

SJSU Project Succeed Retention Report 2019

Exploration of Blocked Classes and
Retention

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Introduction

Project Succeed is a five-year improvement plan grant that was initiated at San Jose State University in October 2014. The goal of Project Succeed is to improve San Jose State University freshmen retention and graduation rates. WestEd STEM Evaluation Unit is serving as the external evaluator for the grant in Years 2-5 of the project. The improvement plan includes interventions in five areas: block scheduling of freshmen, increased support for freshmen through a peer mentor program, living learning communities, a faculty mentorship, and a First Year Experience (FYE) for incoming freshmen. This report explores the relationship of blocked classes with one-year retention rates. A second initiative aimed at improving retention and graduation rates was the implementation of Peer Mentors into a number of classes. A report on the impact of peer mentoring on retention will be delivered this summer.

With this goal in mind of improving freshmen retention and graduation rates, the University began to block schedule freshman students four years ago. Business and Engineering students were first to be block scheduled in 2015, while Computer Science (CS) and Biological Sciences students were first added to the block in 2017. While other majors were also block scheduled, these initial schools mentioned represent the largest groups of students.

This report explores relationships between blocked classes and one-year retention rates for Business, Engineering, CS, and Biological Sciences students, and examines these one-year retention rates in comparison to previous cohorts' one-year retention rates that have not participated in blocked classes. Because the first cohort to participate in blocked classes was the cohort entering in Fall 2015, this report does not include an analysis of graduation rates.

The primary research questions addressed in this report are as follows:

- What relationship does the introduction of blocked classes have with students' one-year retention rates?
- Does the relationship between the introduction of blocked classes and student retention rates differ based on students' gender, ethnicity, or Pell eligibility?

Summary of Findings

The impact of blocked classes on student retention is unclear, but preliminary results suggest it shows promise for supporting student retention and, at minimum, does no harm. One- and two-year retention rates of Engineering students increased for the Fall 2015 and Fall 2016 cohorts (the first cohorts with blocked scheduling) compared to the retention rate in the years

prior. The increase in Engineering student retention rate also appears to be greater for Hispanic students as compared to Asian and White students.

Cohort effects (e.g., change in admission criteria and practices for the Fall 2017 cohort) make it difficult to evaluate the continuation of that trend or the impact of blocked classes on Computer Sciences and Biological Sciences students – any change in retention rates could be due to cohort-specific factors (e.g., admission changes) rather than blocked scheduling.

We recommend continued monitoring of the student retention rate by college and major over time. With only three years of retention data since the first cohort with blocked classes, trends are still inconclusive due to year-to-year variation and implantation of other university initiatives.

Methods

The Project Succeed team provided WestEd with student-level demographic, academic, and retention data for the 2015 through 2017 cohorts. The team also provided WestEd historical cohort-level one-year retention rates, broken down by gender and ethnicity for College of Business and College of Engineering students going back to 1997, and for College of Science students going back to 2004. The team provided historical two-year retention rate data for Business and Engineering students going back to 2010.

We primarily analyzed the data as a short interrupted time series with switching replications. An interrupted time series is an experimental design in which repeated observations are made on a variable, with some intervention occurring at a known point¹. The added feature of switching replications means that two different groups receive the treatment at different times, so they can serve as a control for each other. This feature strengthens the ability to draw conclusions from the data.

For this project, retention is measured over time, before and after the implementation of blocked classes. Blocked classes were implemented for Business and Engineering students with the Fall 2015 cohort (group one), and for the Computer Science and Biological Sciences students with the Fall 2017 cohort (group two). Some other majors were also blocked starting in 2016 or 2017, but the numbers of these students were insufficient for analysis.

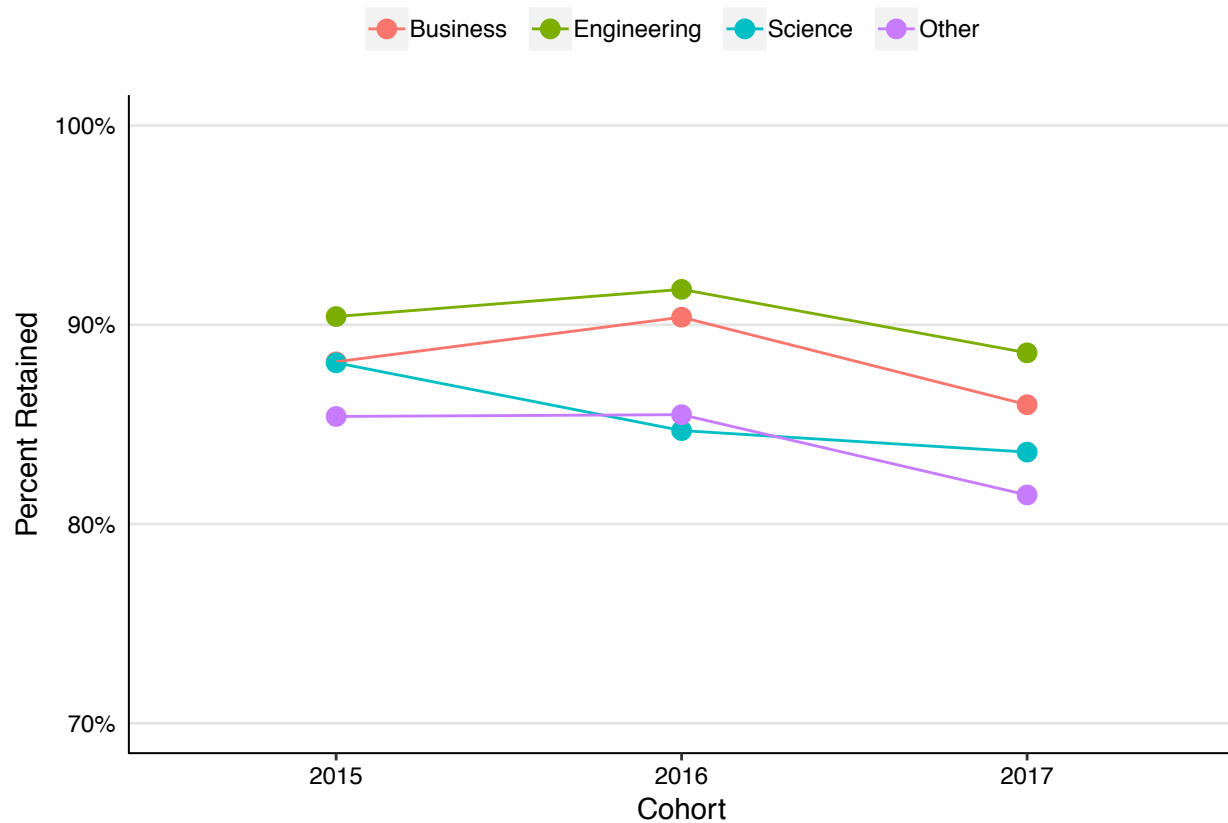
¹ Cook, T. D., Campbell, D. T., & Shadish, W. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

Because the time series is short, with particularly few post-intervention observations, analysis is limited to visual inspection of well-plotted data. While imperfect, Shadish, Cook, and Campbell (2002) describe visual analysis as an important tool for examining time series data. They also describe interrupted time series designs as a strong alternative to randomized designs when those are not feasible, as is the case here. In this case, changes to university admission practices for the Fall 2017 cohort obscure interpretation of the effect of blocked classes on retention. Despite this limitation, the interrupted time series analysis provides the best opportunity to draw conclusions from the data because blocked and unblocked students of a given cohort are not directly comparable – all students in a given college or major were blocked at the same time, so the effect of college or major on retention cannot be controlled for.

Findings

The previous year's analysis, which looked at the impact of blocked classes on the 2015 and 2016 cohorts of Business and Engineering students, found some evidence for an apparent increase in retention for Engineering students and no noticeable change for Business students.

The results of this year's analysis are unclear due to a university-wide drop in one-year retention for the Fall 2017 cohort. Figure 1 shows the one-year retention rates for each of the colleges with all or significant numbers of student participants of blocked classes (Business, Engineering, and Science), with the remaining colleges grouped together as Other. Across all groups, retention rates dropped for the 2017 cohort. The College of Science saw a larger drop for the 2016 cohort follow by another slight drop for the 2017 cohort. This university-wide drop in retention may mask any increasing effect of blocked classes on retention.

Figure 1. University-wide drop in one-year retention for Fall 2017 cohort

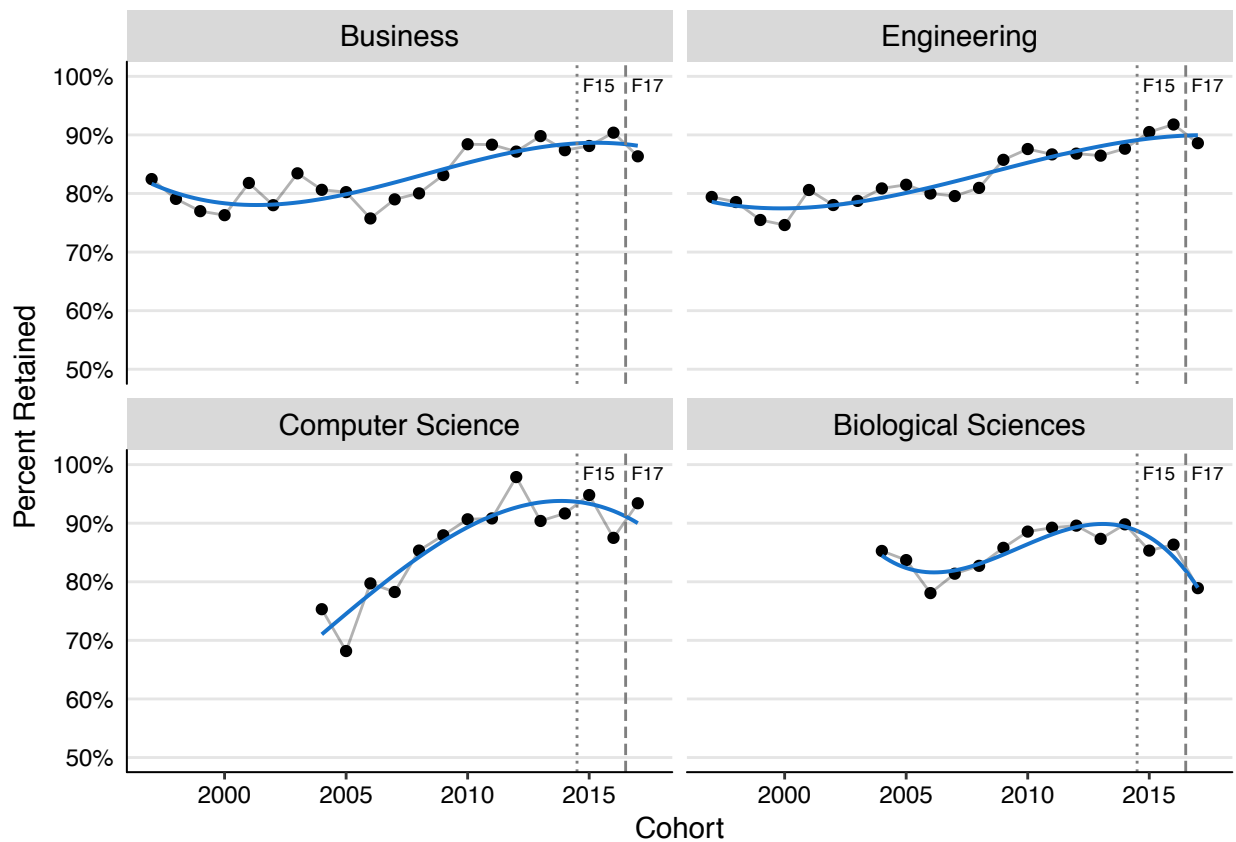
One-Year Retention Results

When looking at the time series data, strong evidence for an effect of blocked classes on retention would look as follows:

- A sudden increase in retention for the Fall 2015 cohort of Business and Engineering students, the first cohort with blocked classes
- Given an increase in retention for Business and Engineering students in 2015, sustained retention rates in 2016 and 2017 with the continuation of blocked classes
- No increase in retention in 2015 or 2016 for Computer Science and Biological Sciences students, as they did not have blocked classes yet
- A sudden increase in retention for the Fall 2017 cohort of Computer Science and Biological Sciences students, the first cohorts for these majors with blocked classes

With the addition of the Fall 2017 cohort data, the effect of blocked classes on retention appears mixed, but appears to fall within the normal year-to-year variation in retention rate (see Figure 2). For Business, Engineering, Computer Science, and Biological Sciences, the historical retention rates show a trend of increasing retention rate over time before flattening out around 2010 as the retention for each group reached around 85%-90%. A cubic polynomial model is shown on the graphs to demonstrate this general trend (but not to forecast future retention rates).

Figure 2. Mixed changes in one-year retention following the blocked scheduling



The retention rate for Engineering students does show a sudden increase in 2015 that was sustained into 2016. It fell in 2017 along with the university-wide drop in retention, but remained slightly higher, at 88.6%, than the average retention rate from 2010-2014, before blocked classes, 87.0%.

The retention rate for Business students shows no clear trend. There was no immediate increase in retention with the Fall 2015 cohort. While there was an increase with the 2016 cohort to 90.3%, compared to the 2014 and 2015 cohorts, this rate was nearly matched in 2013 at 89.8%. This suggests the change falls within the normal year-to-year variation in retention rate for Business students.

The retention rate for Computer Sciences shows more year-to-year variation than the other groups. There was a large drop with the Fall 2016 cohort, the year before blocked classes were implemented. This obscures the interpretation of the increase in retention with the Fall 2017 cohort. While retention did increase for Computer Science students as the overall university retention dropped, it increased back to the Fall 2015 rate. It is unclear how much of this increase is related to Fall 2016 being an outlier and how much is related to the impact of blocked classes. Furthermore, the average retention rate for Computer Science students since 2010 is very high, at 92.1%, so it may be difficult for blocked classes to meaningfully increase this rate.

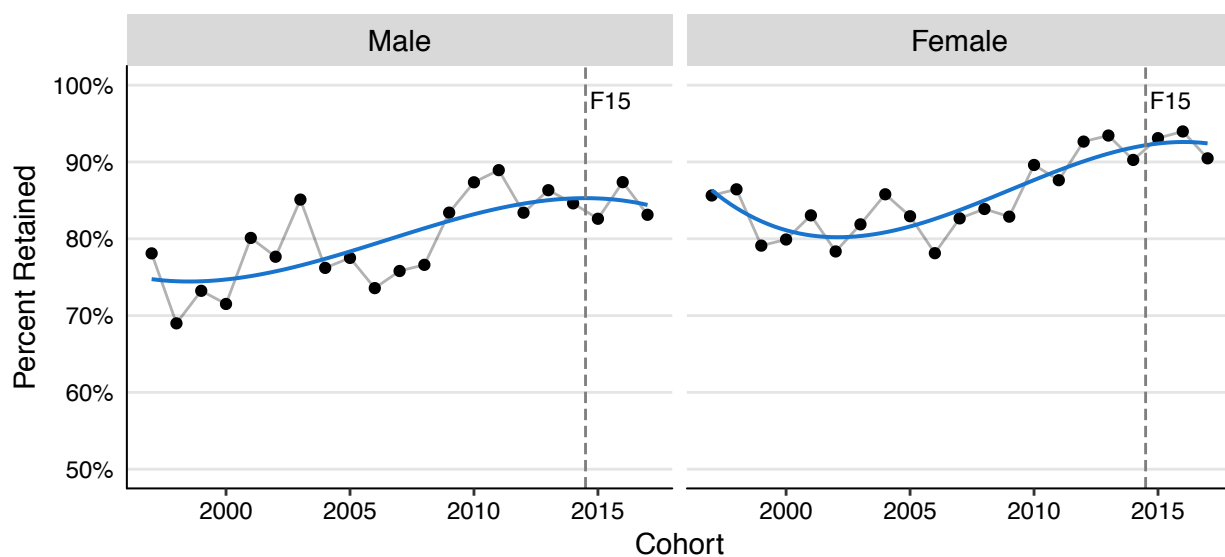
The retention rate in Biological Sciences shows a downward trend since 2014. The large drop in Fall 2017 follows a large increase in the number of students in the major: there were 332 in 2017 following an average of 165 for 2010-2016. Because this change coincided with the implementation of blocked classes, it is difficult to disentangle their effects.

It is promising for the effect of blocked classes that the retention rates of Computer Science and Biological Sciences did not increase in 2015 and 2016, while the retention rate of Engineering did. However, the flat retention rate of Business students suggests that the increased retention rate of Engineering students may have something to do with the College of Engineering specifically, rather than the implementation of blocked classes.

One-Year Retention by Demographic Groups

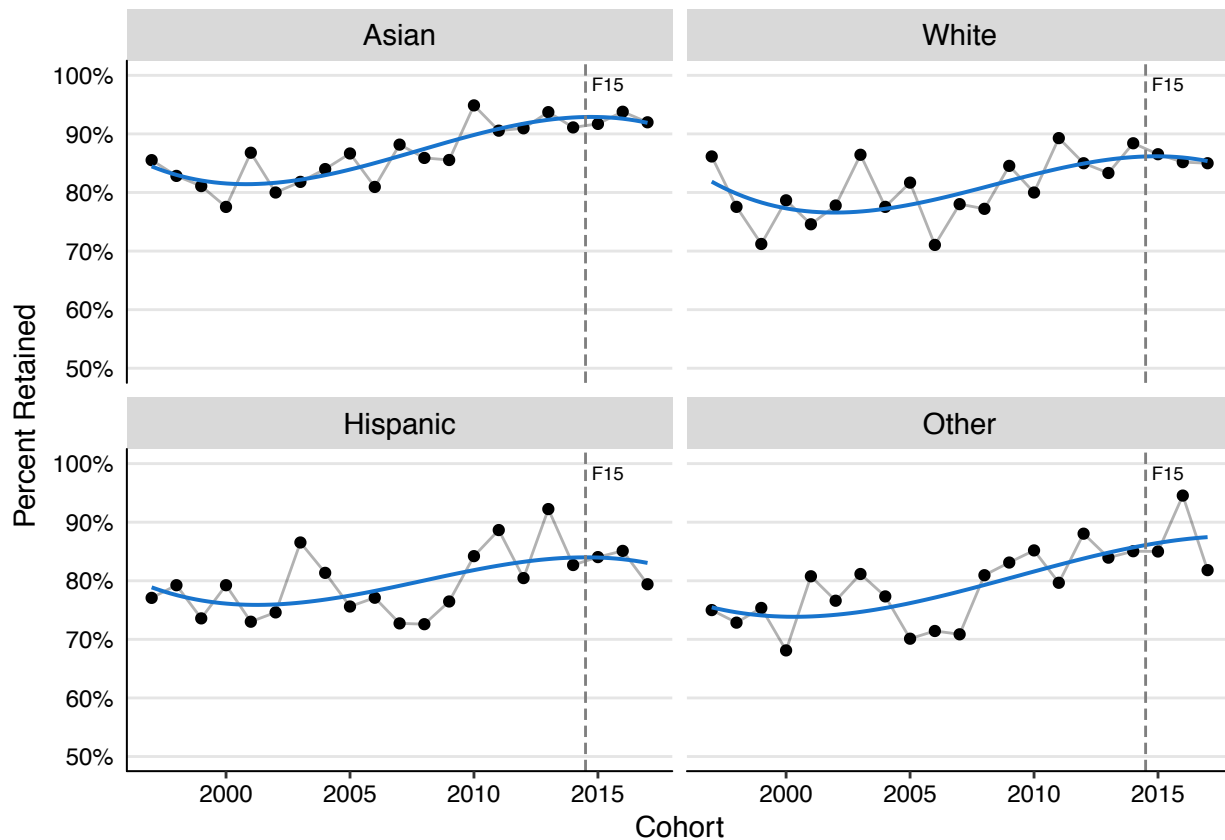
A detailed look at the impact of blocked classes on the retention rates for each college or major by demographic subgroup shows some interesting trends, but no clear overall patterns.

Figure 3. Business student retention, by gender



Female Business students have historically had higher retention than male Business students (Figure 3). Blocked classes did not boost the retention rate of male students to match that of female students. The retention rate of female students increased with the 2015 cohort while the retention rate of male students increased with the 2016 cohort.

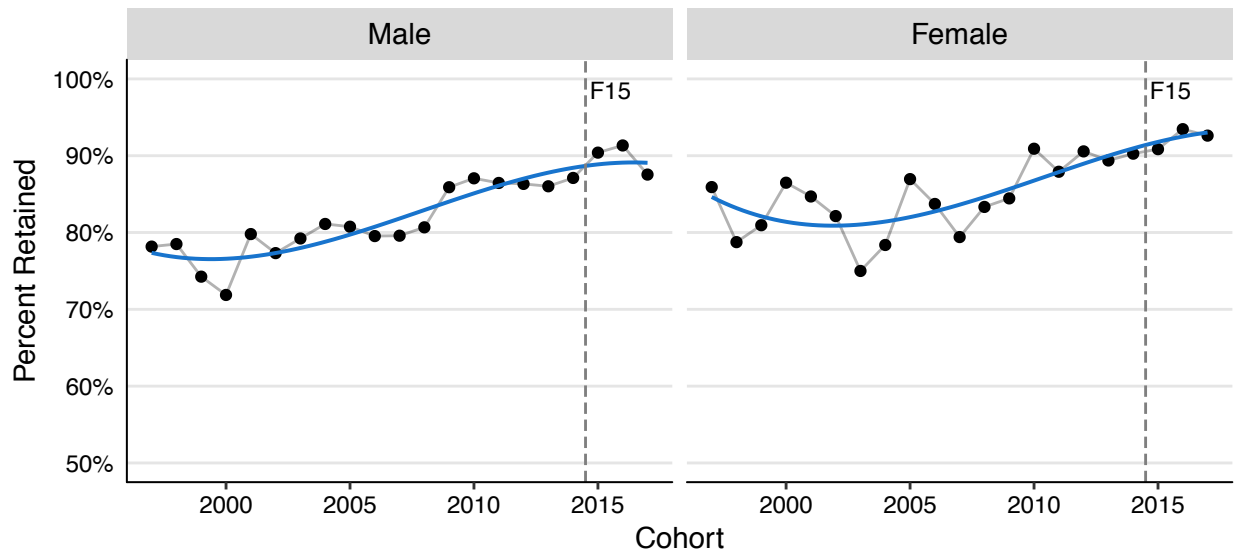
Figure 4. Business student retention, by ethnicity



By ethnicity, the retention rate for Business students has historically been highest for Asian students (Figure 4). Blocked classes did not boost the retention rate of White, Hispanic, or Other ethnicity² students to match that of Asian students. Interestingly, the overall increase in Business student retention for the Fall 2016 cohort can be seen to be entirely due to a spike in retention of Other ethnicity students. From the present data, it is not clear what may have caused this spike.

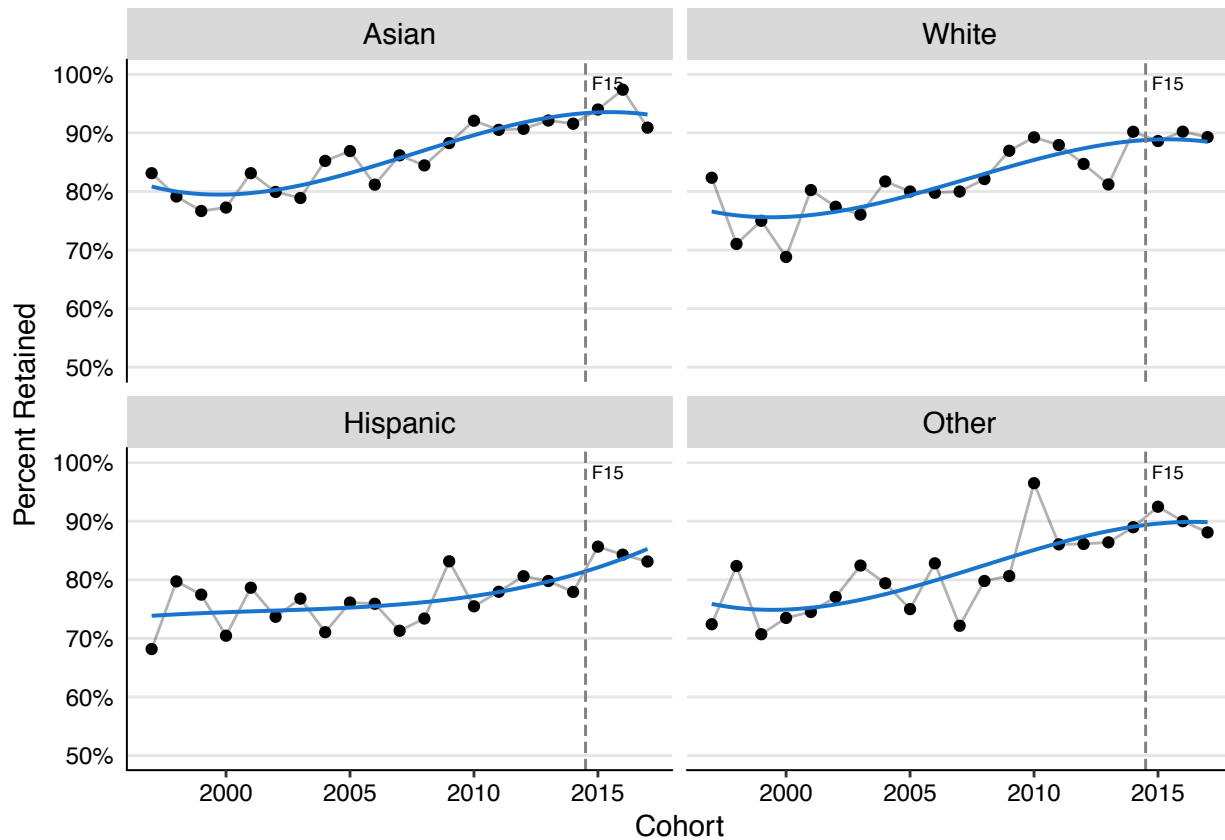
² There were not high enough number of students of ethnicities other than Asian, White, or Hispanic to analyze those ethnic groups separately, so they are grouped together as Other

Figure 5. Engineering student retention, by gender



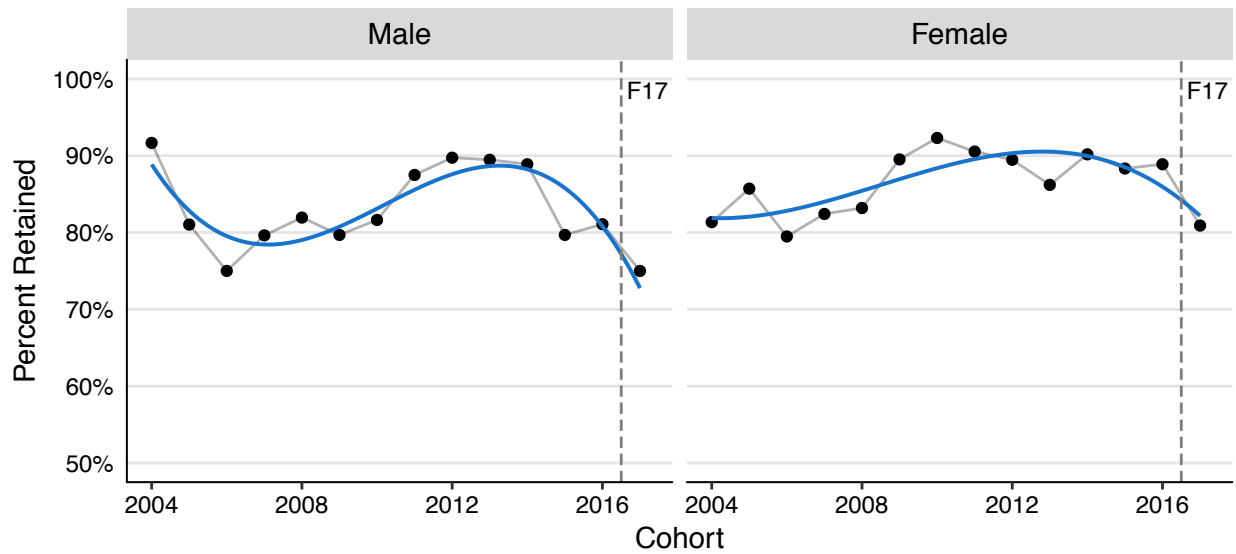
Female Engineering students have historically had higher retention than male students (Figure 5). The retention rate of male students increased to a similar rate as that of female students following the implantation of blocked classes with the Fall 2015 cohort. However, the retention rate of male students dropped back down with the Fall 2017 cohort.

Figure 6. Engineering student retention, by ethnicity



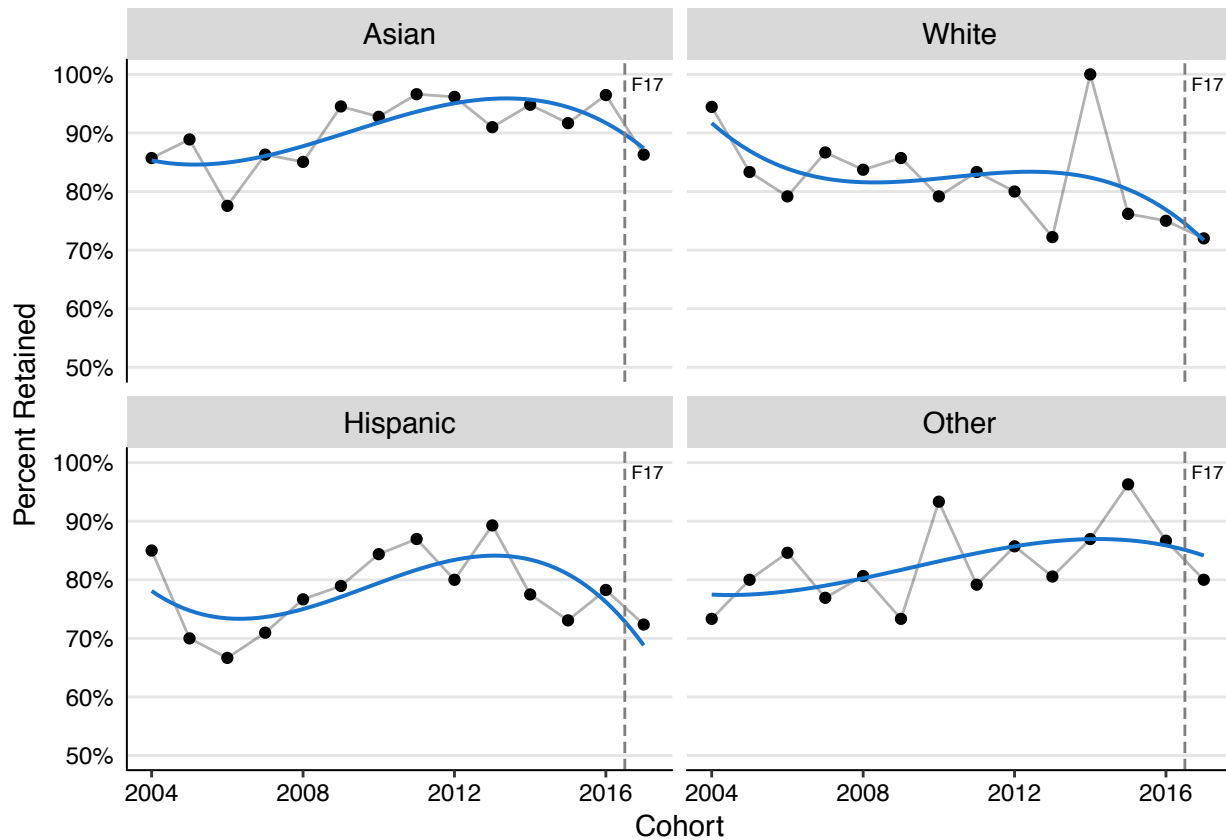
By ethnicity, the retention rate for Engineering students has historically been highest for Asian and students (Figure 6). The retention rate of Hispanic students showed the largest increase following the implementation of blocked classes. The retention rate of Other ethnicity students increased for the Fall 2015 cohort but returned to its Fall 2014 level with the Fall 2016 cohort. The retention rate of White students trended downward from 2010-2013, but rebounded in 2014, the year before implementation of blocked classes.

Figure 7. Biological Sciences student retention, by gender



Female and male Biological Sciences students have historically had approximately the same retention rate (Figure 7). The retention rate of male students began to decline with the Fall 2014 cohort, but the implementation of blocked classes did not prevent further decline with the Fall 2017 cohort.

Figure 8. Biological Sciences student retention, by ethnicity

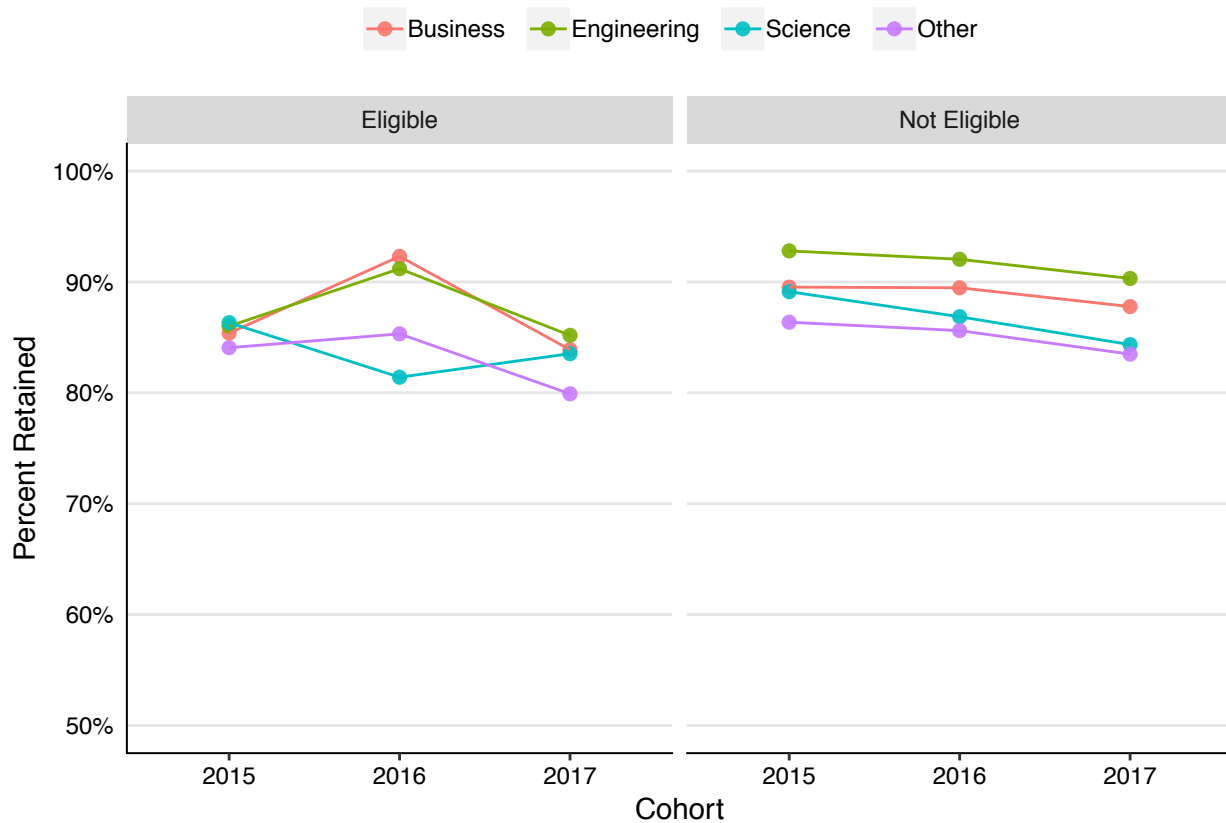


By ethnicity, the retention rate for Biological Sciences students has historically been highest for Asian and students (Figure 8). The retention rate for students of all ethnicities drop following the implementation of blocked classes with the Fall 2017 cohort. That drop in retention rate was smallest for White students.

There were not high enough numbers of Computer Sciences students for analyses by gender or ethnicity.

Historical retention data by Pell eligibility was not available. Instead, just the 2015-2017 cohorts are examined.

Figure 9. Retention rate by Pell eligibility



For the most part, the retention rate of Not Eligible students was higher over these years. The retention rate of Pell Eligible Engineering and Business students did not immediately increase to the level of Not Eligible students following the implementation of blocked classes with the Fall 2015 cohort. Interestingly, the Fall 2016 Eligible Business students were retained at a higher rate than Not Eligible students, and the Fall 2016 Eligible Engineering students were retained at a similar rate as Not Eligible students. Further, Pell Eligible Science student retention rate increased for the Fall 2017 cohort while retention of all other groups decreased.

Conclusion

While the evidence for an impact of blocked classes on retention is unclear, there are some signs that there might be an effect, particularly with Engineering students. There is no evidence

of an increase in retention for Business, Computer Science, or Biological Sciences students, but the effect for the latter two is obscured by changes in admission practices. There is no evidence that blocked classes are harming retention.

To see a clearer effect of blocked classes on retention, more data is needed. One year of post-intervention retention data for Biological and Computer Sciences students is not enough to determine a pattern for those majors of changed retention following the implementation of blocked classes. It also needs to be seen whether retention rates rebound following the changes in admission practices for the Fall 2017 cohort. We recommend yearly monitoring of retention and graduation rates by major and by college. If a pattern emerges of an increased and sustained retention/graduate rate immediately following the implementation of blocked classes for that major or college, that will be strong evidence for the impact of blocked classes.