

A stage-based approach to identifying obstacles to student success

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Abstract

Within a degree program, the author identified the longest sequence of courses, each requiring the previous as a prerequisite required to earn that degree. The author then treated those courses as a series of milestones and examined the enrollment history of each student in that degree program. This enables description of how rapidly typical students progress through the sequence; identification of points in the program where students are most likely to drop out, change their major, or require several attempts to complete a required course; and relating these statistics to the program's catalog description and what is known of its departmental policies. Using these methods, the author learned much more about where the obstacles to degree completion lie than is possible using the more common semester-to-semester retention or number-of-credits-completed approaches.

1 Introduction

The University of Alaska Fairbanks, like many other public institutions with lax admission requirements, suffers from a low degree-completion rate. Typically, only about 10% of freshmen complete a bachelor's degree in four years, and 30% within six years. This is largely but not entirely due to the number of underprepared students who enroll. Traditionally the large dropoff in retention after the first year, perhaps shown as a function of test scores or grade-point averages, is interpreted as the departure of those unprepared students. (section 2 (p. 1)). However, even seemingly well-prepared students often take longer than expected to finish their degrees.

Students complaining about course availability and scheduling have alleged that it was not even *possible* to finish some of the baccalaureate programs in UAF's catalog in 4 years. In spring 2007, the office of Planning, Analysis, and Institutional Research (PAIR) was asked to examine the catalog requirements for each program and verify that it was possible to earn the degree in 8 consecutive fall and spring semesters. As part of that study, the longest "chain of prerequisites" – a sequence of courses, each of which had the previous course as a

prerequisite for enrollment – in each program was identified. As discussed in section 3 (p. 2), the length of this sequence serves as a crude measure of how difficult it is to complete a degree in 4 years.

In 2009, when PAIR's attention was turned to the subject of "baccalaureate near-completers," students who amass more than enough credits to achieve senior class standing but do not apply to graduate, the 2007 chain-of-prerequisites work was revisited, as a possible means of distinguishing between students who had truly nearly completed a degree from those who had repeatedly changed programs or taken large numbers of lower-division electives. The notion of dividing a student's progress through college into stages based on how far he advanced along his chosen major's "chain of prerequisites" (section 4 (p. 4)) grew into the project described in this paper.

2 Counting semesters and credit hours is not good enough

Like most institutions, UAF tracks retention and degree completion rates. Figure 1 shows the six-year enrollment history of the Fall 2003 freshman class. For a traditional full-time student, there is an expectation that a bachelor's degree takes 4 years to complete, and very few students who take more than 6 years to complete a degree will ever complete one; on this basis, IPEDS and other standard reporting instruments use 6-year graduation rate as a key measure of student success.

UAF's enrollment picture is complicated by the presence of large numbers of underprepared students, and large numbers of nontraditional students. Many of the former attend UAF for many semesters before "running aground on the rocks of the core math requirement" and dropping out, where at a traditional institution they may have been weeded out in the first year. Many of the latter are serious part-time students who enjoy considerable success at completing degrees over a long time period: 7% of the Fall 1999 freshman cohort took between 7 and 10 years to complete a bachelor's degree.

Simply equating "students who were freshmen 4 years

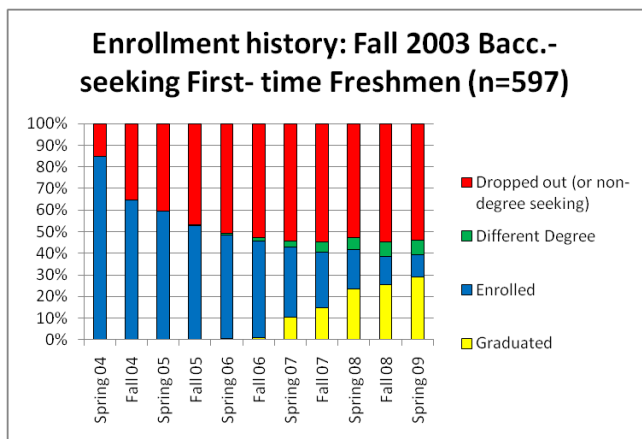


Figure 1: Enrollment history of a typical UAF freshman cohort

ago but haven't graduated yet" with "students who ought to have graduated by now" and looking for a one-size-fits-all method to help them graduate would not be productive. A simple alternative is to look at students who have amassed nearly enough credits for a degree, see if they complete a degree quickly, and if not, focus attention on them to see why not. At UAF, "baccalaureate near-completers" (BNCs) are defined as students who have earned 108 or more credits; are currently in degree-seeking status; and have never received a bachelor's or graduate degree from the University of Alaska system. (120 credits is the minimum required for a bachelor's degree, but some programs require as many as 130.)

At UAF, between 35 and 40% of the students who have 108 credits by the end of the fall term graduate the following spring. Some 20% more graduate within the next year after that. About 20% of students who have more than 108 credits *never* graduate (Figure 2.) UAF has targeted these students as "low hanging fruit" for increasing degree production: PAIR has been tasked with identifying students who have dropped out but could complete a degree within a year if they were enticed to return.

Still, examining the coursework of a sample of students identified as BNCs, it became clear that while *some* of these students were indeed near degree completion, and some had recently changed majors and needed to take a few more classes than their credit-hour total suggested, many others had earned large numbers of elective credits and were nowhere near completion of a degree, and perhaps had no intention of completing a degrees. These included unprepared students who were avoiding taking challenging courses, and people taking community-interest courses who would normally be non-degree-seeking but had applied for admission to a program for some reason or another. (For example, in the past the music department charged majors and non-majors different course fees for private lessons, and several local amateur musicians applied to the music pro-

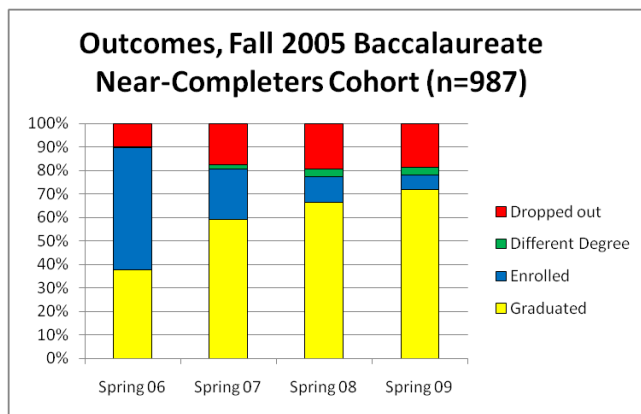


Figure 2: Enrollment history of a typical cohort of UAF students with ≥ 108 credits

gram to receive the discounted fees.)

To confidently identify a student as having nearly completed a bachelor's degree, a more refined method than simply number of credits earned or number of semesters attended was clearly going to be needed. The ultimate solution would be software that looked at what courses a student took each semester and see if he was making progress toward a degree; at UAF such a solution is still well in the future (section 8 (p. 5)).

3 Chains of prerequisites

As described in the Introduction, the length of the longest series of courses required for a degree, each with the previous as a prerequisite, is a crude measure of the complexity of the scheduling problem a student faces when he attempts to fit every course required for his degree into a given timeframe (classically, 8 consecutive fall and spring semesters.) If a sequence of eight such courses is required, then a student who fails to advance along that sequence every semester even once will not graduate on time. If the chain is only 7 courses long, then it may be possible for the student to recover from one "mistake" (having to retake a course, not being told by his advisor that a given course was required, or being unable to enroll in a course because of a time conflict with another course) and still graduate on time, but not from two.

There are a few additional complications. Many courses are offered only once a year, and some are offered only once every two years. For the student, failing to complete a once-a-year course is "twice as expensive of a mistake" as failing to complete an offered-every-semester course. For the purpose of PAIR's analysis, it was necessary to check for cases where a fall-only course had another fall-only course as a prerequisite; even if there was no intervening spring course required, this would add two semesters to the length of the chain. Fortunately this