

Finding the “Bleeding Spots”: How to Identify At-risk Groups

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Abstract - In order to improve retention and graduation rates, it is necessary to identify those students who were most likely to withdraw from the university or did not graduate within six years. We created a three stage research project to find the “Bleeding Spot”: The first stage is to build Cohort tracking files. The second stage is to diagnose “At-Risk Groups” by analyzing the negative factors. The final stage is to zoom in on the results of the studies and identify the group at highest risk. A regression model has been developed to predict who would be at highest risk for the incoming cohort.

Introduction

The Office of Institutional Research at Sacramento State University was asked by the Provost to conduct a study on retention and graduation rates as part of a review as to whether campus wide improvements were necessary. The first stage of this research process was to build First-time freshman cohort tracking data files to serve as a basis for further graduation and retention study. The second stage was to diagnose “At-risk Groups” based on definable student characteristics. The third stage was to zoom-in on the highest at-risk group of students (also known as the “Bleeding Spot”) to develop a short term retention plan for the University.

Cohort Tracking Files

Valid data is an essential component of the study of retention and graduation rates, and the building of cohort tracking files is a long and complicated process due to the amount and type of data needed. A cohort tracking file contains a listing of all First-time Freshmen enrolled for a fall semester of a particular year. The data file is comprised of a combination of demographic and academic information.

Initially, data related to the students’ background is collected, such as admission status, gender, ethnicity, high school GPA, SAT scores, remediation status. Information is also collected as relevant to student academic activities such as commuter status, major, course load and involvement in special programs like Learning Community, Freshman Seminar, and Equity Programs. Once the first semester has been completed, the enrollment status, overall GPA, and probation status is added to each student record. This is done each semester for a span of seven years, or until a degree has been awarded. If a degree has been awarded then the degree term, degree type, degree total units, and degree GPA are added to the cohort file. The enrollment status and degree data is instrumental in determining the retention and graduation rate. A visual summary of the overall retention and graduation rates retrieved from the 2000 cohort tracking file is shown in Illustration 1.

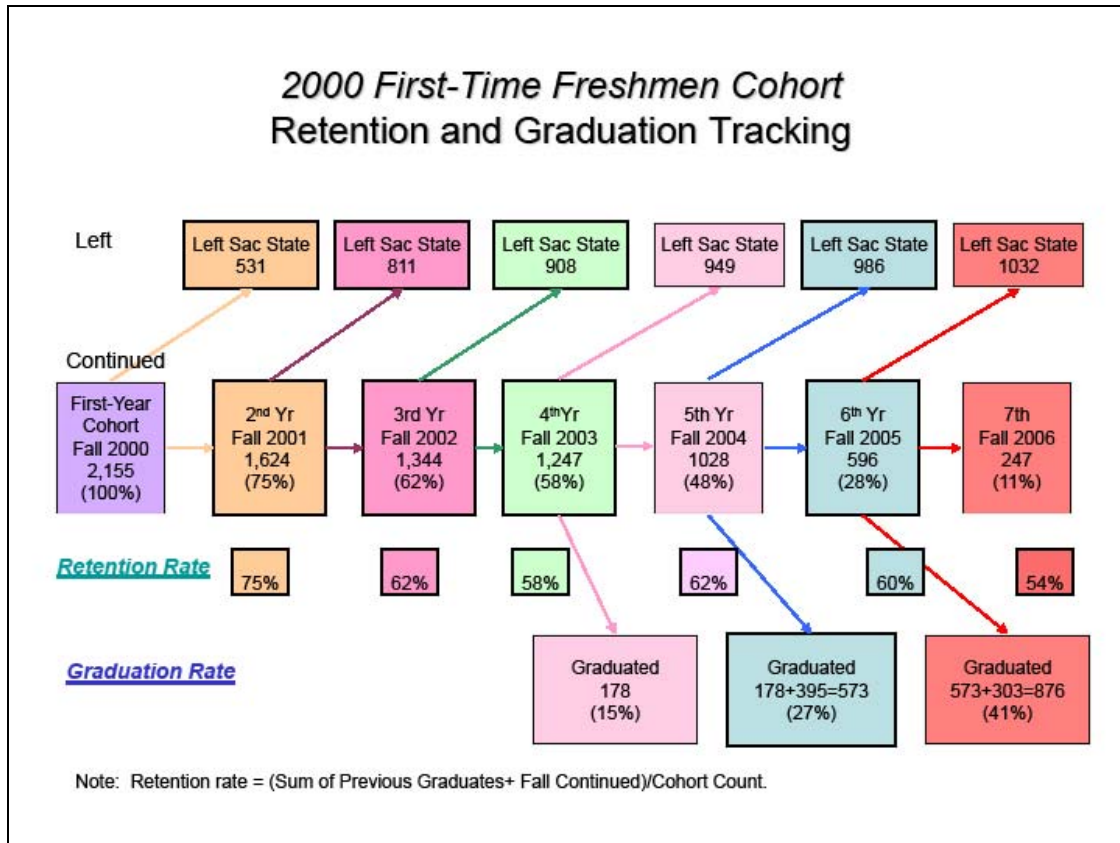


Illustration 1: Retention and Graduation Tracking 2000 First-time Freshmen Cohort

At-risk Groups Diagnostic Methodology

In order to diagnose “At-risk” groups of students a retention and graduation study was conducted by the Office of Institutional Research (OIR). Three cohorts (2003, 2004, and 2005) were selected for inclusion in a one year retention study. These cohorts were selected due to the fact that they were the most recent data available at the time of the study. It was also determined that the initial focus should be on second year retention rates since tracking files have illustrated that the rate of withdrawal is highest after the first year. The 2003 cohort tracking file revealed that approximately 20% of the students attending the University withdrew after their first year, 13% withdrew after the second year, and 5% withdrew after the third year.

In order to conduct the retention study students were divided into two groups consisting of those who returned the following fall semester and those that withdrew during the first year and did not return for the second year. An Independent Sample T-test was used to compare the means of the two groups of students’ high school GPA, SAT scores, first year college GPA, and first semester course load. Additionally, a Chi-Square Test was used to compare the retention rates among the two groups within different categories such as Background, Academic Activities and Performance, College Intervention, and Financial Aid.

In addition to the retention study, a graduation study was performed which included three cohort years (1999, 2000, and 2001). These cohorts were chosen because of the availability of six years worth of historical data. Using a six year graduation rate is the national norm for public universities. The reason for this is that public universities serve a more non-traditional age group and a higher population of part-time students.

To conduct the graduation study, students in each cohort were divided into three groups based upon whether or not they graduated within six years, continued enrollment past the sixth year, or withdrew during the six years. The groups were compared using an Independent Sample T-Test for factors like high school GPA mean, SAT scores, first year college GPA, and first semester course load. Then a Chi-Square Test was used to compare the graduation rates among the three groups within different categories such as Background, Academic Activities and Performance, College Intervention, and Financial Aid.

The following factors were used for both the retention and graduation studies, by category:

- Background
 - Ethnicity
 - Gender
 - Remediation Status
 - Admission Status
 - High School GPA
 - SAT Scores

- Academic Activities and Performance
 - Enrollment Type
 - Commuter Status
 - Probation Status
 - Second Year Retention
 - Major Declaration
 - Changed Major More Than Once Within Six Years
 - First Year GPA, First Year Course Load

- College Intervention
 - Learning Community
 - Freshmen Seminar
 - Equity Program
 - Athletics

- Financial Aid
 - Received Financial Aid During the First Year
 - Received Financial Aid for at Least One Year
 - Received Merit Based Financial Aid for at Least One Year
 - Received Need Based Financial Aid for at Least One Year

Retention Study Results

Sacramento State has a higher second year retention rate when compared with the National Peer Group for both the “Less Selective” category (Average SAT Composition Score < 990) and the “Moderately Selective” category (Average SAT Composition Score < 1,044) and a lower second year retention rate when compared to the CSU system. However, the average SAT score for Sacramento State is skewed due to the fact that submission of SAT scores is not required by students for admission. If a student has earned a high school GPA of 3.0 or above then no SAT score is submitted. Therefore, some of the top SAT scores are not calculated into the University’s average.

Factors that did not appear to have a large impact on second year retention rates were ethnicity, major declaration, commuter status, and SAT verbal/combined scores. Minority students were found to have similar retention rates as those categorized as White, International, or Other. There were no major differences between students who declared a major upon entry and those students who were undecided. It was also found that students living on campus had retention rates similar to those of commuters.

Factors that appeared to have a large impact on second year retention rates were gender, enrollment type, admission status, remediation status, high school GPA, and SAT Math scores. Male students generally had a notably lower retention rate than females. Students that went to school Part-time (with less than 15.0 units), were admitted to the University due to special circumstances, or needed remediation had significantly lower retention rates than their peers in each of these categories. Students who were placed on probation by the end of their first year due to having a GPA of less than 2.0 were most likely to withdraw. Only 51% of this population of students reenrolled in the following year. A much higher retention rate was discovered for those students that entered the University with significantly elevated high school GPA’s and/or SAT Math scores and increased course loads (See Illustration 2).

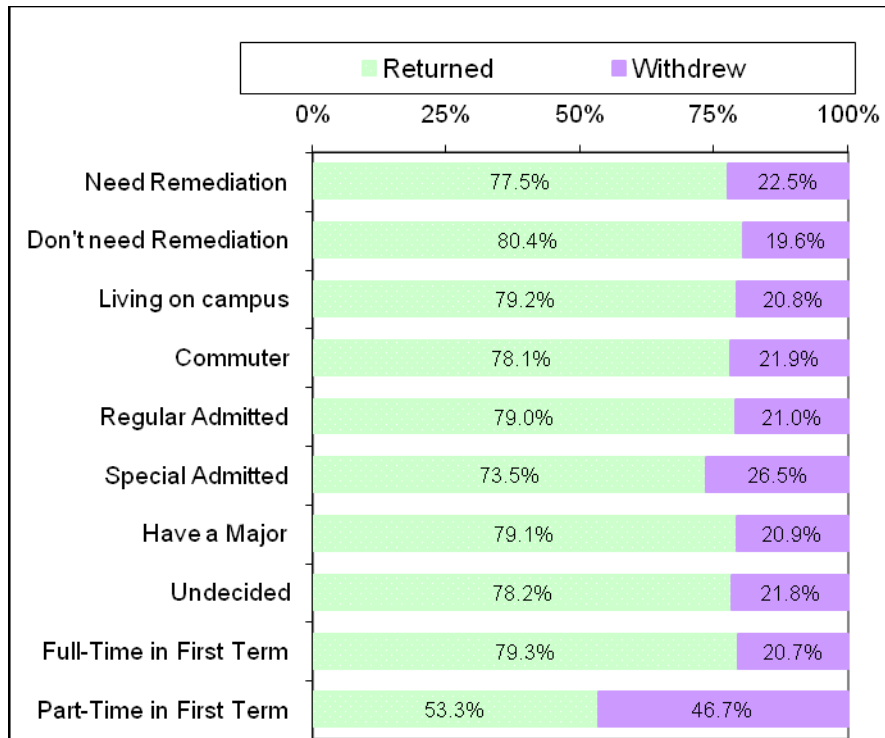


Illustration 2: Second Year Retention Rate by Background and Academics (2003 – 2005 Cohorts)

College intervention programs such as Learning Community, Freshmen Seminar, and Equity Programs also have a large impact on second year retention rates. They were found to positively impact the retention of students participating in those programs compared to those who did not participate. Additionally, students receiving Financial Aid during the first year had significantly higher retention rates than those who did not receive aid (See Illustration 3).

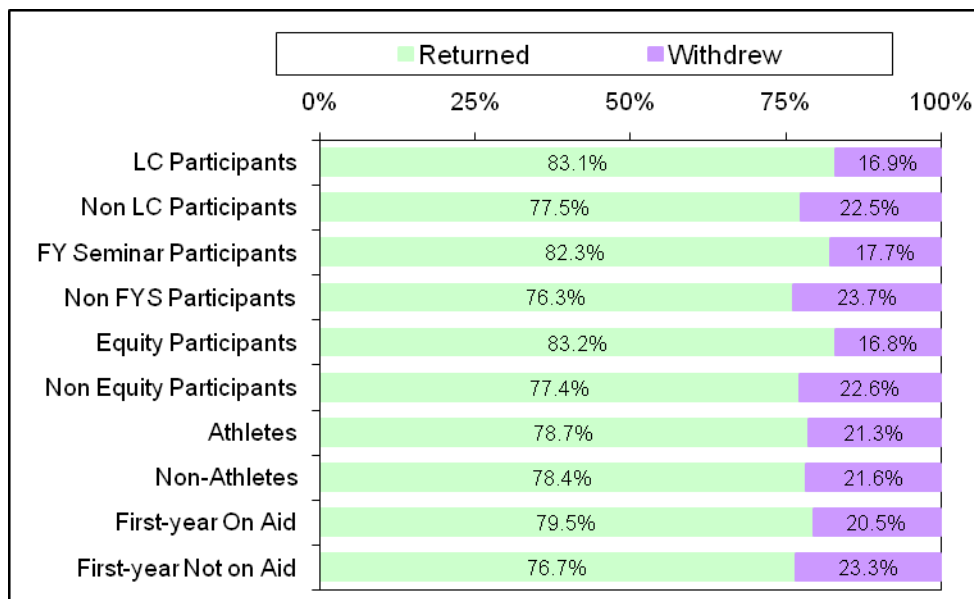


Illustration 3: Second Year Retention Rate by College Intervention (2003 – 2005 Cohorts)

Further exploration went into tracking those students who had withdrawn from Sacramento State after one year. It was discovered that 77% of them had transferred to other colleges or universities. The top three colleges students transferred to were community colleges located in close proximity to Sacramento State: 19% of the withdrawn students enrolled into Sacramento City College, 10% enrolled into American River College, and 8% enrolled into Sierra College (See Illustration 4). On a positive note, most of students who transferred out of Sac State actually went to community colleges so we did not lose many students from the high-end of the spectrum.

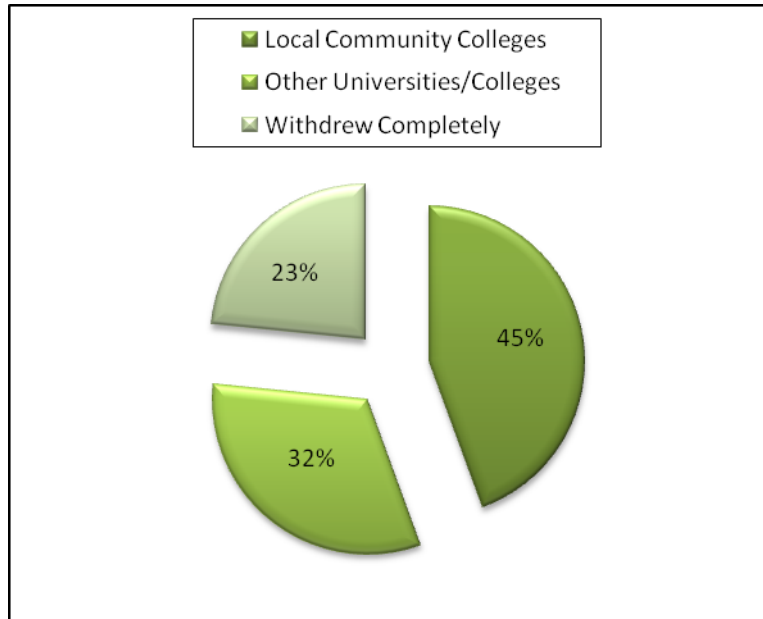


Illustration 4: Tracking Withdrawn Students (2003 – 2005 Cohorts)

Graduation Study Results

The six year graduation rate for Sacramento State is higher than that of our National Peer Group within the “Less Selective” category (Average SAT Composition Score < 990) and lower than that of the CSU system. As mentioned earlier, the SAT scores compiled for Sacramento State are not complete due to it not being required for admission. Only 81% of the students submitted their SAT scores during the graduation study.

No significant difference in the six year graduation rate was noticed for students who declared a major. Students that declared a major within the first enrollment semester were compared against students who declared a major anytime after. A surprising discovery was made when students who had changed majors at least once were compared to students who declared a major during the first semester and did not make a change. The students that changed majors at least once during their six year enrollment had a much higher graduation rate than the students who retained their original major declaration.

Factors that were discovered to have a large impact on the six year graduation rate were gender, ethnicity, enrollment type, commuter status, admission status, remediation status, probation status, second year retention, high school GPA, and SAT scores. Male students generally had a considerably lower graduation rate than females. Minority students had much lower graduation rates than those categorized as White, International, or Other. Students that went to school Part-time (with less than 15.0 units), did not live on campus during the first semester, were admitted to the University due to special circumstances, and/or needed remediation had much lower graduation rates than their peers (See Illustration 5). Additionally, students that began college with lower high school GPA and/or SAT scores than their peers, and carried a light course load, had much lower graduation rates.

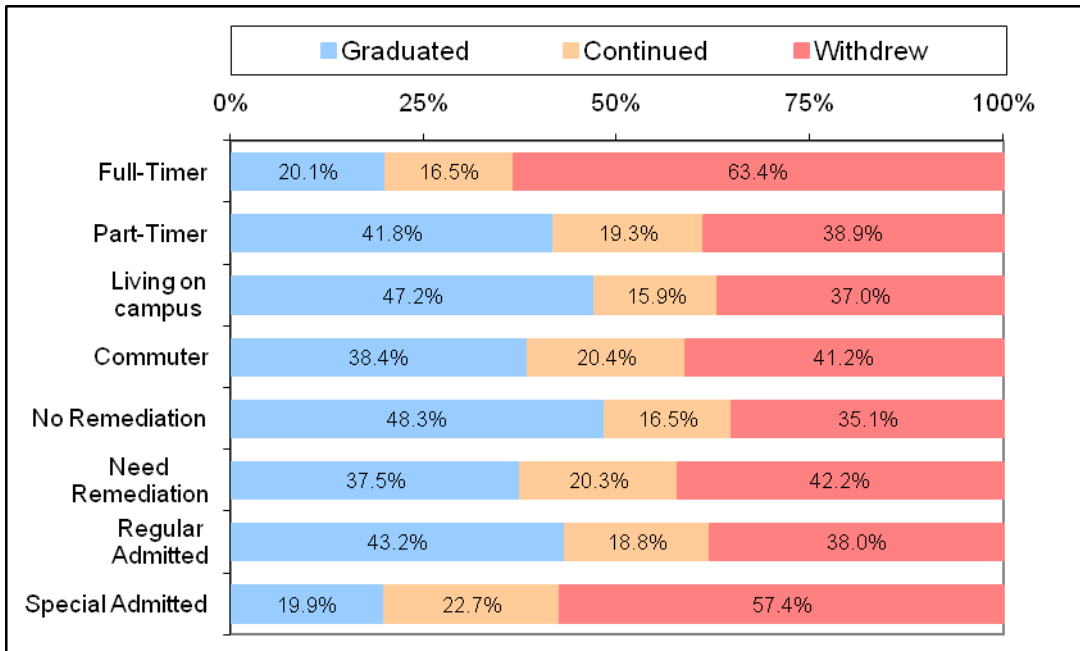


Illustration 5: Six Year Graduation Rate by Background and Academics (1999 – 2001 Cohorts)

The study also revealed a relationship between the second year retention rate and the six year graduation rate. Students who went on to continue for a second year had a significantly higher graduation rate (52%) than those who did not return to the following fall semester (6%). Furthermore, students who were placed on probation by the end of their first year due to having a GPA of less than 2.0 were determined to be most likely not to graduate. Only 13% of this student population graduated within the six years. This means the graduation rate for students on probation is substantially lowered (See Illustration 6).

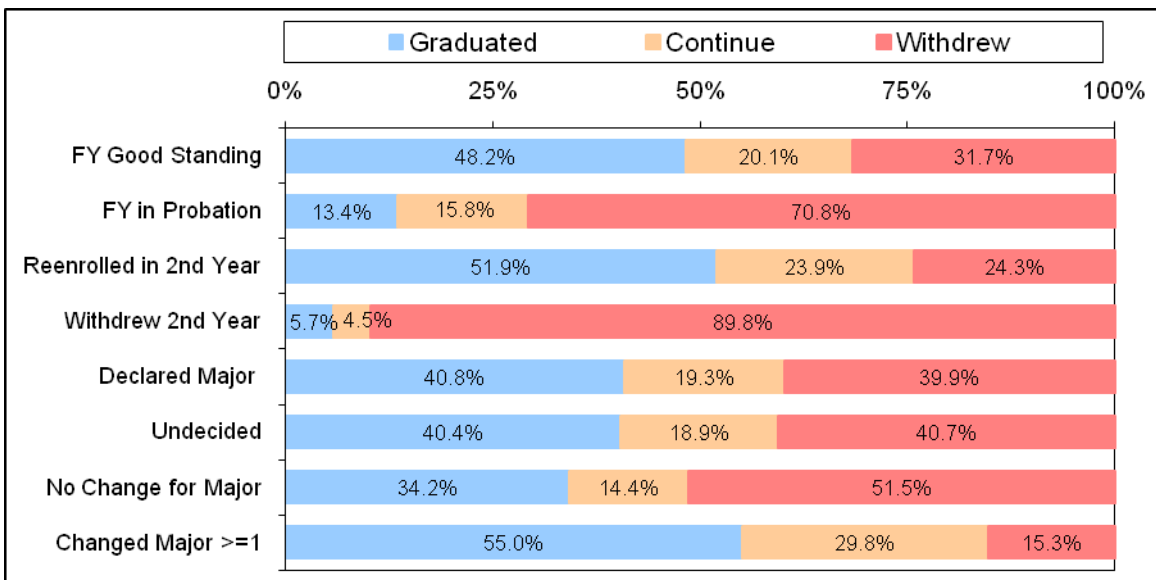


Illustration 6: Six Year Graduation Rate by Academic Activities (1999 – 2001 Cohorts)

The offering of Intervention Programs to students during their first semester at Sacramento State had a positive impact on the six year graduation rate. Specifically, participants in both Learning Communities and Equity Programs had improved their graduation rates considerably. Actually, Participants in the Equity Program had lower graduation rates than non-participants, however, since they generally serve students from a poor academic background, those two groups are not open to valid comparison (the average SAT composition score was 857 vs. 1004). In addition, this program plays an important role toward the retention (the second year retention rate was 77.8%) and graduation of students (the six year graduation rate was 36.3%) from poor academic backgrounds that otherwise might have dropped out of the University. In addition, the offering of Financial Aid impacted the graduation rate in a positive way. Students who received Financial Aid during their first year or for at least one year during their enrollment had a significantly higher graduation rate than those that did not receive Financial Aid (See Illustration 7).

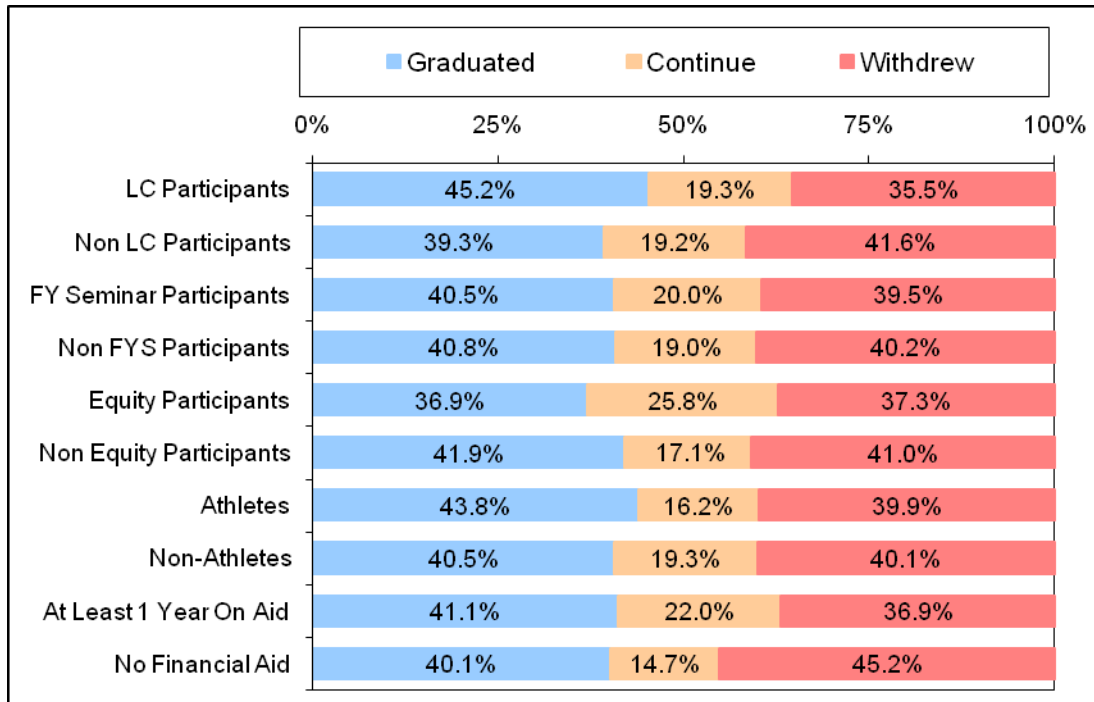


Illustration 7: Six Year Graduation Rate by College Intervention (1999 – 2001)

Zooming in on the “Bleeding Spot”

After discovering several “At-risk” Groups, it is imperative to zoom-in or focus on the highest risk groups of students. The highest risk students are defined as those with the highest one year withdrawal rate and the lowest six year graduation rate. Based on the analysis of the graduation and retention study, students who were on academic probation by the end of their first semester had the lowest second year retention rate (49%) and lowest six year graduation rate (13%) among all at-risk groups. These rates, consequently, had a significantly negative impact on the overall retention and graduation rate. Therefore, students who were placed on probation after their first semester were considered the University’s “bleeding-spot,” or the highest at-risk group.

Utilizing logistic regression, probationary status in the first semester was shown to be the most powerful indicator to predict those students who will most likely withdraw after the first year and/or who will not graduate within six years. A student will be considered on probation if their three GPAs (Current GPA, Sacramento State GPA, and Overall GPA) have fallen below a 2.0. While looking at the retention rates, it was discovered that students with a Sacramento State GPA of 2.0 or above after the first semester were 8.6 times more likely to reenroll the next year than those with a GPA below a 2.0. In the case of graduation rates, students with a Sacramento State GPA of 2.0 or above were 5.6 times more likely to graduate than those with a GPA below a 2.0 (See Illustrations 8 and 9).

Academic Probation and One Year Retention

2003-2005 First-time Freshmen Cohorts

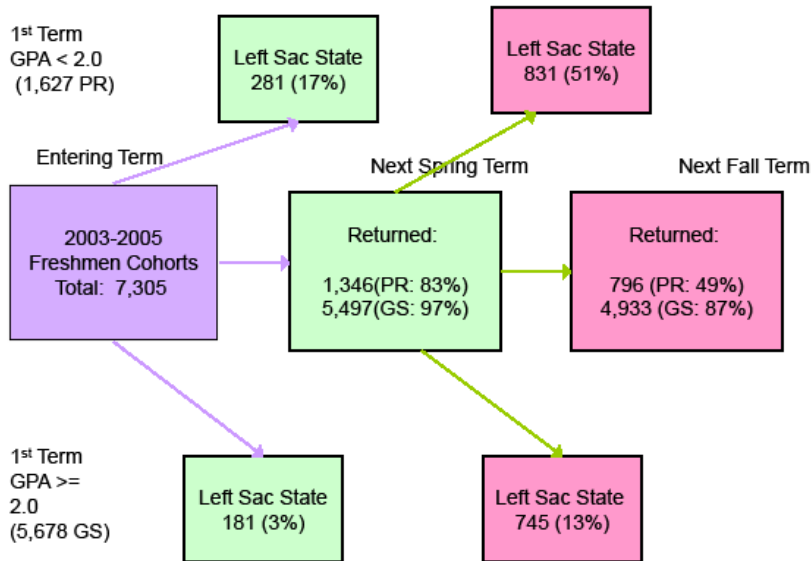


Illustration 8: Academic Probation and Second Year Retention Rate (2003 – 2005 Cohorts)

Academic Probation and Six Year Graduation

1999-2001 First-time Freshmen Cohorts

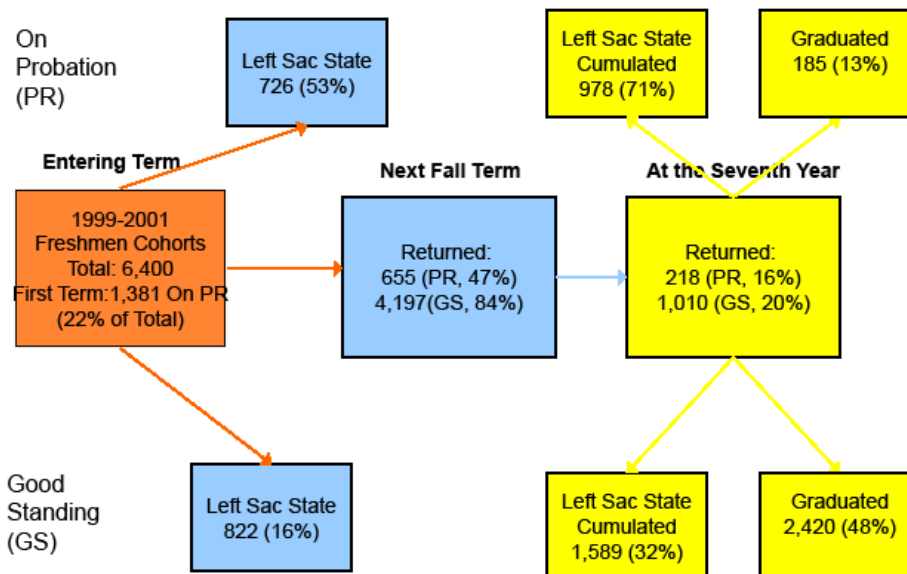


Illustration 9: Academic Probation and Six Year Graduation Rate (1999 – 2001 Cohorts)

Reducing the percentage of students on academic probation is one of the best strategies toward improving the first year retention rate and further increasing the six year graduation rate. In relation to this, one must first recognize that the probation rate is an outcome of student learning rather than a factor of student background. This means that the probation rate could conceivably be reduced through the combined efforts of faculty, administration, and staff. The percentage of students on probation has been relatively consistent across all three cohorts. An average of 22% (which equates to approximately 400 students) each fall is placed on probation. This appears to be a comparatively manageable at-risk group to target within a relatively short time period.

After presenting the results of this study to the Retention Work Team, the Provost, and Vice president for Student Affairs, the OIR was asked to develop a predictive model to identify those students who are most likely to earn a GPA below 2.0 during their first term in college. This model is currently being developed utilizing factors such as admission status, remediation status, gender, and ethnicity to see which combination of factors can be best used to predict whether or not a student will be placed on probation by the end of their first semester. Finally, a short-term plan to reduce the academic probation rate on campus will be created and implemented based on the finding of these studies.

Conclusion

Retention and graduation rates are the most important indicators of the effectiveness of a university. They are also key indicators of student success. In order to improve retention and graduation rates, it is necessary to identify those students who cause a decrease in retention and graduation rates. The Office of Institutional Research (OIR) was able to create a three stage research project in order to identify those students at highest risk of dropping out from the University. First, six First-time Freshman cohort tracking data files were built in the OIR data warehouse. Second, a retention study was performed to compare the retention rates of particular groups of students after their first year of enrollment, and a graduation study was conducted to compare the graduation rates of specific groups of students after six years of enrollment. Third, the two studies were combined to zoom-in on the Universities "Bleeding Spot" (i.e.; those students with the lowest rates of retention and graduation).

Based on subsequent analysis, it was found that students who were placed on probation after their first semester are the "Bleeding Spot". As a result, a Retention Work Team has been working on a short-term campus wide strategy to reduce the number of students on academic probation.

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