## Is there a link between when a student registers, retention, and graduation?

## Could encouraging students to register earlier improve outcomes?

## Answer : It might, but not as much as you'd think.

The questions refer to how long before the start of classes a student first registers, indicating their intention to attend classes for that semester. Because retention is calculated from Fall semester to Fall semester, this analysis will focus on the Fall registration period beginning in Spring semester and running through the start of Fall classes, including the 21-day grace period after classes begin when students can add and drop classes without penalty.

## The Data:

Registration data were collected for four Fall cohorts, starting with Fall 2011. Excluding known exemptions, data errors, and records missing information used in the analysis, produced a sample of more than 17,000 students tracked over an 8-year period. Registration for Fall semester opens about 154 days before classes start,
 and the latest is 21 days after classes. (There were cases in the raw data outside of those parameters, but they were eliminated as either errors or cases with extenuating circumstances.)

According to the data, half of all students register 80-days or more before classes start (median $=81$ ), with a mean of 77 days; relatively few students register after classes begin.

## Relationship between registration and retention

On average, first-year students who register the following fall semester (IPEDS definition of retention) register 34 days earlier than students who don't return. Not only is this difference statistically significant, a Cohen's d score of -0.88 tells us that there is nearly a full standard deviation between the means for the two groups. However, linear regressions reveal that while the association is significant, it is relatively weak-the slope of the regression line is so low that only a large shift in registration time will create a meaningful increase in the probability a student will return. When controlling for other variables, the association becomes less significant. Our simple model estimates that for every day earlier a student registers, the probability they return in a year rises $\mathbf{0 . 1 9 \%}$. After controlling for Pell eligibility, gender, $1^{\text {st }}$ generation status, degree level, age (above or under 24), minority status, and first term GPA, registering one day earlier only raises the probability of retention by $0.01 \%$. The multivariate model suggests that first term GPA might be a greater predictor of retention-a 0.1 rise in GPA (from 2.0 to 2.1 , for example) increases the probability of retention by $1.6 \%$.

A logarithmic regression helps us better understand how a change in registration time might affect retention for specific students, for example, a student who already registers 130 days before start of term versus a student who registers much later. The model estimates that the probability a student will return if they register 57.3 days
(the average for a non-returning student) before the term is $58.8 \%$. If a student registers one week_earlier, at 64.3 days, the probability of retention rises to $60.2 \%$, a 1.4 point gain.

However, the changes in probability are not constant; the farther away from the mean (-77.2 days) a student has registered in the past, the less an equal change in registration time will affect the probability they will return the following fall. If our 130-day student also registered a week earlier, the probability of retention would only change 1.1 percentage points.

## Registration times: Who is registering when?

T-tests show that there is a significance difference in registration time based on certain student characteristics. However, the t -tests don't really tell us anything that we don't already know about these groups of students: Women register earlier than men and are also more likely to graduate ( $37 \%$ to $32 \%$ ).

Likewise, $1^{\text {st }}$ generation students and students over 24 both register later and have lower graduation rates than their counterparts.

| Gender | Days $^{+}$ |
| :--- | :---: |
| Female | 80.2 |
| Male | 67.2 |
| Days Difference | $13^{*}$ |


| Ethnicity | Days |
| :--- | :--- |
| White | 78.1 |
| Minority | 64.6 |
| Days Difference | $13.5^{*}$ |


| First Generation | Days |
| :--- | :---: |
| No | 74.5 |
| Yes | 72.1 |
| Days Difference | $2.4^{*}$ |


| Degree Level | Days | Pell Eligibility | Days |  |
| :--- | :---: | :---: | :---: | :---: |
| Bachelors | 76.1 |  | Eligible | 74.0 |
| Associate | 70.0 |  | Not Eligible | 73.3 |
| Days Difference | $6.5^{*}$ |  | Days Difference | 0.7 |
| nalysis shows these as negative $(-)$ | *statistically significant difference |  |  |  |

## Registration and Graduation

The analysis of the relationship between registration time and graduation produces very similar results. Students who graduate register, on average, 42.3 days earlier than those who don't graduate. (Average registration time was used when looking at graduation, rather than first semester registration. ) However, as with retention, a linear probability model shows that the power is pretty small; a one-day change in the average time a student registers in years they attend increases probability of graduation by $0.6 \%$. It would take a relatively large shift in average registration time (not just the first semester) to create a meaningful difference in the probability of graduation.

As with retention, the logit regression model shows that the effect of changes to registration time will have greatest effect on students whose registration times are closes to the mean (for graduation, the mean of average registration time for non-graduates is - 62.5 days) would benefit most from registering earlier, but the power of small changes is still limited-barely enough to move the needle. A student who registers on average 62.5 days before the start of classes increases their odds of graduating $3.9 \%$ by registering on average a week earlier (or 69.5 days). However, this involves changing their registration habits for not just one semester, but over the course of several semesters. A one-time change in registration time will probably not have any meaningful difference.

