AIR Professional File

Association for Institutional Research
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Professional Development, Informational Resources & Networking

Number 100, Summer, 2006

Does it Matter Who's in the Classroom? Effect of Instructor Type on Student Retention, Achievement and Satisfaction

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Introduction

This study examines the association between three outcomes of the freshman and sophomore years (retention, academic achievement and student rating of instruction) and the amount of exposure to three types of instructors (regular full-time faculty, adjunct faculty and graduate teaching assistants).

The growing reliance in higher education on instructors who are not part of the permanent, full-time workforce that has traditionally constituted the professoriate is well documented. Since 1981, the number of part-time faculty employed by colleges and universities has grown by 79 percent, while the share of traditional tenure track faculty hired on the traditional tenure track has grown at a much lower rate (Anderson, 2002). According to a report by the Coalition on the Academic Workforce (as cited in Cox, 2000) non-tenure track faculty make up almost half of the teaching staff in many humanities and social science disciplines.

In this study, part-time faculty will be referred to as *adjuncts*. Adjuncts' employment may be long- or short-term, but is paid on a part-time contract outside of the regular faculty pay plan. Full-time instructors and lecturers on multi-year contracts but not on tenure-earning lines are included with regular, full-time faculty members.

At this public research-intensive university, approximately 44% of the instructional faculty are adjuncts, and they deliver about 40% of the undergraduate courses. This is similar to their representation in other commuter student institutions in this state and near the median among this institution's 14 peers. In the present study, faculty members taught about 51% of the first-year credit hours, adjuncts 31%, and graduate teaching assistants (GTAs) 18%. Disciplines in the colleges of Arts and Letters and Science are most likely to employ GTAs. By the second year, faculty members are delivering 66% of the credit hours, adjuncts 25% and GTAs 9%.

The growing use of adjunct faculty is directly attributable to the leveling off of state support for higher education in the 1990s (Gappa, 2000). Universities can offer a course by an adjunct for a fraction of what the same course would cost if taught by a regular full-time faculty member. This cost-cutting measure helps keep lower-level undergraduate courses at a reasonable size, and allows institutions the flexibility of increasing or decreasing course offerings as enrollments fluctuate (Anderson, 2002).

But adjuncts are not by any means a homogeneous group. In addition to the "aspiring academics" who piece together part-time teaching assignments because full-time opportunities are not available, there are professionals, specialists and experts who bring the advantage of their primary careers to the classroom and without whom the university would not be able to offer students the latest technology or practitioner skills. Other adjuncts engage in part-time instruction as a transition to retirement or after retirement from full-time teaching. A fourth group of adjuncts are "free lancers" who prefer working simultaneously in several professions, one of which is teaching. (Gappa and Leslie, 1993). These different types of adjuncts mayhave different impacts on instruction.

Background

Concerns about the use of adjuncts are based on several assumptions. One is that adjuncts and GTAs are professionally underdeveloped and scholarly weak, and that students are progressively shortchanged for every course delivered by a nonfaculty member (Carroll, 2003). However, the academic credentials required by regional accrediting agencies such as the Southern Association of Colleges and Schools are identical regardless of who is delivering the instruction. There is no body of evidence indicating that part-timers teach any less effectively than regular full-time faculty (Haeger, 1998).

Another assumption about adjuncts is that they compromise the quality of higher education because they don't have a full-time commitment to the university. Because the university does not invest in them with comparable salaries, benefits, support services, office space or job security, adjuncts are less likely to be fully integrated into campus life. This is consequential in light of the significant body of research pointing to the positive associations between bachelor's degree completion and high levels of student involvement with faculty, with fellow students or with academic work (Pascarella and Terenzeni, 1991; Astin, 1993). Adjunct faculty may lack sufficient knowledge about the institutional support services critical to first-time-in-college (FTIC) students and may be unprepared to identify at-risk behavior in students.

Faculty members are likely to point out that adjuncts do not participate in the research and service missions of the university. Faculty may also fear public perception that a university education can be delivered just as well and more cost effectively without making a lifetime commitment to the employment of full-time faculty.

Although there have been a number of studies examining the changing composition of the workforce, these have generally centered on issues of job satisfaction, salary, benefits, and impact on institutional budgets. Most studies have failed to confront the most important question of all: What effect does the use of adjuncts have on the quality of education? (Anderson, 2002).

A handful of recent studies attempted to examine the effect that exposure to adjunct instructors has on student outcomes. Harrington and Schibik (2001) found that among students entering college in the fall semesters of 1997 to 2001, those not returning for the spring semester were more likely to have more than half of their courses taught by adjunct instructors. They noted these students also were more likely to be male, have lower SAT and ACT composite scores, fewer first semester earned credits and a lower first semester GPA.

Kehrberg and Turpin (2002) studied the effect of exposure to adjunct faculty on college GPA and student retention. Preliminary findings of relationships between exposure to adjuncts and each of these outcomes disappeared when academic preparation and first-year experiences were controlled.

Generally, studies have focused on the direct relationships between exposure to adjunct faculty and student outcomes, without taking into effect the background characteristics and other enrollment experiences that may affect these outcomes. The present study attempts to remedy that knowledge gap by modeling student outcomes as a function of exposure to different instructor types while controlling first for variables known to be associated with these outcomes.

Data

The population for this study includes 3,787 students who entered this university in Fall 2000 and Fall 2001 as FTIC students, out of a total enrollment of 25,000 students. Characteristics of the cohorts are displayed in Tables 1 and 2.

This study investigated the association between the amount of exposure to each of three types of instructor (faculty, adjunct, or GTA) and three outcome variables. "Retention" was defined as re-enrollment for the spring, the second fall and the third fall. "Academic achievement" was measured by cumulative GPA at the end of the first fall semester, after the first year and after the second year. "Student satisfaction with instruction" was examined using average ratings from the Student Perception of Teaching Instrument (SPOT) for lower division courses in which the cohort students were enrolled from Fall 2000 through Spring 2002.

The outcome measures of college GPA and student retention were selected as objective indicators of student achievement and success. Variables selected for the retention and academic achievement models include conceptually-relevant characteristics available from the university's student information system. Variables representing the student's background are gender, race/ethnicity, high school GPA, and graduation in the top 20% of the high school class ("Talented 20"). Originally, SAT scores and their equivalents for ACT were included in the analysis, but these scores did not contribute to model fit beyond the information provided by high school GPA. "Enrollment Experience" variables include whether the student resided on-campus, the college of their first declared major, and type of financial aid received. In the retention models, cumulative GPA was included as a predictor. The final group of variables, instructor type, captures the essence of this study. Students were assigned to a category within each instructor type depending on the percentage of total credit hours attempted with that instructor type.

Background variables were selected because of their known association with the outcomes we selected. Tinto (1975), as well as Terenzini and Pascarella (1978) emphasized the importance of individual attributes and

Table 1: Retention Rates of First Time in College (FTIC) Students Entering Fall 2000 and Fall 2001, by Study Variables

Variable	N	% of Cohort	Persist to Spring	Persist to 2nd Fall	Persist to 3rd Fall
Total	3,787	100%	87%	67%	52%
Cohort					
Fall 2000	1,788	47	88	68	53
Fall 2001	1,999	53	86	65	51
Gender					
Male	1,687	45	86	66	51
Female	2,100	55	87	67	53
Ethnicity					
White	2,346	62	86	65	50
Black	647	17	90	70	57
Hispanic	453	12	86	66	50
Asian	176	5	89	74	61
Native American	17	0.4	77	71	53
International	148	4	85	68	54
College					
Architecture, Urban & Public Affairs	170	5	87	70	58
Arts & Letters	582	15	89	72	56
Business	719	19	87	65	51
Education	307	8	87	70	58
Engineering	475	13	88	70	56
Honors	159	4	93	79	64
Nursing	146	4	93	77	52
Science	602	16	89	71	55
Undecided	627	17	78	49	34
First Term Housing					
In-Housing	1,591	42	87	65	50
Not in-housing	2,196	58	86	68	54
Talented 20					
Talented 20	407	11	88	74	61
Not Talented 20	3,380	89	86	66	51
High School GPA	3,731	99	3.30-yes 3.18-no	3.34-yes 3.17-no	3.37-yes 3.19-no
Test Scores					
SAT-Verbal	2,808	74	516-yes 514-no	518-yes 512-no	518-yes 513-no
SAT-Math	2,808	74	527-yes 516-no	529-yes 519-no	530-yes 520-no
ACT	1,313	35	22-yes 21-no	22-yes 21-no	22-yes 21-no
Financial Aid					
Loan	1,141	30	88	65	51
Grant	1,265	33	89	68	55
Scholarship	2,037	54	91	73	59
Instructor Type					
Faculty					
over 75% of credits	404	11	87	71	55
51-75%	1,270	34	90	69	62
26-50%	1,600	42	90	68	46
0-25%	513	14	69	52	16
Adjuncts					
over 50% of credits	465	12	79	59	29
26-50%	1,701	45	89	66	53
0-25%	1,621	43	87	69	55
GTAs					
over 25%	1,079	29	86	67	37
0-25%	2,708	71	87	66	55

Table 2: Mean Cumulative GPAs of First Time in College (FTIC) Students Entering Fall 2000 and Fall 2001, by Study Variables

Variable	N	% of Cohort	1st Fall GPA	1st Year GPA[1]	2nd Year GPA[1]
Total	3,787	100%	2.42	2.44	2.80
Cohort					
Fall 2000	1,788	47	2.44	2.46	2.78
Fall 2001	1,999	53	2.40	2.42	2.80
Gender					
Male	1,687	45	2.29	2.33	2.66
Female	2,100	55	2.52	2.53	2.89
Ethnicity					
White	2,346	62	2.49	2.51	2.85
Black	647	17	2.09	2.11	2.56
Hispanic	453	12	2.31	2.35	2.74
Asian	176	5	2.55	2.50	2.78
Native American	17	0.4	2.66	2.70	2.79
International	148	4	2.91	2.97	3.09
College					
Architecture, Urban & Public Affairs	170	5	2.35	2.33	2.71
Arts & Letters	582	15	2.63	2.62	2.82
Business	719	19	2.42	2.44	2.78
Education	307	8	2.44	2.49	2.87
Engineering	475	13	2.36	2.39	2.67
Honors	159	4	2.90	2.94	3.15
Nursing	146	4	2.34	2.38	2.76
Science	602	16	2.43	2.45	2.86
Undecided	627	17	2.17	2.16	2.62
First Term Housing					
In-Housing	1,591	42	2.34	2.36	2.74
Not in-housing	2,196	58	2.48	2.50	2.83
Talented 20					
Talented 20	407	11	2.79	2.83	2.96
Not Talented 20	3,380	89	2.37	2.39	2.77
High School GPA	3,731	99	r=.42	r=.47	r=..49
Test Scores					
SAT-Verbal	2,808	74	r=.22	r=.27	r=.30
SAT-Math	2,808	74	r=.25	r=.27	r=.27
ACT	1,313	35	r=.36	r=.40	r=.42
Financial Aid					
Loan	1,141	30	2.32	2.24	2.64
Grant	1,265	33	2.39	2.35	2.77
Scholarship	2,037	54	2.71	2.68	3.09
Instructor Type					
Faculty					
over 75% of credits	404	11	2.61	2.72	2.84
51-75%	1,270	34	2.42	2.48	2.78
26-50%	1,600	42	2.37	2.36	2.80
0-25%	513	14	2.41	2.35	2.72
Adjuncts					
over 50% of credits	465	12	2.38	2.28	2.78
26-50%	1,701	45	2.37	2.40	2.75
0-25%	1,621	43	2.48	2.52	2.81
GTAs					
over 25%	1,079	29	2.35	2.40	2.79
0-25%	2,708	71	2.43	2.46	2.78

[1]For students enrolled for both Fall and Spring

academic p reparation/qualifications as predictors o f college student retention. Tinto's longitudinal model of dropout includes attributes such as sex, race and measures of ability as obtained on a standardized test or demonstrated through high school grade performance. Pre-college characteristics included by Terenzini and Pascarella included sex, race/ethnic origin, initial (academic) program of enrollment, academic aptitude (standardized test scores), and high school achievement (measured as high school class percentile rank).

A third outcome measure, student ratings of instruction, was examined to determine whether students perceive a difference in their classroom experiences with different types of instructors. Ratings measure the student's satisfaction with instruction, an important component of the educational experience. Moreover, student ratings have been determined to be relatively valid against a variety of indicators of effective teaching (d'Apollonia and Abrams, 1997; Marsh, 1987). Therefore, student ratings may be more relevant outcome measures than either retention or GPA.

The analysis of student perception of teaching compared average ratings on nine SPOT items by instructor type. Although the characteristics of students enrolled in specific courses were known, on average only about two-thirds of enrolled students complete the SPOT. Rather than assume that the nonresponse was random, we decided to limit the analysis to class average data only and adjust for two correlates known to affect student ratings of instruction: course discipline and class size.

Several statistical methods were used to analyze these data. Descriptive statistics provide a picture of the population cohorts on the study variables and their relationship with the outcome variables of retention and academic achievement. Multivariate techniques (logistic regression and ordinary least squares (OLS) regression) were used to assess whether background variables, enrollment experience variables, and instructor type were associated with these outcomes. Analysis of covariance was used to compare student ratings of instruction by instructor type. These are further described below.

Statistical Methods

Retention

Logistic regression was used to assess the effect of the study variables on persistence because it is well suited for the study of dichotomous outcome variables, and is the most appropriate technique to use with a mixture of categorical and interval independent variables. (Feinberg, 1983; Cabrera, 1994; Peng et al., 2002). Logistic regression estimates how various factors will influence the probability that a particular outcome might happen. The use of dichotomously coded independent variables leads to a more straightforward interpretation of probability outcomes, although continuous variables can be used. In this study, all variables were dichotomously coded except for GPA. When a variable is comprised of more than two discrete categories (ethnicity, major, financial aid, instructor type) sets of dichotomous variables were created indicating the presence or absence of the characteristic. This approach necessitates that a reference category be created, and these are noted on the tables. For continuous variables, linearity in the logit was confirmed through the grouping procedure recommended by Hosmer and Lemeshow (1989). Collinearity among independent variables was estimated through inspection of tolerance levels obtained using a linear regression model (Menard, 1995).

The sequential approach to logistic regression was used to enter blocks of variables in order to examine the contribution of each block, first in relation to the baseline (intercept-only) model and then in succession. Three sets of variables were examined sequentially, entering the model in chronological order, with student characteristics (background) entered first, then variables reflecting enrollment experience during the relevant terms. Type of instructor was entered last, allowing all other variables to exert their influence before testing the variables of most interest in this study. Results are displayed in Table 3.

For the final model, the standardized beta weights represent the importance of each variable, controlling for all others, on the logit. Although the sign associated with the beta weight indicates the direction of the association of the independent variable with the outcome, the coefficients themselves are expressed in logits rather than in the original scale of measurement. In the case of categorical variables, the interpretation of the coefficients is a function of the excluded, or reference category. Because of these complications, it is customary to use the delta-p statistic to display the effect that the independent variables have on the outcome (Cabrera, 1994; Peng et al., 2002). Delta-pis the impact that each significant variable makes on the probability of retention, controlling for all other variables in the model. For the dichotomous variables in the model, delta-p provides an estimate of the change in the probability of retention for students having that characteristic compared to students who do not. For continuous variables like high school GPA, delta-p is an estimate of the change in the probability of retention associated with a one-point change in high school GPA. For this study, delta-p statistics were computed using the formula developed by Peter sen (1985), and are expressed as a change of percentage points in a baseline percentage. [1]

Goodness of fit for the entire logistic model is given by the pseudo R^2, the proportion of cases correctly predicted by the model, and the chi-square statistics for overall fit. Pseudo-R^2 represents the proportion of error variance that a n alternative model r educes in r elation to t he

intercept-only model (Cabrera, 1994). Pseudo-R^2 was computed using the formula recommended by Aldrich and Nelson (1984), who also recognize that R^2 from logistic regressions are generally lower than the R^2 estimated with OLS. These authors also suggest that the proportion of cases correctly predicted (PCP) by the logistic regression model provide an overall indicator of fit analogous to the OLS R^2, with large PCPs indicating that the model provides a good fit to the data. Finally, the chi-square for overall fit tests the null hypothesis that the independent variables as a group have no effect on retention.

Academic Achievement

The more familiar OLS regression analysis was used to test hypotheses about the effect of background variables, enrollment experience variables and instructor type on students' academic achievement, as measured by cumulative GPAs at three points in time. After examining several different approaches, a stepwise solution was selected to obtain the smallest subset of predictors. Table 4 displays the results of the final models with the unstandardized and standardized regression coefficients for the independent variables that were statistically significant in predicting the outcome. The R^2 for the OLS regression equations indicates the percentage of variance in GPA attributable to the significant predictors in the model.

Student Satisfaction with Instruction

The third analysis tested whether students differed in their ratings of faculty, adjuncts and GTAs on the SPOT instrument. Nine of the 29 total SPOT items were selected for analysis because these might differ by instructor type, such as availability of instructor, use of class time, and concern for students. Analysis of covariance was used to compare mean ratings by instructor type while controlling for class size, a variable known to be related to student ratings of instruction (Marsh, 1987). Because the colleges make different use of the various instructor types, and because ratings can vary widely by discipline, it was decided to conduct separate analyses for each college.

Assumptions for homogeneity of variance were tested using Levene's Test of Equality of Error Variance for each SPOT item by college. For several analyses where the assumption of equal error variance was not met, an inverse transformation of the data was undertaken to help symmetrize within-group distributions and improve their spread. Because this transformation has the effect of reversing the order of item scores, the distribution was reversed prior to applying the transformation to maintain the original ordering.

For each SPOT item, pairwise comparisons among the three instructor types were computed, and the results reaching statistical significance were reported in Table 5 with 'plusses' and 'minuses' along with their significance level. The comparisons were done in this manner rather than reporting mean ratings for two reasons. First, the scales underlying the items vary, with several using a Likert-type agreement scale, and others using ratings that indicate, for example, pace of the course, or amount learned. Second, students tended to rate instructors quite favorably, and the absolute rating or even the difference in average ratings was of less interest than simply the direction of the difference. The Bonferroni method was used to adjust for multiple comparisons.

Bivariate Results

As shown in Table 1, 87% of the study cohort returned for a first spring semester, 67% for a second fall, and 52% for a third fall term. Black and Asian-American students were more likely to persist during the first year, and students who did not declare an initial major were less likely to return at all points in time. Students with higher high school GPAs and test scores are more likely to persist, and scholarship or grant recipients have the retention edge over students receiving loans. With respect to instructor type, Table 1 shows that overall, higher exposure to faculty and less exposure to adjuncts results in higher retention rates. Exposure to GTAs does not appear to make a difference in retention until the third fall, when students with greater exposure to GTAs are less likely to be retained.

Table 2 shows a mean cumulative GPA for the first fall of 2.42, for the first year of 2.44, and for the second year of 2.80. Female students had higher GPAs, as did international students. Students in the Honors College earned the highest GPAs, and undecided students earned the lowest GPAs. Students in the "Talented 20" earned higher GPAs, although the gap narrows with time. Correlations between high school GPA and cumulative GPA are in the moderate range (.42 to .49), and correlations between test scores and cumulative GPA fell in the low to moderate range (.22 to .42). Students receiving scholarships and grants earn higher GPAs than students receiving loans. Greater exposure to faculty and less to adjuncts and GTAs appears to result in higher GPAs through the first year, but seems to have little association in the second year.

The more favorable retention and achievement results associated with greater exposure to faculty instruction is consistent with the findings of other studies. However, it is plausible that students who are more likely to take courses with faculty share other characteristics that predispose them to academic achievement. The multivariate models will help unravel these effects.

Table 3: Final Logistic Regression Models of Retention on Study Variables

	First spring		Second fall		Third fall	
	Beta	Delta-p	Beta	Delta-p	Beta	Delta-p
BACKGROUND VARIABLES						
Cohort						
2001 entering cohort	-.146		-.132		.026	
Gender						
Male	.043		.271		004	
High School GPA	-.565 ***	-7.8%	-.184 *	-4.2%	-.032	
Talented 20	-.230		.001		-.089	
Race/Ethnicity [1]						
Black	.652 ***	+6.2%	.492 ***	+10.2%	.129	
Hispanic	-.086		-.008		-.064	
Asian American	.007		.256		.018	
Native American	-.528		.419		-.542	
International	-.132		.020		-.358	
ENROLLMENT EXPERIENCE						
Housing [3]						
On campus first year	.016		-.113		N/A	
College of First Major [2]						
Business	-.132		-.285 **	-6.1%	.069	
Education	-.121		-.017		.129	
Engineering	-.157		-.165		.036	
Nursing	.539		.256		-.649 *	-14.2%
Science	-.077		-.176		.040	
Honors	.007		.042		.150	
Arch, Urban & Public Affairs	-.136		-.069		.641	
Undecided	-.591 ***	-7.2%	-.742 ***	-17%	-.215	
Financial Aid [3]						
Grants	.144		.144		.418 **	+.7.2%
Loans	-.053		-.071		-.215	
Scholarships	.543 ***	+6.7%	.239 **	+5.6%	.004	
Cumulative College GPA	.817 ***	+6.8%	.829 ***	+15.3%	.702 ***	+11.2%
INSTRUCTOR TYPE						
Faculty [4]						
0% to 25%	-.214		-.589 ***	-13.9%	.377	
51% to 75%	-.198		.082		-.061	
Over 75%	.065		.129		-.132	
Adjuncts [5]						
0% to 25%	-.088		-.098		.154	
Over 50%	.159		.229		-.139	
Graduate Teaching Assts. [6]						
Over 25%	.147		.222		-.105	
Constant	1.95 ***		-.442		-.274	
Model Indicators						
Baseline p	87%		67%		52%	
Model N	3787		3787		3787	
-2 Log L	2344.24		4013.46		1817.42	
Chi-square (df)	330.33 (6)		611.43 (9)		73.81 (8)	
Pseudo R^2	.09		.15		.04	
% correctly predicted	88%		74%		82%	

***** p < .001, ** p < .01 , * p < .05**

[1] Reference category = White
[2] Reference category= Arts and Letters
[3] (1= Yes 0 = No)
[4] Reference category = 26% to 50%
[5] Reference category = 26% to 50%
[6] Reference category = 0% to 25%

Table 4: Final OLS Regression Models of GPA's on Study Variables

	First Fall GPA			First Year GPA			Second Year GPA		
	b	SE b	Beta	b	SE b	Beta	b	SE b	Beta
BACKGROUND VARIABLES									
Cohort									
2001 entering cohort	-.077	(-.030)	-.038 *	-.091	(.029)	-.046 **	.002	(.022)	.001
Gender									
Male	-.129	(.034)	-.062 ***	-.124	(.032)	-.062 ***	-.114	(.024)	-.094 ***
High School GPA	.656	(.035)	.348 ***	.640	(.033)	.350 ***	.338	(.023)	.316 ***
Race/Ethnicity [1]									
Black	-.197	(.044)	-.073 ***	-.212	(.043)	-.081 ***	-.221	(.033)	-.140 ***
Hispanic	-.104	(.047)	-.033 *	-.104	(.045)	-.034 *	-.077	(.035)	-.041 *
Asian American	-.019	(.072)	-.004	-.033	(.069)	-.007	-.124	(.048)	-.047 **
Native American	.142	(.225)	.009	-.056	(.215)	-.004	-.052	(.145)	-.006
International	.462	(.094)	.073 ***	.496	(.090)	.080 ***	.315	(.062)	.092 ***
ENROLLMENT EXPERIENCE									
Housing[3]									
On campus first year	-.059	(.033)	-.028	-.021	(.031)	-.011		N/A	
College of First Major [2]									
Business	-.210	(.052)	-.079 ***	-.183	(.047)	-.071 ***	-.059	(.036)	-.038
Education	-.247	(.065)	-.066 ***	-.185	(.060)	-.051 **	-.021	(.044)	-.010
Engineering	-.304	(.059)	-.098 ***	-.306	(.054)	-.102 ***	-.147	(.041)	-.082 ***
Nursing	-.212	(.086)	-.040 *	-.096	(.082)	-.019	-.055	(.058)	-.019
Science	-.336	(.053)	-.120 ***	-.292	(.048)	-.108 ***	-.068	(.037)	-.042
Honors	-.580	(.087)	-.115 ***	-.308	(.097)	-.063 **	-.183	(.056)	-.070 ***
Arch., Urban and Public Affairs	-.217	(.080)	-.044 **	-.182	(.074)	-.038 *	-.070	(.054)	-.025
Undecided	-.425	(.053)	-.154 ***	-.415	(.048)	-.155 ***	-.204	(.042)	-.104 ***
Financial Aid [3]									
Grants	.064	(.037)	.029	.080	(.035)	.038 *	.047	(.027)	.037
Loans	-.080	(.034)	-.036 *	-.101	(.035)	-.047 **	-.122	(.027)	-.091 ***
Scholarships	.108	(.037)	.053 **	.103	(.035)	.052 **	.371	(.025)	.309 ***
INSTRUCTOR TYPE									
Faculty [4]									
0-25%	.041	(.043)	.018	-.066	(.051)	-.023	-.054	(.080)	-.014
51-75%	-.033	(.044)	-.014	.031	(.040)	.015	.030	(.035)	.025
Over 75%	-.146	(.070)	-.046*	-.192	(.059)	-.060 **	.055	(.046)	.043
Adjuncts [5]									
0-25%	.047	(.043)	.023	-.013	(.039)	-.006	-.020	(.030)	-.017
Over 50%	.011	(.047)	.004	-.105	(.044)	-.034 *	.042	(.058)	.016
GTAs[6]									
Over 25%	-.074	(.040)	-.033	.019	(.038)	.009	.002	(.042)	.001
Constant	-.521**	(.163)		-.656***	(.154)		1.631***	(.083)	
	Adjusted R^2 =.237			Adjusted R^2 = .258			Adjusted R^2=.373		

***** p<.001,** p<.01,* p<.05**

[1] Reference category = White
[2] Reference category= Arts and Letters
[3] (1= Yes 0 = No)
[4] Reference category = 26% to 50%
[5] Reference category = 26% to 50%
[6] Reference category = 0% to 25%

Table 5: Comparison by Instructor Type of Average Ratings on Selected Student Perception of Teaching Items (Significance levels in parentheses)

SPOT Item	Comparison	College					
		Arts & Letters	Business	Education	Engineering	Honors	Science
Was available during office hours or appointment times	Faculty to adjunct	+ (.01)	+ (.01)			+ (.05)	
	Faculty to GTA						- (.05)
	Adjunct to GTA	- (.01)					- (.01)
Used class time effectively	Faculty to adjunct	- (.05)				+ (.05)	
	Faculty to GTA						- (.01)
	Adjunct to GTA						- (.01)
Seemed concerned with whether students learned	Faculty to adjunct		+ (.05)	- (.05)		+ (.05)	
	Faculty to GTA				- (.05)		- (.001)
	Adjunct to GTA						- (.001)
Respect and concern for students	Faculty to adjunct		+ (.01)				
	Faculty to GTA	- (.05)					- (.001)
	Adjunct to GTA						- (.01)
Willing to listen to students' questions and opinions	Faculty to adjunct		+ (.01)		- (.05)		
	Faculty to GTA	- (.05)		- (.05)			- (.001)
	Adjunct to GTA						- (.001)
Pace at which the instructor covered the material (+ = faster)	Faculty to adjunct	- (.01)	+ (.05)			+ (.01)	
	Faculty to GTA	+ (.01)	+ (.05)				+ (.001)
	Adjunct to GTA	+ (.001)					+ (.001)
Effort you put into this course	Faculty to adjunct	+ (.01)		+ (.01)		+ (.001)	
	Faculty to GTA	+ (.05)			- (.05)		+ (.001)
	Adjunct to GTA				- (.05)		+ (.001)
Overall rating of instructor	Faculty to adjunct	+ (.05)	+ (.05)			+ (.01)	
	Faculty to GTA						- (.01)
	Adjunct to GTA						- (.05)
Compared to other instructors you have had (+ = more effective)	Faculty to adjunct	+ (.05)				+ (.001)	
	Faculty to GTA						
	Adjunct to GTA						
Number of courses taught by faculty		444	54	24	33	146	196
Number of courses taught by adjuncts		333	33	41	7	7	112
Number of courses taught by GTAs		280	2	11	20	0	455

Lower division classes only

Fall 2000 - Spring 2002 excluding summers

Multivariate Results

Instructor Type and Retention

Table 3 displays the effects on retention of the study variables. Initially, the most influential variable is high school GPA; a one point increase in high school GPA reduces retention to the first spring by 7.8 percentage points. This effect carries over to the second fall retention, although its impact is lessened, and it disappears altogether for retention to the third fall. The negative effect of high school GPA on retention seems counterintuitive; we would not expect better academic preparation to decrease retention.

This example illustrates the need to exercise care in interpreting logistic regression results, particularly where independent variables are correlated. Other significant predictors in the model, especially receipt of a scholarship and cumulative college GPA, are associated with an increase in retention. After controlling for these predictors, the effect of high school GPA on the probability of retention diminishes. Further, delta-p must be interpreted not as a constant, but against its starting value before the one point change in the value of the predictor (Long, 1997). The average FTIC student enters the university with a high school GPA of 3.2. Thus, the 7.8 percentage point drop in retention is associated with an average high school GPA of 4.2. [2] Other studies have shown that this university is more likely to lose students with the best academic preparation to transfer institutions.

Entering the university without declaring a major lowers retention by 17 percentage points by the second fall. By the third fall, the effect of not declaring a major is no longer statistically significant. Among racial/ethnic groups, being Black was associated with increased retention through the second fall. Student surveys consistently demonstrate that Black students exhibit a high level of satisfaction with their experience at this university. By the third fall, however, students on academic probation, a group containing a disproportionate number of Blacks, were no longer allowed to continue. Not unexpectedly, receiving a scholarship had a positive impact on retention, at least through the second fall. The retention advantage shifts to grant recipients by the third fall. Retention of business majors drops in the second fall as they face more demanding coursework. Students who initially intended to major in nursing face an increased attrition risk in their third fall as they compete for limited seats in the junior year of their program. Not unexpectedly, academic performance in college as measured by cumulative college GPA results in greater retention.

After background and enrollment experience variables have exerted their effects on retention, very little additional information was added by the amount of exposure that students have to various instructor types. The only significant effect occurred where students who took less than one quarter of their credit hours during their freshman year with full-time faculty could be expected to experience a drop of almost 14 percentage points in their retention to a second fall.

Instructor Type and Academic Achievement

Inspection of the standardized regression weights in Table 4 reveals that the largest impact on cumulative GPA was high school GPA. Negative effects on GPA include being male, being in an ethnic minority group, entering without a declared major, and receiving loans. Students in the reference category for college of first major, Arts and Letters, tended to earn higher GPAs, resulting in negative effects on GPA for declaring majors in other colleges. The negative effect on GPA for Honors students runs counter to the results of the bivariate analysis, where these students earned the highest GPAs. However, the average high school GPA for Honors students is above 4.0, and once the effects of this largest predictor were removed, the connection between college and cumulative GPA was less straightforward.

The regression model for GPA detected several effects for instructor type beyond those accounted for by other variables in the model. Students who took more than 75% of their credit hours with faculty could expect lower first fall and first year GPAs; there was a smaller negative effect for students who took more than half of their courses with adjuncts during their first year. There was no instructor type effect on the second year GPA, and no effects at any time for exposure to GTAs.

Instructor Type and Student Satisfaction

Results of the comparison by instructor type of average ratings on selected items on the SPOT instrument are shown in Table 5. What may be most surprising is how few statistically significant differences exist in ratings among instructor types. In colleges where differences existed, faculty members were rated more available than adjuncts. In the College of Business, faculty members were rated more favorably than adjuncts on most items. In the College of Science, GTAs teach more courses than the other instructor types combined, and they were particularly popular. Students viewed them as being more available, making more effective use of class time, being more concerned with whether students learn, being more respectful, and being more willing to listen to their questions and opinions. However, GTAs tended to cover the course material at a slower pace, and students said that they put more effort into courses taught by faculty and adjuncts. The College of Engineering showed some of the same effects in comparison of GTAs with other instructor types. In the College of Arts and Letters, faculty members were rated more highly than adjuncts on some items, but were seen as using class time less effectively and covering the course material less quickly. The GTAs in the College of Arts and Letters were also judged more

respectful and concerned for students, and willing to listen to questions and opinions.

Discussion

This study uncovered little evidence that instructor type has a widespread impact on student outcomes. Rather, the study demonstrated that retention and academic achievement can be predicted primarily from background and educational experience variables. Student ratings of instruction vary widely by college, with faculty having the edge in some areas, and GTAs in others. Adjuncts rarely showed any statistically significant differences in their comparisons to other instructor types. The negative effect on first fall and first-year GPA from taking a large percentage of credit hours from faculty may be related to the perception reported on the SPOT that these courses require more effort, and are perhaps more rigorous.

However, the almost 14 percentage point drop in retention to the second fall for students with the least exposure to faculty merits further investigation. This group comprised about 14% of the study cohort, or 513 students. They attempted, on the average, the same number of credit hours as other students. There was nothing measured in this study that distinguished them from other groups except for the greater proportion of credit hours taken from adjuncts and GTAs. The negative effect does not carry through to the third fall, but after two years, fewer students have this low level of exposure to faculty. Only eight percent took fewer than 25% of their credit hours with faculty, and almost half had faculty exposure at the 51% - 75% level.

The attrition for students with low faculty exposure, coupled with the significantly lower retention rates of students who enter without a declared major, suggest that the kind of involvement with the university that research demonstrates is critical for retention is lacking for students who are in these categories. Recognizing the risk, the university added interventions directed toward students with undecided majors, including earlier advising and creation of a learning community. The university might also be well advised to monitor freshman course taking to ensure adequate exposure to full-time faculty members.

Limitations and Next Steps

One limitation of this study is that the outcome variables used are only gross indicators of students' academic experiences. Students have many reasons for leaving, or for failing academically, many of them unrelated to their experiences in the classroom and outside the university's control. Even student ratings, although providing a glimpse into the instructor's perceived effectiveness, do not provide direct evidence of how the instructor influences the student's educational experience. If the concern with over-reliance on part-time faculty or GTAs is that educational quality will suffer as a result, more direct measures of these constructs are needed.

In this study, adjuncts were treated as a homogenous group, although their characteristics may vary greatly depending on whether they are aspiring academics, free-lancers or experts in the field in which they are primarily employed. Instructors on multi-year contracts are in a category by themselves, as they are more integrated into the university community than term adjuncts but lack the status of faculty. It might be instructive to explore the effects of exposure to these different types of adjuncts.

In the final analysis, the link between experiences with instruction and student outcomes may have less to do with the type of instructor than his or her ability to convey information effectively to students. In its comprehensive standards on faculty, the Commission on Colleges of the Southern Association of Colleges and Schools requires institutions to consider in its faculty, whether full- or part-time, "competencies and achievements that contribute to effective teaching and student learning outcomes." It is the responsibility of the university to ensure that whoever is in the classroom has the tools to make this happen.

Endnotes

[1] Delta-p = exp (L_1) / (1 + exp (L_1)) - P_0
where P_0 = overall sample mean of the dependent variable
$L_1 = L_0 + b$ (logit change after a unit change in variable of interest)
L_0 = natural logarithm of $(P_0 / (1- P_0))$
b = beta weight for variable of interest, expressed in logits.

[2] In this state, students can earn bonus points toward their high school GPAs through completion of Honors, Advanced Placement o r I nternational B accalaureate courses, resulting in a possible high school GPA greater than 4.0.

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