



Integrating Recruiting into the First Year Experience: An Opportunity to Boost Enrollment and Retention

Dr. Elizabeth Anne Stephan, Clemson University

Dr. Elizabeth Stephan is a faculty member in the General Engineering program at Clemson University. She earned B.S. and Ph.D. degrees in Chemical Engineering from the University of Akron, and worked as a production engineer at Dow Chemical in Traverse City, Mich. She is the district director for Tau Beta Pi and Chief Advisor for SC Alpha Chapter of Tau Beta Pi.

Dr. Edward Randolph Collins Jr., Clemson University

Dr. Edward "Randy" Collins is an associate dean of the College of Engineering and Science at Clemson University, and a professor of Electrical and Computer Engineering.

Dr. Chris Porter, Clemson University

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Clemson University combines the benefits of a major, land-grant, science- and engineering-oriented research university with a strong commitment to quality teaching and individual student success. Clemson is a student-centered community characterized by high academic standards, inclusiveness, collaboration and a drive to excel.

Located in a college-town setting, Clemson boasts a 17,500-acre forest, a 295-acre botanical garden and a lakefront setting. Undergraduate enrollment is managed to ensure small classes, an 18-to-1 student-to-faculty ratio, and high retention and graduation rates. Clemson scores above the national average on student engagement and satisfaction surveys, and has earned national recognition for living-learning communities, Creative Inquiry, writing across the curriculum and participation in community service¹.

Clemson University is divided into five colleges. The engineering program is housed in the College of Engineering and Science, which is comprised of 15 schools and departments, offering sixteen undergraduate majors, shown in Table 1.

Table 1. List of undergraduate majors within Clemson's College of Engineering and Science.

Bioengineering	Chemistry
Biosystems Engineering	Computer Information Systems
Chemical and Biomolecular Engineering	Computer Science
Civil Engineering	Geology
Computer Engineering	Physics and Astronomy
Electrical Engineering	Mathematical Sciences
Environmental Engineering	
Industrial Engineering	
Materials Science and Engineering	
Mechanical Engineering	

The Office of Undergraduate Recruitment (OUR) for the College of Engineering and Science (CES) is charged with managing and coordinating recruitment initiatives for the College. The OUR has a staff of two full-time employees and one part-time graduate assistant. A major component of the overall recruitment program is the College's weekly tour program for prospective students and parents, also referred to as "Friday Tours." The Friday Tours, offered ten times each Fall and Spring semester, were developed over a decade ago as a means to present a structured a well-defined message to prospective students and their parents. Today, Friday Tours allow guests to register and attend one of four comprehensive visits of related majors within CES, shown in Table 2.

Table 2. Friday Tour choices for prospective students, and percentage of total tour attendance for Spring 2012.

Tour 1	Bioengineering	29%
	Chemical Engineering	
	Materials Science & Engineering	
Tour 2	Biosystems Engineering	24%
	Civil Engineering	
	Environmental Engineering	
Tour 3	Computer Engineering	19%
	Electrical Engineering	
Tour 4	Industrial Engineering	28%
	Mechanical Engineering	

At the beginning of the Friday Tour, all guests report to Holtzendorff Hall for the 12:40 pm start, which is the home to both General Engineering (GE) and OUR. Guests are registered and gather in a 150-seat auditorium for a presentation by GE; additional lecture halls are used during busy times of the semester. A packet of CES information is given to all prospective students during check-in. GE faculty conduct a 20-minute presentation to all guests, as all freshmen and transfer students wishing to pursue a degree in engineering initially begin their collegiate career in GE, about the philosophy, curriculum, teaching methods, advising, and enrichment opportunities offered in GE and the College. At the end of the presentation time is allotted for questions, which typically include Advanced Placement credit, retention, cooperative education, and job placement.

The tours continue to the specific departments, led by students who range from second-semester sophomores through graduate students in the respective majors. At least one student guide represents each department during the tours, but sometimes there may be as many as four. Guides are provided, and compensated, by the respective departments. These students do not necessarily have a 4.0 GPA, but rather they are out-going, well-spoken students who are active in their departments and across campus. It is important students possess knowledge of a wide variety of activities, from study abroad to co-op and internship to departmental research to organizations and clubs, to be able to answer questions during the tour based on their own experiences. Each department is allotted between 35 and 45 minutes for their presentation. A majority of the guests have taken a general University campus tour in the morning, allowing the CES tours to focus solely on curriculum, research opportunities, study abroad, cooperative education, awards, student clubs/organizations, and graduate school/job placement within each department. The tour allows guests to visit department classrooms, laboratories, and research facilities. In addition to the student guides, many of the departments will have faculty, staff, and even department chairs speak with the prospective students and parents.

Tour attendance by prospective students and guests is up 58% since academic year 2008-2009. During the same time period GE enrollment is up 51%, from 693 in Fall 2008 to 1,103 in Fall 2012, while Clemson's overall freshman enrollment only rose by 18%, from 2,927 in Fall 2008 to 3,465 in Fall 2012 as shown in Figure 1.

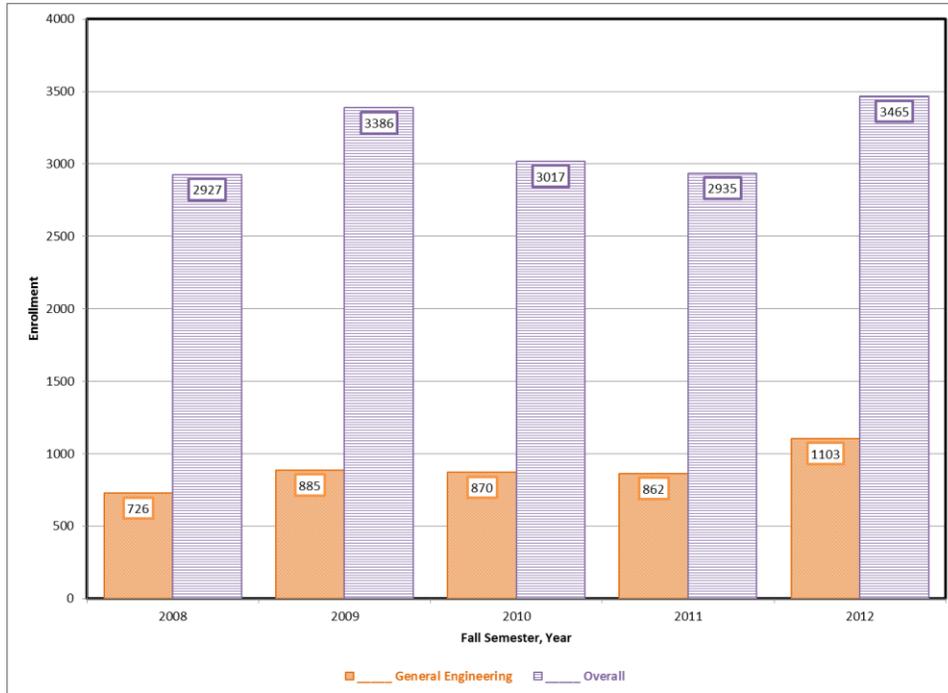


Figure 1. Enrollment of students in (a) Clemson University and (b) General Engineering.

Despite the large increase in enrollment, SAT scores for GE students are also up, from 1266 in Fall 2008 to 1289 in Fall 2012 as shown in Figure 2. The national SAT score has remained essentially constant during this time period at 1012.

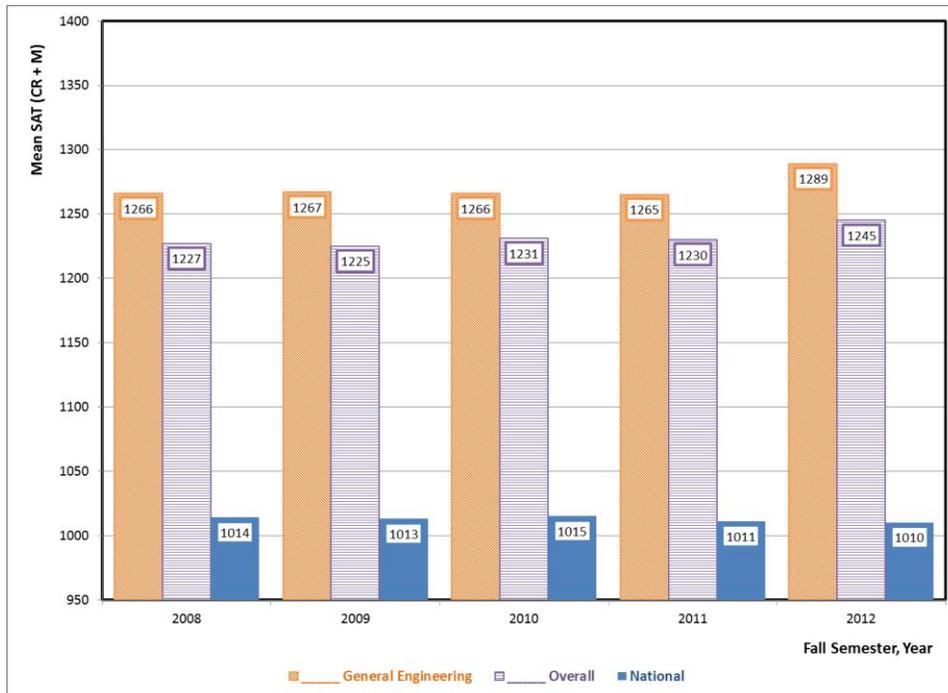


Figure 2. Comparison of SAT scores for Clemson General Engineering entering freshman, Clemson overall entering freshman, and the national average².

Each semester approximately half of the prospective students are from outside of South Carolina and the overwhelming majority are high school seniors. The Friday Tours have had a positive impact on how guests rank Clemson among institutions they are considering, with students ranking Clemson higher post-visit as shown in Figure 3.

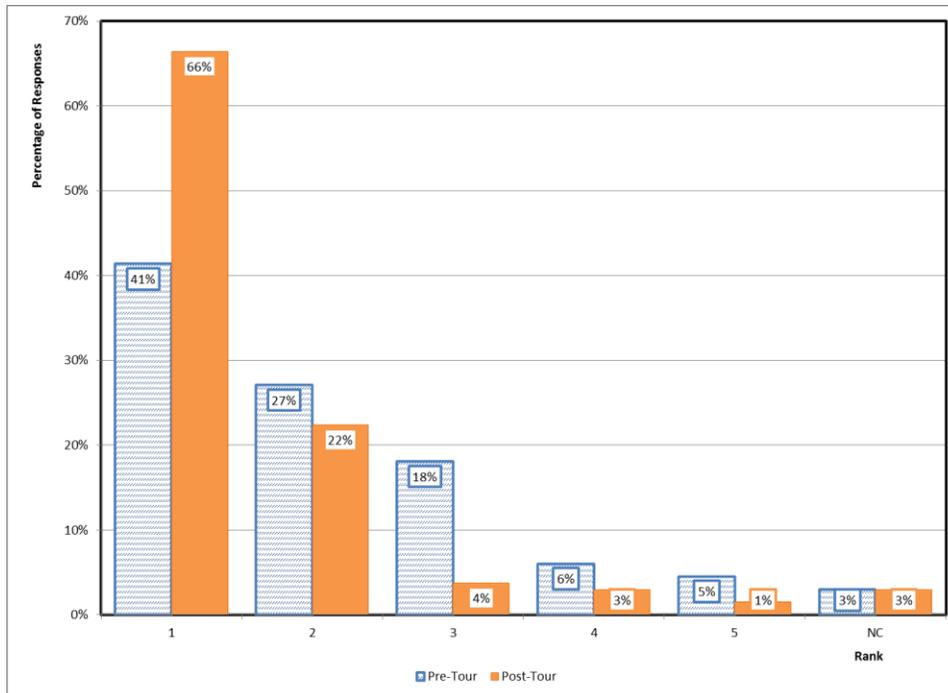


Figure 3. Response by students pre-tour and post-tour to question "How does Clemson Engineering rank in your choice of school among institutions you are considering attending?"

Once students enroll in Clemson as an engineering student, they are placed in the GE. All GE students take a common first-semester course which has three main objectives: (1) to prepare students for the rigor of future engineering classes; (2) to provide students with a solid foundation of basic engineering skills; and (3) to introduce students to the different engineering majors and career options.

Several activities are used to promote career exploration. Clemson has ten different engineering disciplines. While some, like mechanical engineering or chemical engineering, are well known to students and can be found at most universities across the country offering engineering, several programs are unfamiliar to most students. Biosystems Engineering, Environmental Engineering, and Material Science and Engineering are three of the smaller, less familiar programs at Clemson. These three departments come and give presentations during the first-semester class to expose students to the opportunities in their fields at the end of September. Students also hear lectures during the same week on the National Academy of Engineers Grand Challenges and how the diverse professors teaching the first-semester course chose their own majors.

Next, students are required to complete two tasks: 1) describe, in two sentences using their own words, each of the 10 engineering majors offered at Clemson and 2) schedule two out-of-class tours and explain, in writing, why they are interested in those specific tours. This exercise is designed to help students fully explore what all of the engineering majors here at Clemson have to offer. Students are told the tours will be more effective if they choose to attend the tours of the two engineering majors that seem most appealing after completing the writing exercise, so they can gain a better sense of whether those majors are a good match.

All students must complete two tours of different departments during the month of October as part of the course grade. Typically, tours are 0.5% each, for a total of 1% of the overall course grade. The master schedule of departmental tours is coordinated using General Engineering Online (GEO), a program developed for Clemson^{3,4}. Students are given the option to ask permission to attend a non-engineering tour as one of the two tours, or to request to attend more than two tours.

The tour registration requirements are quite strict. Students must be preregistered to attend any tour; walk-ins are not accepted. Any tour cancellation must be done 24 hours prior to the tour. Missed tours are allowed to be made up if it is due to an excused absence (such as documented illness, funeral...). No exceptions are made for completely booked tours. If a tour is full prior to the second week in October, more seats are released or additional tours are scheduled. After the second week, it is assumed all students are registered and no add additional capacity is added.

The actual tour planning and content is determined by the departments. Tours last between 45 minutes and 1 hour in length, and occur in the evenings. Each department is allowed to choose the day and time to make the tour available. The number of sessions offered by each department is determined by the projected enrollment and historical data on the choice of major. The departments will use faculty, staff and students to conduct a combination of lecture and hands-on activities to showcase the opportunities students will have if they decide to pursue that major.

For the last two years (Fall 2011 and Fall 2012), the statistics of tour registration and attendance have been identical despite the large increase in course enrollment. In both years, 4% of the students enrolled in the first-semester course did not register for tours, and 8% of the students did not attend any tours. In 2011, 35% percent of the students who did not attend any tours

ultimately dropped the class by the withdraw date, and of those who remained in the course, 23% of these students failed the course for a total DFW rate of 58%.

In both years, 94% of the students registered for two or more tours; 18% attended only one tour and 74% attended two or more tours. For students attending only one tour, 9% dropped by the withdraw date and this group had a total DFW rate of 17%. For students attending two or more tours, only 3% withdrew from the class and this group had a total DFW rate of 13%.

One measure we use to determine the success of the tours, and of the course success in meeting the overall objectives, is measuring the confidence of students in their choice of major. Students are asked to select a major and rate their confidence in their choice on a scale of 1 – 10 during the first week of the first-semester course, and again after the tours are completed. As an example, in Fall 2011 students reported a confidence rating on average of 6.8 [+/- 2] in August during the first week of class. In November, after the tours were completed, students reported a confidence rating on average of 8 [+/- 1.5]. Both the increase in confidence and decrease in the standard deviation illustrate the value of the tours. Two student comments regarding the tours are given below. Table 3 shows the increase in confidence by choice of major.

- To me, this class was an opportunity ... to explore a broad career field with the goal to eventually narrowing down my engineering choice to a specific one. If it had not been for this class ...I believe I would have chosen the wrong major and therefore would have spent the last semester unhappy. I credit this class for saving me time and money because of the help it provided.
- It is a great class because it gives students the opportunity to see what specific engineering major that they want to go into, instead of making an uninformed decision and having to change majors later on.

Table 3. Confidence in choice of major, polled in August (pre-tour) and November (post-tour) for first-semester students; Fall 2011.

Major	August	November	% Change
Bioengineering	7.48	8.08	23%
Biosystems Engineering	6.00	7.00	25%
Chemical Engineering	6.75	8.21	45%
Civil Engineering	6.55	8.07	44%

Computer Engineering	7.05	8.49	49%
Electrical Engineering	6.47	7.91	41%
Industrial Engineering	6.93	7.69	25%
Material Science & Engineering	6.41	8.13	48%
Mechanical Engineering	6.89	7.92	33%

Tour attendance is a good predictor of future success. Table 4 shows the GPR comparison based on tour attendance. While it is perhaps not a great revelation that students who complete course requirements do better in their courses, what is surprising is how the tours, worth only 1% of the overall grade, predict the retention of students. Figures 4 and 5 show the retention of students based on tour attendance.

Table 4. GPR as of January, 2012 of students, based on tour attendance, for students in Fall 2010 and Fall 2011.

Number of Tours Attended	0	1	2	3 or more
Fall 2010				
GPR	2.54	2.83	3.14	3.21
Number of Students	77	143	662	88
Fall 2011				
GPR	2.33	2.84	3.15	3.25
Number of Students	79	172	666	42

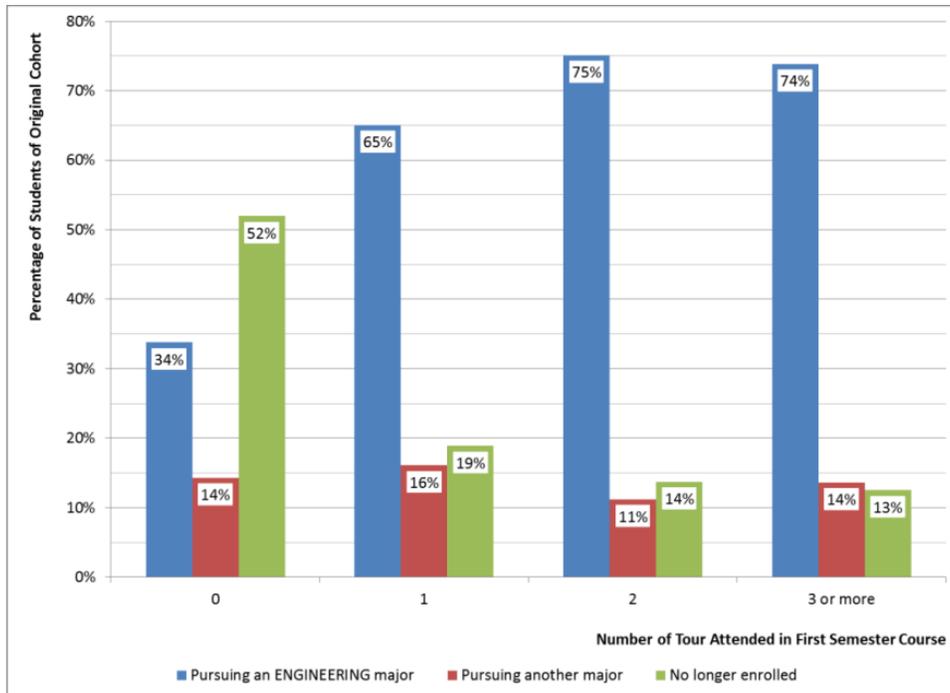


Figure 4. Students who began in Fall 2010; current major as of January 2012 (after 5 semesters) based on number of tours completed first-semester engineering course.

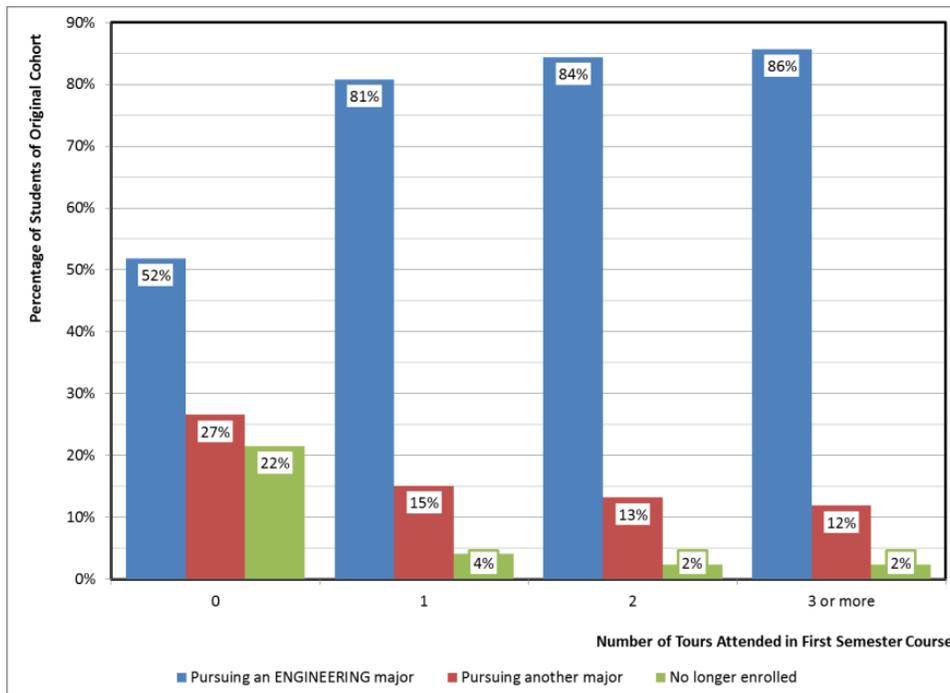


Figure 5. Students who began in Fall 2011; current major as of January 2012 (after 3 semesters) based on number of tours completed first-semester engineering course.

The number of students pursuing an engineering major in Figures 4 and 5 above include the number of students who are still enrolled in General Engineering. To matriculate out of GE, students must pass the following classes with a C or better, and meet the GPR requirement for the department: Chemistry, one semester [CH 101]; Calculus I and II [MTHSC 106 & 108]; Physics, one semester [PHYS 122]; General Engineering, two semesters [ENGR 102 & 141]; English Composition [ENGL 103]. Most departments require a 2.0 GPR; some have more stringent requirements. For example, Bioengineering has a requirement of a 3.0 to ensure students who enter this major can successfully matriculate to graduate school, as most graduates in this field continue to pursue an advanced degree. GPR restrictions are put in place to ensure student success both in the major and upon graduation. Students remaining in the GE program past the first two semesters of their college experience are "off-track" to graduate in four years, and require more resources to administer. These students often repeat classes and require more advising time than a student who is "on-track". Figure 6 shows the percentage of students who remain in GE based on tour attendance.

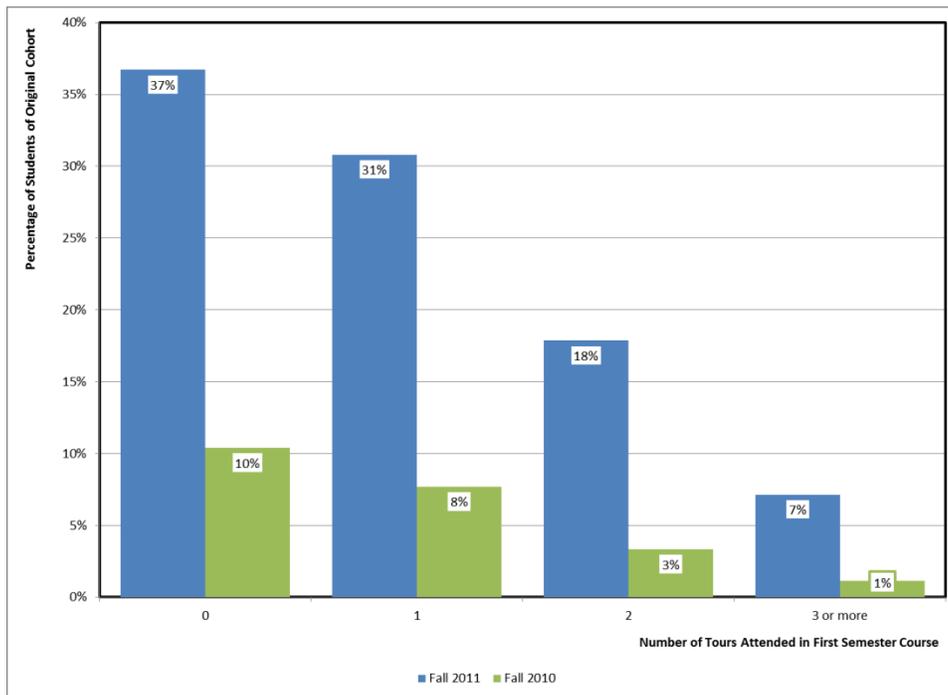


Figure 6. Students who began in Fall 2010 and Fall 2011; percentage of students who are still in General Engineering as of January 2012 (after 5 or 3 semesters respectively) based on number of tours completed first-semester engineering course.

The combined process of helping students (a) decide if Clemson is right for them and (b) decide which engineering major is right for them has had a positive impact on overall retention, shown in Figures 7 and 8. Since 2003, retention of students in engineering from the freshman to sophomore year has increased from 66% to 83%. In the same time frame, the number of students retained in the upper level departments has increased. The percentage of students

graduating or still enrolled in engineering at the 6 year mark rose from 46% in 2003 - 2004 to 63% in 2007 – 2008. Graduation rates have also increase dramatically. Between 2003-2004 and 2008-2009, the 4 year graduating rate rose from 15% to 33%.

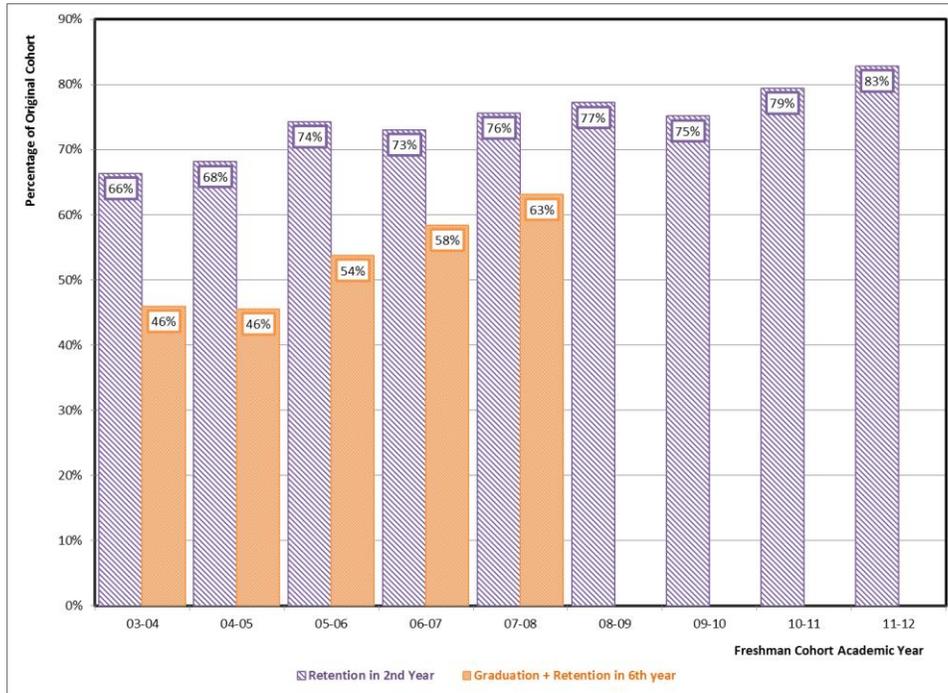


Figure 7. Percentage of original cohort retained in an engineering major from (a) first-year to second-year and (b) first-year through graduation or enrollment in sixth year.

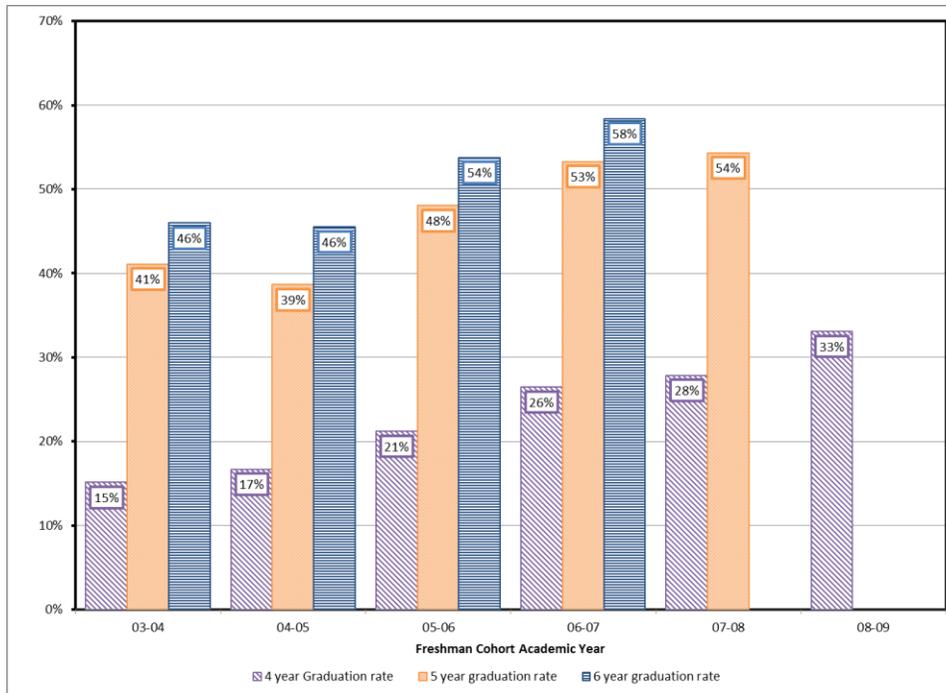


Figure 8. Percentage of original cohort graduation rate in an engineering major after (a) four years; (b) five years; and (c) six years.

Future Work

The current format of integration of recruiting and first-year choice of major activities has had a strong, positive correlation on retention and graduation rates. Future work will include tracking students from original choice of tour during the prospective student phase through their ultimate choice of major upon graduation. For students who do not attend any class required tours during the first-semester course, an intervention program will be developed to attempt to increase the retention of this at-risk group.

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