

## **Graduation and Retention Patterns Lehigh University 1994 to 1998**

Graduation rates have become an important measure of success for colleges and universities, especially those with selective admissions. When admissions standards are high and many applicants are not admitted, naturally people conclude that every freshman has the ability to graduate. Of course, changes that occur in students' lives can significantly alter the course of their education over four years. The general public, however, expects that a highly ranked university will have a high graduation rate, and many of the best universities do have excellent graduation rates.

Historically the freshman retention rate (percent of freshman class that returns in the fall of their second year) has been considered the key driver for graduation rates. A visual examination of the data at Lehigh's 45 peer institutions, all highly ranked private universities with between 2000 and 10,000 undergraduates, suggests that freshman retention has less impact on graduation rates at Lehigh than might be expected. This observation can be confirmed analytically.

For the freshman classes arriving in the falls of 1994 to 1999 the average freshman retention rate was 93.1% and there was very little variation in the freshman retention rate during those years. Regression applied to recent data for the 45 peer institutions predicts an 87% six-year-graduation rate for a freshman retention rate of 93%. In contrast to this prediction, Lehigh's six-year graduation rates for the freshman classes entering in 1994 and 1995 were 84.1% and 82.9% respectively. Finding the reason behind Lehigh's lower graduation rate is the prime motivation behind this study.

The methodology developed for this study of graduation and retention rates also has a predictive capability that provides some encouraging results. Using pooled data for prior years back to 1994 to replace missing data with estimated probabilities, it predicts six-year graduation rates of 84% for the 1996 freshman cohort and 85% for the next 3 cohorts. In this environment the important question is, how can we improve the Lehigh experience for our undergraduates in ways that will help us exceed these predictions?

We cannot expect to find simple explanations for Lehigh's lower than expected graduation rates or easy ways to improve the Lehigh undergraduate experience to increase them. Hopefully the results of this project will provide a foundation for the Lehigh community to work together in many and varied ways to enhance graduation rates.

The rest of this report will present an overview of the multifaceted picture of retention and graduation at Lehigh that has emerged from this project. More detailed statistical analysis and tables of data are contained in separate reports prepared by the Office of Institutional Research on the different phases of the project.

### **Retention Beyond the Freshman Year**

The model used throughout this study tracks students from the fall semester of one year to the fall semester of the next year and records for each fall semester whether they were an active student, an inactive student with no academic history for that semester, or had already earned a first degree from Lehigh. This approach produces a dynamic picture of how undergraduates move through these three mutually exclusive states - active, inactive and graduated.

For each transition, that is, first year to second year, second year to third year, etc., the frequency at which the students moved from one state to another was determined from the data. For example, in the 1994 cohort 91% of the students actively enrolled in the fall of their second (sophomore) year were also enrolled in the fall of their third (junior) year. In addition, 9% were not enrolled in the fall of their junior year, and 0% of them graduated before the their junior year. Thus from the second to third year there was a 91% transition frequency from active to active, a 9% transition frequency from active to inactive and a 0% transition from active to graduated.

Although the model contains 54 such transition frequencies, there are only five important ones, three major and two minor ones. The major ones are the active-to-active transitions between the freshman and sophomore year (the usual freshman retention rate), the sophomore to junior year, and the junior to senior year. For convenience we will refer to them as freshman, sophomore, and junior retention rates ignoring the official standings of the students as sophomores or juniors. The minor ones are the inactive-to-active between both the sophomore and junior years and the junior and senior years.

Perhaps the most striking observation from this data is that the sophomore retention rate (fall to fall) has actually been lower than the freshman retention rate for 5 of the last 6 years. Only for the 1998 cohort was it higher with freshman retention at 92.9% and sophomore retention at 94.4%. Improvements in freshman retention cannot overcome the rate at which second-year students move from being active to inactive in the third year. An impossible 99% freshman retention rate would yield at most an 86.5% graduation rate without improvements in the sophomore and junior retention rates.

For the freshman cohorts from 1994 to 1997 their junior retention rates were all close to 95% and moved to 96% for the 1998 cohort. Even though the junior

retention rate is the best of the three retention rates, at 95% it raises the question “why are roughly 5% of the students active in the fall of their third year not returning for their fourth year”? It also has a significant impact on the graduation rate because a 1% increase in junior retention would produce a 0.5% increase in the six-year graduation rate.

The transition analysis was expanded to study the potential effect of transfers from one college to another on progress toward a degree. The two most recent cohorts for whom a full six years of data is available are 1994 and 1995. The transfer behavior between colleges for these two cohorts was carefully examined. Students who were actively enrolled in a different college from the admit college in the fall of the second year actually graduated in six years at a higher rate than those who remained in the same college through the fall of the third year. Students who remained in the same college for three semesters, however, and then transferred to a different college by the fall of the third year graduated at a lower rate than the students who remained in the same college through the fall of the third year and were still active students. In both cases the students who made a college change had a lower four-year graduation rate.

Finally it is worth noting that students who return from being inactive to active status do contribute to the graduation rate. In fact, if no inactive students return for their junior or senior years, the six-year graduation rate would fall by 2%.

### **Gender and Graduation**

There are differing views on campus about the effects of gender on retention and graduation and it is important to separate the myths from reality. Gender provides an either/or situation with an obvious comparative question to address. Are the retention and graduation rates higher for female students or male students? For retention and graduation rates we tested for whether or not the rate for female students was greater than the rate for male students.

When the basic three retention rates for men and women from years 1 to 2, 2 to 3, and 3 to 4 are compared for the freshman cohorts in 1994, 1995, 1996, 1997, and 1998, the women had high retention rates in 12 out of 15 cases. For two retention rates – year 2 to 3 in 1996 and year 3 to 4 in 1997 – the retention rates for women exceeded those of men by over 3% and are statistically significant. Most of these differences, however, were generally smaller than 3% and cannot be considered as significant for retention on a year-by-year basis.

There is, however, an accumulative affect of the many higher retention rates for female students and it can be striking. For the 1995 freshman cohort the female and male six-year graduation rates were 86.9% for women and 80.3% for men, a statistically significant difference. The six-year graduation rate was also

higher for women in the 1994 cohort (85.7%) than for men (83.0%) but not as dramatically so. Furthermore, this trend appears to be continuing. The predicted female and male graduation rates for the 1996 and 1997 differ by over 4%. From the 1998 freshman cohort, 88.1% of the female students were actively enrolled in classes in the fall of 2001, but only 83.7 of the male students returned for their fourth year, another difference over 4%.

### **Resetting the Clock**

The vast majority of the student transfers between colleges have already occurred by the end of the first semester of the junior year. Moreover, the freshman and sophomore exodus is over when the junior begins, whether or not it is larger than desired. The colleges now have new upper level cohorts of active students who have largely completed their general education requirements and basic prerequisites for some program of study in the college. In a sense the clock has been reset and the success of these upper level cohorts can be examined. These upper level cohorts consist precisely of those students from a freshman cohort who were actively enrolled in courses and received grades for them in the fall of the third year.

The same analytic methods were applied to these cohorts both in their entirety and split into sub cohorts by gender and college for the 1994 through the 1997 cohorts. The rates at which these upper level cohorts graduate are quite stable with roughly 80% graduating in four years and between 95% and 96% graduating in six years. The gender differences continue to be greater than 4% with over 98% of the women graduating in six years.

Although this report is written in terms of percents because they are easier to compare over several cohorts, the actual numbers of students in many instances can be instructive because only 11 students is approximately 1% of a freshman cohort. The actual numbers of students who do not graduate in six years from an upper level cohort illustrates that a 95% graduation rate for these students is not as good as one might think.

In the upper level cohort extracted from the 1994 freshman cohort there were 34 men and 5 women who did not complete their first degree in 6 years. The numbers for the 1995 upper level cohort are very similar with 37 men and 5 women not finishing in six years. The prognosis for the 1996 upper level cohort is no more optimistic with 42 men and 10 women inactive in the fall of their sixth year. Losing over 30 students from those actively enrolled in the fall of their junior year represents a substantive loss of the educational and financial investments made by the individual students, their parents and Lehigh University.

## **Academic Performance**

To examine the relationships between academic performance and retention, the cumulative grade point average (GPA) was divided into four bands, 0 to 2.0 (At Risk), 2.0 to 2.75 (Below Average), 2.75 to 3.25 (Average), and 3.25 to 4.0 (Above Average). For the active students in a fall semester, the GPA Band for their cumulative GPA at the end of that semester was included in the study database. No GPA indicator was included for inactive students in a fall semester. By this means the cumulative academic performance of students could be tracked as they made progress toward a degree.

Any student who is academically dismissed can hardly escape having his or her cumulative GPA below 2.0 at the end of at least one fall semester. Consequently the effect of poor scholarship on graduation rates can be measured by tracking the retention patterns of students who fell into the At Risk category at least once in their first three fall semesters.

For the 1994 and 1995 cohorts 131 (11.8%) and 113 (10.8%) students respectively had a cumulative grade point average below 2.0 at least once at the end of a fall semester. The six-year graduation rate of these students, however, was 43% and 51% respectively. From this data we can make two observations. First, the support services for academically at risk students appear to be helping a substantial portion of these students. Second, academic dismissal accounts for at most 6% from the 16% to 17% of these two cohorts that did not graduate in six years. Although poor academic performance may be part of a student's decision not to continue their education at Lehigh, it apparently is not the overriding consideration in a majority of these decisions.

Since the GPA for all first semester freshmen was close to 2.80 from 1994 through 1997, those freshmen with a GPA over 2.75 at the end of their first semester form a sub cohort of students who have made a solid start as undergraduates. Because there is no hint of any initial academic difficulties with college level work for this sub cohort at the end of the first semester of enrollment, its retention and graduation patterns are of interest.

For the 1994 through 1997 freshman cohorts, the students who earned at least a 2.75 GPA in their first semester had a freshman retention rate that averaged 2.8% higher than the overall rate and a sophomore retention rate that averaged 2.3% higher than the overall all one. The junior retention rate was, however, at most 1% higher than the overall rate, so the effect of a strong start on retention diminishes over time.

The six-year graduation rate for this sub cohort was 91.7% in 1994 and 89.3% in 1995, and the number of students who did not graduate in six years in these two sub cohorts was 51 and 63 respectively with about half of them coming from the College of Arts and Sciences. Since the predicted six-year graduation rates

for the students with at least a 2.75 GPA in their first semester in 1996 and 1997 remains close to 90%, the expected loss of these students in the next two sub cohorts is also between 50 and 60.

### **The Importance of Belonging**

Current theories on student retention argue that the extent to which a student belongs to a formal or informal social group is a good indicator of their persistence in college and eventual success earning a degree. To gain insight on how this theory might be operating at Lehigh, the retention patterns of fraternity and sorority members and Taylor residents were compared with the rest of the student population. Because of the significant difference in graduation rates between men and women, these comparisons were done by gender for fraternity and sorority members.

For the five freshman cohorts from 1994 through 1998, fraternity members had a freshman retention rate that was at least 10% higher than that of independent male students. The sophomore retention rate was at least 6% higher in four of the five years, and the junior retention rate was at least 5% higher also in four of the five years.

The results for sorority members are similar but not as striking. For the same five years, sorority members had a freshman retention rate that was at least 9% higher than that of independent female students. The sophomore retention rate was at least 4% higher in four of the five years, but the junior retention rate was only 0% to 1% higher for the last three of the five cohorts.

For the 1994 and 1995 cohorts, the most recent cohorts for which six-year graduation data is available, these consistent differences in retention rates resulted in graduation rates that were significantly different. Specifically, members of sororities and fraternities had six-year graduation rates that were 16% to 20% higher than those of independent female and male students respectively.

Students who lived in Taylor in the fall of their freshman year were studied as an example of students having a more informal membership in a social group. Although this analogy has its drawbacks not the least of which is the small number of students living in Taylor, it is the best available surrogate for belonging to a social group other than a fraternity or sorority. The results confirmed expectations. Students who lived in Taylor in the fall of their freshman year in 1994 and 1995 had a six-year graduation rate of over 90%. The six-year graduation rate was close to 75% for those students who neither lived in Taylor nor joined a Greek living group.

## College Comparatives

The data for the freshman cohorts was also examined from the college perspective by dividing the cohorts into three sub cohorts according to which college the students were admitted. The fundamental problem in studying retention and graduation data for colleges is distinguishing between students who transfer from one college into another from those who leave the university. Although the colleges should be interested in the success within the colleges of the admit cohort, the comments here will be limited to the success of the students at Lehigh and provide an overview of the similarities and differences. In the college context retention can have two distinct meanings, within the college itself or within the university but in another college. In this report, retention rates will always mean the retention rate as a Lehigh student in any college. The inactivity rate is simply the rate at which active students in a college move to inactive from one fall to the next fall.

Over the five freshman cohorts – 1994 through 1998 – the average retention rates from year 1 to year 2 for the three undergraduate colleges are almost identical and very close to 93%. The average inactivity rates from year 2 to 3 are also almost identical for the College of Business and Economics and the College of Engineering and Applied Science at 92.7%. The average for the College of Arts and Sciences is between 1% and 2% lower. For year 3 to 4, the Arts and Sciences and Engineering averages are nearly equal at 96% with Business between 1% and 2% higher.

The College of Arts and Sciences has consistently experienced the highest rate of transfer to the other two colleges between years 1 and 2, and the College of Business and Economics has consistently had the lowest rate. Beyond this initial shifting of students between colleges, the transfer rates among them decline and are similar.

The six-year graduation rates for 1994 and 1995 calculated by college of admission exhibit sharp change. These rates are the rates at which students admitted to a college graduate from Lehigh in any college, not the rate at which they graduate from their college of admission, the latter are primarily of interest to the individual colleges. For both of these two years the six-year graduation rate for the students admitted to Arts and Sciences was slightly below the campus six-year graduation rate. The six-year graduation rate for the freshman Engineering class went from the highest college rate at 86% for 1994 to the lowest for 1995 at 80.5%, while the Business students moved from 83% to 87%, the highest of the three six-year graduation rates for 1995.

What are the best ways to look ahead and gauge what the future holds for the college cohorts? Four-year graduation rates do not seem to be a suitable choice because student transfers among the colleges and program requirements affect the colleges differently. The persistence of students to the fourth year, that is, the percent of the students in the cohort who are active in the fall of year 4, should be a better prognosticator.

The four-year persistence rate for students admitted to Arts and Sciences was highest for the 1996 cohort and has declined slightly since then. For students admitted to Business it has been gradually increasing the five years. For Engineering students the minimum occurred with the 1996 cohort, and it is now back to level of the 1994 cohort. Although the fourth year persistence rates are somewhat encouraging, they do not indicate a large increase in six-year graduation rates in the near future.

### **Final Comments**

The emphasis in this report has been on connecting graduation and retention patterns with student experience at Lehigh. Joining a fraternity or sorority, transferring from one college to another, and earning good or poor grades are important events in the lives of undergraduates. The data measures the linkages between such events and student success. Some of them confirm expectations; others are unexpected. Although these numbers cannot fully explain student behavior, they can guide efforts to improve student success through the student experience at Lehigh.

There is another large area of data that also merits a similar systematic analysis and could help guide admissions strategy. Academic Index (AI) and SAT data from these earlier freshman classes has been loaded into the new student information system. Data on financial aid, legacy, and minority status are also of interest, but the data is less robust. The next emphasis in this research should be using this data to connect graduation and retention patterns with the profile of incoming students. In other words, learning as much as we can from the existing data about how a student's prior experiences contribute to their success at Lehigh.