Student Success, Retention, and PSCI210: An Empirical Analysis

David C.W. Parker

Associate Professor of Political Science and PSCI 210 Instructor

PSCI 210: Introduction to American Government has had a DFW Rate exceeding 25 percent over the last two years. The rate has fluctuated during that time between 32 and 38 percent.

In light of the current focus on improving retention in so-called "barrier" courses (defined as those with DFW rates exceeding 25 percent), it seemed logical to perform an analysis in an attempt to disentangle three key factors likely responsible for the rate: institutional, instructional, and student readiness for college.

I obtained data on performance in PSCI 210 from 2010 through spring of 2013 from the Office of Planning and Analysis. I did two things with these data. First, I examined the data globally to uncover patterns in student performance and what factors might be associated with student success. Institutional factors examined include high school GPA (this is also a student readiness measure, but I see it largely as an institutional factor for reasons explained below), the student's GPA in the previous term, and a measure of whether the course was taught by a tenured or tenure track faculty member (denoted by a dummy variable of 1 for tenured or tenure track faculty). I was on leave from teaching PSCI 210 for two semesters and we had, in one case, an adjunct teach the course and a visiting assistant professor in the other. This created a natural experiment allowing us to see whether having a tenured track faculty member teach the course had any effect on student performance.

Second, during the spring terms of 2012 and 2013, I had collected data on student attendance in PSCI 210. During the spring of 2012, students took weekly quizzes that assessed their mastery of course readings. These quizzes were done online via D2L and required a password to access. Students would receive this password on the day of the quiz in class. Students who did not attend would not receive the password. In spring of 2013, I dropped the quizzes and instead took attendance on five occasions at random. These two measures represent different ways of capturing student readiness for college; namely, whether students are responsibly attending courses and engaging in readings in a thoughtful and timely fashion. All of the analyses were performed with standard OLS regressions and I report in the tables below the unstandardized coefficients along with the standard tests of statistical significance.

Global Student Performance

Table 1 represents a global analysis of student performance in PSCI 210 from spring 2010 through spring 2013. The dependent variable is the final grade received by the student, ranging from F (0) to A (4.0). Variables include the previous term GPA of the student, a dummy variable indicating whether I was the instructor, the student's high school GPA, and two dummy variables denoting whether the student was a political science or elementary education major.

Table 1: Global Student Performance in PSCI 210

Final PSCI Grade	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
HS_GPA	0.48274	0.07897	6.11	.000	0.327662	0.6378181
Previous Term GPA	0.44298	0.04658	9.51	.000	0.3515038	0.53446
Elementary Ed Major	-0.151	0.0907	-1.67	0.096	-0.3291487	0.0270581
Parker Dummy	0.19159	0.08381	2.29	0.023	0.0270124	0.3561772
Polisci Major	-0.0216	0.13799	-0.16	0.876	-0.2925964	0.2493726
Constant Term	-0.5203	0.24473	-2.13	0.034	-1.000929	-0.0397336

Number of observations: 633

Adjusted R-Square: .2454

Prob >F = .0000

The results clearly indicate three important trends. First, students taking the course with me—a tenured professor—perform better than those taking the class with an adjunct or a visitor. Second, students that did well in high school tend to do well in PSCI 210. Finally, students who performed well the previous semester also do well in PSCI 210. In all three cases, the statistical relationships are strong. To illustrate the substantive impact of these three key variables, a student with a 4.0 in high school, a 4.0 the previous term, and taking the class with Parker would receive a grade of 3.89—which represents an A grade. Students who are well prepared do well in PSCI 210 and this has been the case for three years.

The Relationship between Student Responsibility and Performance

Tables 2 and 3 look specifically at the final grades obtained by students in two semesters of PSCI 210 for which I have attendance data. In 2012, students took weekly quizzes on the readings. In 2013, I took attendance during lecture on five occasions at random. Again, the dependent variable is the student's final grade. In the case of Spring 2012, it is again F (0) through A (4). In the case of Spring 2013, I employ the raw numerical percentage between 0 and 100 as I have the information available to me via D2L. In Table 2, Quiz Grade is the average quiz score recorded by the student and in Table 3, Random Attendance is the number of times the student attended class. The values range between 0 and 5.

Table 2: Attendance and Student Performance (Spring 2012)

Final Grade	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
High School GPA	0.3512138	0.18003	1.95	0.053	-0.0051134	0.7075409
Previous term GPA	0.0508393	0.10226	0.5	0.62	-0.1515711	0.2532497
Elementary Ed Major	-0.3025542	0.25529	-1.19	0.238	-0.8078374	0.2027291
Quiz Grade	0.2526881	0.03658	6.91	.000	0.1802797	0.3250965
Constant Term	-0.6702899	0.42437	-1.58	0.117	-1.510244	0.1696641

Number of observations: 129

Adjusted R-Squared: .4636

Prob > F= .0000

Table 3: Attendance and Student Performance (Spring 2013)

Final Grade	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Random Attendance	2.419384	0.73534	3.29	0.001	0.9628136	3.875954
Previous term GPA	1.681128	1.19174	1.41	0.161	-0.6794727	4.041729
High School GPA	5.982357	2.29809	2.6	0.01	1.430285	10.53443
Elementary Ed Major	-3.452327	2.42478	-1.42	0.157	-8.255354	1.350699
Constant Term	48.05564	6.32869	7.59	0	35.51973	60.59155

Number of observations: 120

Adjusted R-Squared: .2552

Prob > F=.0000

What do the Tables 2 and 3 show? Again, high school GPA is positive and significant as in the global analysis. Previous term GPA is not significant. Performance on reading quizzes and class attendance are positive and significant predictors of grades in PSCI 210. In the case of Spring 2013, perfect attendance is associated with a student receiving 12 additional percentage points (or more than one whole letter grade) for their final grade in PSCI 210. A 4.0 High School GPA is associated with 23.9 additional percentage points in the student's final grade. Student ability and readiness are both important to determining student success.

Conclusion and Recommendations

In examining the three factors affecting student performance (institutional, instructional, and student readiness for college), all have a significant impact on student performance in PSCI 210. Students who do well in high school and here at MSU do well in PSCI 210. Students who are responsible and attend class also do well, and students who are taught by tenured or tenure-track faculty perform better in PSCI 210. These findings suggest four courses of action that can be taken to improve performance in PSCI 210 and perhaps in barrier courses more generally.

1. Retention begins with recruitment.

Students who are better prepared for the rigors of college do better. If MSU really wants to increase its retention and graduation rate, one very tangible solution is to attract better students to matriculate every year. It also suggests that MSU might want to consider minimum high school GPA, ACT, and SAT scores for students. This would likely attract better students to apply and perhaps attend MSU. Better students want a school that will challenge them and provide degree cache. MSU must begin to ratchet up its admission standards to attract quality students.

2. Foster a Culture of Class Attendance

Class attendance does not guarantee success. In fact, the bivariate correlation between measures of attendance and performance in PSCI 210 as measured by final grade is about .5 or .6. Weak students generally do not attend lecture, but some very good students also find that they can do well and not attend. What is very clear, however, is that the chances of success improve markedly when students come to class. If barrier courses can figure out some way to incentive class attendance, this can create a culture of attendance that might improve retention and also improve the learning atmosphere in the classroom.

This past semester, I increased the final grade of students by as much as a half letter grade if they attended class during the five times I took attendance (and by four points if they attended four times, and so forth). In the analysis above, I used the raw score earned by the student and not this adjusted final score. After this analysis was complete, only three students moved from D+ grades to C- grades. In other words, it was clear that the students who performed poorly did not attend class while students who performed on average or better may or may not have been attending class regularly. The main point is to improve DFW rates we must get students to attend their large lecture classes.

3. A Shared Culture of Learning

One of the largest problems in a large lecture class is fostering a culture of learning and shared learning experiences. Although there are some ways the campus is doing this—by creating TEAL classrooms and the like—there are other ways this can be done without changing the

lecture experience itself (which some faculty, including myself, find has some intrinsic and inherent value). In speaking to a successful PSCI 210 student last week, he was part of a group of ten students who studied together and motivated each other in terms of performance. They had a contest to see who could get the best grade on each assignment. Other students took note of the success of this group and tried to join the group themselves. The students themselves created learning synergies that worked to improve their performance collectively.

One major obstacle to student success in PSCI 210 is the lack of separate discussion sections of 20 to 30 students led by a convener. Nearly every other large university breaks large lecture sections into additional discussion sections, usually led by a graduate student. Other large lecture classes at MSU utilize this format successfully. PSCI 210 should also move to this format. Unfortunately, the political science department does not have a graduate program to provide the manpower for this. Here is a compelling reason based in the undergraduate learning experience for a doctoral program for the department and perhaps across other programs in the social sciences.

4. The Need for More Tenure Track Faculty

Student success in PSCI 210 is associated with tenured or tenure-track faculty teaching the course. As the university grows, it is absolutely clear that the over-utilization of adjuncts and temporary faculty is potentially detrimental to student retention and success. The university should consider expanding tenure-track lines and having tenure track faculty teach large lecture courses.