

AC 2007-1266: AN INNOVATIVE METHOD TO REALISTICALLY TRACK ENGINEERING STUDENT RETENTION AND ACADEMIC PROGRESS

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An Innovative Method to Realistically Track Engineering Student Retention and Academic Progress

Accurate data about student persistence (retention) and academic progress, particularly for first-year and lower division students, is essential to understanding and addressing factors affecting student success in engineering. Unfortunately, nationally standard methods of measuring freshman persistence and graduation rates provide an incomplete, and in some cases inaccurate, picture of engineering student retention issues. Standard assessment methodology is based on a simplistic model of higher education – the expectation that freshman enter a university, choose a major, attend full time, and emerge four to six years later from that same university with a degree. All other students – those who transfer into or out of a university, those who work off campus and attend college part-time, those who take a semester off for personal, military or financial reasons – are not included in the standard model or the reported statistics.

In today's higher education environment where 60% of "Millennial" students attend more than one institution, this simplistic model is becoming outmoded. And in our metropolitan university that provides educational access to a wide range of students – where many of our engineering students arrive on campus needing preparatory coursework in math, where almost all students work off campus, and at least 40% attend college part time – the standard model becomes ineffectual.

To better understand factors affecting persistence and success in our student population, our team developed a model that measures retention and academic progress of all engineering students. Additionally, our team focused special emphasis on freshman level students. Unlike the rigidly linear model described above, our model recognizes multiple entry and exit points and differing rates of progress along the route of engineering education. Over three academic years, our team developed and refined an algorithm to query the university database and ask meaningful questions about our students and their progress. In our algorithm:

- Students are classified (pre-freshman through senior) based on their level of completion of the curriculum in each engineering department, rather than based on university credits.
- Retention and academic progress of all engineering students, regardless of transfer status or part-time enrollment, is considered when tracking student graduation and progress.
- Progress through the curriculum is analyzed through the filters of gender, ethnicity, socioeconomic status, age, level of math preparedness, and other parameters.

In this paper we will explain how our model and algorithm have provided greater clarity on retention issues and trends affecting pre-freshman and freshman level engineering students. The data prompted our engineering college to respond in several ways, such as creating a new introductory engineering class for pre-freshman level students, enhancing emphasis on advising, and supporting math education through a variety of programs. We will also explain how the sorting algorithm is a method easily adaptable and portable to database systems at other universities.