z test was used to identify whether the overall relationship between remediation status, terms to complete lower division English and math GE requirements, completion of the upper-division writing requirement, and number of times students changed major and time-to-degree was significantly different between the two data sets. The difference was non-significant, supporting the model's validation and indicating that the model could be generalized to future fall cohorts.

Targeted Intervention Strategies

The results of this model suggest that students would benefit from completing the lower division English and math GE requirements within their first two years at CSUSB, from completing the upper-division writing requirement by the end of their third year of enrollment, and from minimizing the number of times they change major. To encourage adherence to these recommendations, several targeted intervention strategies are proposed.

First, the importance of achieving certain course milestones could be verbally communicated during students' SOAR orientation.

Second, the Degree Audit Reporting System (DARS) could be used to track students' level and completion of GE English, GE math, and the upper-division writing requirement. Students who do not complete the requirements during the proposed timeframe will be flagged, contacted, and helped to adjust their course schedule to get back on track. A contact list for these flagged students could be produced by the CSUSB Office of Institutional Research, and would contain basic contact information, such as name, phone number, and email, as well as course information such as course deficiency, current GPA and enrolled units, and a course list for the current and following quarter.

Third, notifications via email and MyCoyote could be used to remind students to adjust their schedules themselves. At the start of students' second year of enrollment, positive service indicators could be posted to MyCoyote reminding them to complete their GE English and GE math requirements. A similar notice could be posted at the start of students' third year of enrollment reminding them to complete the upper-division writing requirement. An email reminder would then be sent at the end of the second or third year to those students who did not complete the requirement(s).

Fourth, peer advisors could use the information to guide students' choice of courses as well as to monitor and discourage unnecessary major changes.

Concluding Remarks

Timely graduation is beneficial to both the student and the local community. The results of this model suggest that time-to-degree could be improved through monitoring course-related factors, such as gatekeeper courses and the number of times students changed major. Implementation of targeted intervention strategies would be one way to utilize these findings to affect positive change.

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