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Abstract

This study used data from five years of first-semester entering freshmen cohorts (1999-2003) from North Carolina State University to assess the effects of exposure to part-time faculty upon student retention. A logistic regression model containing high school gpa, total first year hours attempted, gender, SAT verbal score, SAT math score, and percent faculty exposure was found to be a significant predictor of second year retention. While the percentage to which first-year students were exposed to part-time faculty instruction was statistically significant in predicting retention, it had no practical impact upon the odds ratio of being retained. For each unit (first year hours) increase in percent exposure to part-time faculty, the odds of being retained decreased by less than 1%.

**The Effects of Part-Time Faculty on First Semester Freshmen
Retention: A Predictive Model Using Logistic Regression**

by

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Chapter One

Introduction

Introduction

In the United States of America, record numbers of high school graduates are continuing their education by enrolling in an institution of higher education. As stated in Baum and Payea (2003), “Enrollment in postsecondary education has risen for all economic, racial, and ethnic groups during the past quarter century” (p. 3). However, not every first-semester student who enrolls at a college or university remains there to graduate. In fact, Tinto (1993) writes,

More students leave their college or university prior to degree completion than stay. Of the nearly 2.4 million students who in 1993 entered higher education for the first time, over 1.5 million will leave their first institution without receiving a degree. Of those, approximately 1.1 million will leave higher education altogether, without ever completing a two- or four-year degree program. (p. 1)

A considerable body of research exists regarding why some students persist and others do not in higher education, however, no clear answer exists. A review of the literature reveals a multitude of studies focusing on the issue of retention. These studies consistently agree that retention is a complex issue that involves the interaction of different variables (Levitz & Noel, 1990; Pascarella & Terenzini, 1977, 2005; Tinto, 1993). This broad range of variables includes such general demographic characteristics as gender, race, ethnicity and age to very complex psychological variables such as

intention and commitment (Tinto, 1993). One potential factor affecting freshman retention that has received little quantitative study is the degree to which their first semester classes are taught by part-time faculty. Researchers like Pascarella and Terenzini (2005) and Tinto (1993) have asserted that increased contact with faculty will lead to higher levels of student satisfaction and persistence in a college/university environment. However, current literature portrays part-time faculty in a less than flattering light. Leslie and Gappa (2002) state that a common misrepresentation of part-time faculty in the literature is as a “disappointed lot”,

The popular image of part-time faculty, as presented in frequent stories and opinion pieces in the media, perpetuates the commonly held assumption that part-timers are a temporary and dissatisfied lot who patch together part-time jobs by teaching at several institutions simultaneously and queue up for academic career opportunities that seem more and more scarce all the time. (Leslie, D., & Gappa, J., 2002, p. 59)

If the description of part-time faculty as a “disappointed lot” is to be accepted as accurate, perhaps their negative attitude toward their position will have a detrimental impact on student outcomes.

The use of part-time faculty in higher education is not a new concept. In the Fall 2001, 66.7% of all faculty in the public community college system were employed part-time compared to 28.0% within public 4-year institutions (NCES, 2003). Leslie (1998) in part attributes the increasing use of part-time faculty to increased financial stress upon institutions,

The raise also paralleled increasing financial stress in many colleges and universities, particularly with the dramatic leveling off of state support for higher education in the early 1990's. Two of the papers prepared for the Sloan seminar (Haeger, Wyles) suggested that increasing enrollment without a commensurate rise in institutional income was indeed an important factor in reallocating faculty positions from full-time to part-time. These conditions made it harder to hire more full-time faculty, given the lower salaries paid to part-timers, the shorter time commitment to them, and the fact that part-timers mostly need not be paid benefits (p. 7).

Part-time faculty members tend to be women, teach fine arts or literature/English and hold a master's degree or less (Leslie, 1998). Because part-time faculty typically hold only a master's degree and spend less time (if any) on research compared to full-time faculty members, it has been hypothesized that the quality of instruction from part-time faculty is less than that from a full-time faculty member (Gappa & Leslie 1993).

However, this hypothesis may or may not be correct. Little quantitative research on this issue exists in the literature thus; no clear conclusion can be drawn as to the effect of part-time faculty on student retention in higher education.

This research will attempt to replicate with modification, the results of a quantitative study done by Harrington and Schibik (2004) by exploring the following research question:

Research Question

What is the quantitative impact of part-time faculty instruction upon first-semester freshman retention?

The Harrington and Schibik study found a significant negative correlation between exposure to part-time faculty and student retention at a comprehensive Midwestern university. Harrington and Schibik compared the retention rates from first semester to second semester on four years worth of incoming freshmen. The retention rates in the study were then correlated to a quartile value for the percent instruction from part-time faculty in the first semester. Unlike the Harrington and Schibik study, this research will be conducted at North Carolina State University; a large, research-extensive institution located in Raleigh, NC. NC State University enrolls an average first-year freshman class of approximately 3,800 each year and has an average freshman retention rate of approximately 90%. In addition, this research will utilize a continuous, ratio scale (0-100%) to measure the percent exposure to part-time faculty rather than a quartile-based scale used by Harrington and Schibik. The use of a ratio scale is more appropriate than quartiles for an independent, quantitative variable like percent exposure because it allows greater quantitative detail than an ordinal scale like quartiles (Hatcher and Stepanski, 1994). Finally, unlike the Harrington and Schibik study, this research will separate the type of instruction in three groups: full-time faculty, part-time faculty, and graduate student. Full-time faculty status will be defined as any employee having a professional rank or those faculty teaching a full-time enrollment (FTE) at North Carolina State University. The Harrington and Schibik study fails to define full-time faculty status and appears to classify graduate students as part-time faculty.

Since both part-time faculty employment and first-semester freshmen enrollment rates continue to increase into the foreseeable future, the exploration of the effect of part-time faculty exposure upon first-semester freshmen retention is warranted. Because of

the limited amount of quantitative data relating the effects of exposure to part-time faculty upon first-year student retention rates, this research is justified.

Chapter Two

Literature Review

Introduction

Higher education is one of the biggest businesses in the United States of America. According to Gappa (1984), “In the mid-1980’s, colleges and universities will be spending well over \$60 billion a year on operations...” (p. 1). A substantial portion of this amount will be spent on salaries for faculty and staff. McCabe and Brezner (1978) note, “...higher education is a labor intensive enterprise with approximately 80 percent of operating costs in personnel” (p. 59). According to the National Center for Education Statistics (NCES), during the Fall of 2001 approximately 1.13 million faculty were employed in institutions of higher education with 44.5% of those being employed part-time (NCES, 2003). This translates into a considerable amount of money being spent to employ part-time faculty by higher education institutions. While part-time faculty certainly serve as a source of cheap and flexible labor, one must wonder at what cost to student success. Do the benefits of employing part-time faculty justify the costs?

Defining Part-Time Faculty

Before any discussion about the pros or cons of using part-time faculty can commence, one must begin by defining “part-time” faculty. This is not an easy task. Gappa (1984) states that because no uniform definition of a part-time faculty member exists, researchers are forced to rely on one of several methods to define their population. Leslie defined six approaches to defining part-time faculty in 1978. These definitions still hold merit:

1. The US department of labor defines part-time employment as based upon the number of hours worked per week. Typically, less than 35 hours is considered part-time.
2. Institutions themselves may define part-time status based upon the number of credit hours taught by the faculty member.
3. Labor unions involved in collective bargaining at the institution may themselves define part-time status.
4. States themselves may define part-time and full-time faculty status.
5. Some institutions define part-time and full-time status within the individual faculty members' contract.
6. Individual units within the institution may define faculty status.

Because of this high level of variability in defining part-time status, it is difficult to make analytical comparisons between part-time faculty from one institution to another (Leslie, 1978). Gappa (1984) defines a part-time faculty member as “anyone who (1) teaches less than the average full-time teaching load, or (2) has less than a full-time faculty assignment and range of duties, or (3) may have a temporary full-time assignment” (p. 5). The definition of part-time faculty provided by Gappa also excludes graduate assistants who are teaching part-time in the department where they are also pursuing a graduate degree. According to Gappa (1984), all persons included in her definition of part-time faculty are “non-tenured and nonpermanent and have little or no job security unless specific mention is made of tenure status” (p. 5).

Characteristics of Part-Time Faculty

Having defined part-time faculty according to Gappa (1984) it is now important to examine who makes up the population. The use of part-time faculty as an instructional tool is not a new concept. Blackburn (1978) writes,

While records do not permit a definitive determination of the development and use of part-time faculty, we do know the phenomenon extends back to the first colleges and universities. Indeed, the first college staffs in the

United States, as elsewhere, were composed of individuals whose principal occupation was other than academic. Most were ministers serving part-time in the classroom and destined to leave for a full-time career in the parish in a few years. It was not until well into the nineteenth century, with the possibility that one could make such a life an actual career, that laypersons entered the work of college teaching. (p. 100)

A look at the history of higher education finds that as employment opportunities within higher education became more common and lucrative, the population of part-time faculty grew. With the passage of the Servicemen's Readjustment Act of 1944, commonly known as the GI Bill, enrollment within US higher institutions experienced an unprecedented increase in student enrollments (Lucas, 1994). The rapid increase in post-war enrollment at US institutions placed two-year or community colleges in an unfavorable position of competing with four-year colleges and universities for qualified, full-time faculty thus leading to an increased demand for part-time instructors (Blackburn, 1978). The use of part-time faculty in the community college system has continued to grow to this day and as of 2001, sixty-four percent of the total part-time faculty in public higher education was employed in the community college (NCES, 2003). In addition to being found mostly in community colleges, the most recent statistics from the National Center for Education Statistics (NSOPF, 1999) describe part-time faculty as having an average age of 45-54; 87% White; 52.4% male; 75% are married; 79% had an advanced degree and 18% had a doctorate. Gappa (1993) also states that 74% of all part-time faculty members reported being “somewhat satisfied” or “very satisfied” with their jobs.

In a pioneering study, Howard Tuckman (1978) organized a national sample of 3,763 part-time faculty into seven categories based upon their reasons for choosing part-time employment (as follows):

Table 2.1 Reasons Faculty Choose Part-Time Employment

Part-Time Faculty Category	Percentage of Sample	Reason for Choosing Part-time Employment
Semiretired	2.8	Former full-time academics or professional
Graduate Student	21.2	Employed part-time in institutions other than the one they were seeking a degree in
Hopeful Full-timer	27.6	Wanted a full-time position but could not locate one
Full-Mooner	13.6	Hold another primary job of at least 35 hours per week elsewhere.
Homeworker	6.4	Care for children or relatives at home preventing full-time employment.
Part-mooner	13.6	Hold another job of fewer than 35 hours per week elsewhere.
Part-unknown	11.8	Unknown reason for working part-time

(Gappa, 1993)

Based upon extensive, national surveys, Gappa (1993) broadens the Tuckman classification scheme by reducing the number of part-time faculty categories in the topology from seven to four: 1) Career enders; 2) Specialists, experts, and professionals; 3) Aspiring academics; and 4) Freelancers. In the updated Gappa (1993) scheme, the Freelancer category is composed of the part-unknowners, part-mooners, and homeworkers from the Tuckman classification scheme while the semiretired becomes the career enders; Full-mooner becomes specialists, experts, and professionals; hopeful part-timer and graduate student combine to become aspiring academic. In both the Tuckman and Gappa classification schemes, it is clear that part-time faculty members teach for a

variety of reasons. Empowered with a definition (or at least a sense) of what a part-time faculty member is and a general idea of who comprises the population, this literature review will now focus on why part-time faculty are employed and what the impact of their use is upon higher education.

Why Institutions Use Part-Time Faculty

The use of part-time faculty in the United States began its most noticeable increase following World War II (Jacobs, 1998). Graduate schools were producing new Ph.D.'s at an incredible rate to meet the demand for qualified instructors to educate the growing number of enrolled students. As Gappa (1984) states, “despite pell-mell expansion of graduate programs, the production of adequately credentialed scholars and researchers bent on academic careers did not catch up with demand in most fields until the mid-1970's” (p.3). However, eventually production of doctorates did catch up to demand and Ph.D. output began to exceed the number of vacant positions (Blackburn, 1978). The increased production of doctorates, particularly in the humanities, led to an over saturation in the market (Gappa, 1984). Because retirement rates are low in higher education institutions and the tenure system assures job security; an increasing number of newly graduated doctorates found themselves unable to find permanent positions in universities (Blackburn, 1978; Gappa, 1984).

The dramatic increase in enrollment following World War II initially hurt the community college system. Unable to financially compete with universities for the limited number of doctorate instructors in the market, the community college system turned to the part-time instructor (Gappa, 1984). The use of part-time faculty by the community college system however, turned out to be an incredible advantage. As Gappa

(1984) states, “Part-Timers provided the great flexibility needed to offer the large assortment of vocational and technical programs available at low cost – with or without academic credit, day or night, on or off campus” (p. 3). The community college system was not the only type of institution to benefit from the use of part-time faculty. Four-year colleges and universities also capitalized on the availability of part-time faculty. Part-time faculty allowed a college or university to rapidly institute new programs or update existing ones at a very low cost. In support of this philosophy, Gappa (1984) states: “Administrators could provide competent instruction by part-timers at between 50 and 80 percent of the direct cost of comparable instruction by full-time faculty” (p. 4). While there are certainly many reasons for the rapid expansion of part-time faculty in higher education post-World War II, Leslie (1998) summarizes that the two biggest underlying causes have been:

1. The rapid expansion of the community college system.
2. Increased financial constraints coupled with increased competition among colleges and universities.

The Problem with Part-Time Faculty

Although the increased use of part-time faculty within higher education makes sense from an administrative point of view, their use does not come without criticism. Haeger (1998) writes: “The most important academic concern is the perception that part-time faculty threaten the quality of academic programs in terms of course content, advising, faculty-student interaction, and collegiality within academic departments” (p. 85). This concept is supported by Gappa (1984) who adds,

Hiring part-time faculty, in the general view, is at the expense of program quality; the major advantage in hiring them is financial. When part-time

faculty are discussed at all, it is primarily with respect to their disadvantages, not their advantages. Part-time faculty are seen as less well qualified, but studies comparing the effectiveness of part-time and full-time teaching are not cited. (p. 8)

In addition to the perceived difference in quality of instruction, opponents of the use of part-time faculty argue that the level of student service provided by part-time faculty also lags behind that of full-time faculty. In a case study conducted by Gappa (1993), a vice president states:

Part-time faculty don't have the institution's mission in focus. They do not know as much about the "open-door" student body as the full-time faculty know. They probably aren't as ready to diagnose problems and give individual help. Part-time faculty don't know where to send students who need help, where to get assistance themselves, or other avenues to help, and so on... (Gappa, 1993, p. 101)

If a quantitative difference exists between the quality of instruction of part-time and full-time faculty (and there is little evidence in the literature to support this claim) then the increased use of part-time faculty in higher education could be having a negative impact upon student outcomes.

Retention

While it is true that enrollment in higher education has seen phenomenal growth, it unfortunately is also true that more students leave their college or university before completing their degree program (Tinto, 1993). The rate at which students of a given group (a cohort) depart from an institution prior to attaining a degree is referred to as an

attrition rate. Attrition rates are typically measured as the number of students enrolled at the end of a year divided by the number of students enrolled at the start of the year. Of particular interest to researchers in higher education is the attrition rate within the first year. Tinto (1993) writes,

We begin our study of departure with the first year of college. We do so because the first year proves, as we shall see in later chapters, to be an especially important year in the process of persistence. The character of one's experience in that year does much to shape subsequent persistence. By the same token, the largest proportion of institutional leaving occurs in that year and prior to the beginning of the second year. For this reason alone, as we shall see in chapter 5, the first year has become a special object of institutional policy aimed at reducing student attrition. (p. 14)

Most published retention rates focus on new high school graduates from the preceding spring (called first-semester freshmen) because they compose an overwhelming majority of an incoming cohort (Tinto, 1993). These attrition rates also typically exclude foreign students from analysis due to the scarcity of reliable information on their movements within higher education (Tinto, 1993).

A review of the literature reveals that two major theories are most often cited to explain retention within the higher education system. The first model, proposed by Vincent Tinto and referred to as the Student Integration Model, asserts that attrition is the result of interactions between a student and his or her educational environment (Cabrera, Castaneda, and Hengstler, 1992). The underlying premise of the Student Integration

Model is that the closer the match between a student and their institution, the stronger the commitment between the individual and the institution to completing the degree program (Tinto, 1993). The second major theory used to describe attrition was proposed by John Bean and is commonly known as the Student Attrition Model (Cabrera, et. al, 1992). The Student Attrition Model asserts that attrition is analogous to turnover in the corporate world and is driven by behaviors which are shaped by beliefs affected by various factors of the institution (Bean 1984). While the models may differ regarding the importance of specific, individual factors, both models agree that attrition is a byproduct of the students' academic environment. As stated in Cabrera, et. al (1992),

Both models regard persistence (lack of attrition) as the result of a complex set of interactions over time. The two models also argue that precollege characteristics affect how well students subsequently adjust to their institution. Further, the two models argue that persistence is affected by the successful match between the student and the institution. (p. 145)

Why Not All Students Are Successful

Working from Tinto's Student Integration Model, research by Pascarella and Terenzini asserts that student-faculty interactions play a crucial role in the match between student and institution (Pascarella & Terenzini, 1977, 2005). According to Gaff and Gaff (1981), "student-faculty contact is a significant factor in predicting college persistence" (p. 649). Furthermore, the type of interaction that students report as being most important is contact outside of the classroom (Stodt, 1987). Endo and Harpel (1982) have found that informal contact, in which faculty members develop more friendly

relationships with students and exhibit a personal and broad concern with their emotional and cognitive growth has more influence not only on students' personal and social outcomes but, also on their intellectual gains (Stodt 1987, p. 9). A study by Plecha (2002) reports,

The quality of student-faculty contact is as important as the frequency of contact. Numerous studies have examined the impact of positive student-faculty interactions on students' development. Endo & Harpel (1983) conducted a longitudinal study to examine the impact of these positive interactions on students' self-reported growth in cognitive measures (similar to academic-self confidence). When controlling for variables such as academic ability and degree aspirations, the researchers' regressed student reported cognitive growth on measures of quality interaction with faculty. The researchers found that students who perceived faculty as concerned about students and who developed close relationships with faculty reported the most academic growth. (p. 6)

According to Levitz and Noel (1990), "studies have shown that freshmen who can name a campus-affiliated person they can turn to with a problem are more than twice as likely to return for the sophomore year as those who cannot" (p. 10).

The Impact of Part-Time Faculty on Students

Given the importance of student-faculty contact upon retention, one must wonder if the increased use of part-time faculty is having an adverse effect within US higher education. In addition to any difference in the quality of education inside the classroom,

Haeger (1998) adds that the environment outside of the classroom also suffers in the use of part-time faculty who often times do not have offices, hold limited or no meeting hours, have limited or no phone access, and are not compensated for advising students. If Haegers' claim is taken at face value, it is reasonable to assume that the reduced availability of part-time faculty will have a negative impact upon student satisfaction with the institution leading to lower first-year retention rates.

The Myth of Part-Time Faculty

The literature shows little information in regards to a correlation between faculty and retention in higher education. Gappa (1984) writes:

Very little objective information is available about the comparative effectiveness of part- and full-time teachers; what is available is about two-year colleges. And, taken together, the few studies that have been published are inconclusive. (p. 81)

Using a national sample of community colleges, research by Jack Friedlander (1980) compared 11 different factors between part-time and full-time faculty including: teaching experience, selection of course materials, use of instructional media, use of instructional support services, availability to students, and involvement in professional activities. Based upon his research, Friedlander concluded that differences between the two types of faculty were the result of differences in level of education and experience, and institutional policies and practices (Friedlander 1980). If one accepts Friedlander's assumptions about what criteria affect teaching effectiveness, then one could conclude that the quality of instruction provided by a college is likely to be adversely affected as the proportion of part- to full-time faculty increases (Friedlander 1980). Opponents to

Friedlander's research note that his work examines only inputs rather than results such as attrition rates, thus making his conclusions questionable.

While research studies advocating an apparent decreased quality of instruction resulting from the use of part-time faculty may be found in the literature, an equal number can also be found arguing the opposite case. Gappa (1984) sites numerous studies (e.g., Cruise, Furst, and Klimes 1980; Willett 1980; Behrendt and Parsons 1983) advocating that no quantitative difference exists between the quality of instruction delivered from part-time versus full-time faculty. Based upon the range of data in the literature Gappa (1984) concludes:

While the information available that compares the teaching effectiveness of part- and full-time faculty in community colleges is minimal and inconclusive, it appears that part-time faculty themselves do not detract from the quality of instruction and that they can enrich it greatly. (p. 84)

In fact, recent research by Gappa (1993) suggests that the use of part-time faculty actually increases quality of instruction because those instructors who consistently receive poor reviews tend not to have their contracts renewed, removing them from the teaching pool – an option not available with tenured faculty.

There is little doubt that the combination of increased enrollment, decreased educational funding and an over production of doctorate students has lead to the rapid increase in the use of part-time faculty. Part-time faculty clearly serve a valuable purpose in higher education, however, their increased use raises serious concerns. While current literature shows that part-time faculty have less formal education than permanent faculty,

there is little evidence that supports this equating into an inferior quality of instruction (Leslie, 1982). The lack of current literature regarding part-time faculty instruction leaves one questioning any statement that institutions are doing their students a disservice by employing part-time faculty. Nonetheless, the lack of any clear quantitative data regarding the effects of part-time faculty on student retention illustrates the need for additional research within the field. According to Leslie et al. (1984), “The key to effectively using part-time faculty lies in how they are selected, supported and assigned” (p. 140). Higher education is ultimately a consumer driven business and consumers are very particular about the products they purchase.

The Harrington and Schibik Study

A 2004 study by Harrington and Schibik attempted to produce some quantitative data in response to the apparent void in the literature regarding a correlation between part-time faculty exposure and retention. The Harrington and Schibik (2004) study examined 7,174 entering first-year students to a midsized comprehensive Midwestern university between 1997 and 2001. The study found a significant ($p = 0.01$) negative correlation between the percentages of courses taught by part-time faculty to retention rates in the second semester. Harrington and Schibik concluded that part-time faculty members posed a “significant challenge” to first year students, particularly those “at-risk” (p. 14). Unfortunately, the Harrington and Schibik study failed to define who constituted the part-time faculty, used a nominal scale to measure part-time faculty exposure, focused on a relatively short retention span, and tended to cluster students of lower academic ability with higher percent exposure to part-time faculty.

Conclusion

While the work of Harrington and Schibik study does advance the literature regarding the effects of exposure to part-time faculty on retention, its dependence upon quartiles (a non-continuous scale) places serious limitations upon its external application. The research in this study will attempt to replicate with modification the Harrington and Schibik study but will use a continuous ratio scale to measure exposure to part-time faculty. In addition, a logistic regression model will be used in an attempt to produce a predictive model that correlates the likelihood of first-year retention to a combination of part-time faculty exposure and various student demographic variables including gender, ethnicity, high school rank, high school gpa, and SAT score.

Chapter Three

Research Methodology

Introduction

A review of current literature reveals little in regards to the quantitative effect of exposure to part-time faculty on first-year freshmen retention. What little information is available suggests that as exposure to part-time faculty increases, retention rate decreases. This study will strive to quantify this effect by using logistic regression to construct a predictive model for retention based upon part-time faculty exposure and several other first-year student attributes. This research is based upon a study done by Harrington & Schibik (2004) who found a significant ($p=0.01$) correlation between exposure to part-time faculty and student retention at a comprehensive midwestern university. Unlike the Harrington and Schibik study, this research will be conducted at North Carolina State University; a large, research-extensive institution located in Raleigh, NC. In addition, this research will utilize a continuous, ratio scale (0-100%) to measure the percent exposure to part-time faculty rather than a quartile-based scale used by Harrington and Schibik. Lastly, this research will examine the percent exposure to part-time faculty over the entire first year rather than only through the first semester as studied by Harrington and Schibik.

Research Question

This research strives to answer the following research question:

What is the quantitative impact of part-time faculty instruction upon first-semester freshman retention?

Sample Selection

For this study, the entire first-semester freshmen cohorts from North Carolina State University for fall 1999, 2000, 2001, 2002 and 2003 were analyzed. NC State University enrolls an average first-year freshman class of approximately 3,800 each year and had an average freshman retention rate of 89.6% for the years 1999-2003. The combined cohorts 1999-2003 yielded 18,620 unique first semester student records. From this data, 41 records were removed from the analysis population. These 41 records had no matching enrollment data, most likely explained as the student withdrawing from the university during the first few days of the school year prior to the university census date. The resulting dataset had a total of 18,579 unique students.

In an effort to make the sample more generalizable to the traditional, first-semester freshman population, several subpopulations of students were removed from the analysis population of 18,579. A total of 1,427 part-time students (those taking less than 12 hours in either Fall or Spring semesters), 703 student athletes, 513 academic scholarship recipients, 382 University Transition Program participants, and 155 international students were deleted from the analysis population. The final analysis population contained 15,399 students. Because both athletes and scholarship-supported students have a monetary stake in persisting in college, they cannot easily be generalized as a “typical” student. In general, international students bring dramatically different educational experiences and cultural expectations into college and thus were excluded from analysis. Lastly, the NCSU Transition Program consists of students eligible for admission into NCSU but not into their first or second choice colleges. These students receive unique support services such as intensive academic advising not available to

regular undergraduate students, making their inclusion in the analysis population inappropriate.

Data regarding faculty status received special consideration. The assignment of faculty into full-time, part-time, or graduate student status was done using an exclusion process. First, a list of instructors was derived from all courses taken by the analysis population (new freshmen) during their first year of enrollment. Graduate teaching assistants were then removed from the list of instructors. Next, tenure and tenure-track instructors or those nontenure-track instructors teaching one full-time enrollment were assigned full-time faculty status. The remaining instructors were assigned part-time faculty status.

Data collection

Anonymous student record data for the 1999-2003 undergraduate cohorts as well as course enrollments and faculty teaching schedules were provided by the NC State University Planning and Analysis department. Student demographic data (SAT, gender, ethnicity, high school rank, and high school grade point average) were merged with first-year (Fall and Spring semesters) course data (course, credit hour, instructor) and instructor data (position) using SAS software. The resulting dataset contained non-normalized (multiple records per key) student data containing one record per student per course for the first, fall/spring academic year. Each course record identified the rank/position of the instructor as either: full-time faculty, part-time faculty, or graduate student.

Table 3.1 Variables

Variable	Model Role	Description
Retained	Dependent	Binary value, the student persisted (1) into their second year or they did not persist (2).
Ethnicity	Independent	Nominal value, White (1), African American (2), Native American (3), Asian (4), Hispanic (5), Other (6).
High School Grade Point Average	Independent	Ratio scale value ranging 0-5.
Gender	Independent	Nominal value, male (1) or female (2).
High School Rank	Independent	Ratio scale value ranging 0-100. Percentage of students with a rank below the observed rank.
Percent Exposure to Graduate Student	Independent	Ratio value ranging 0-100%. The total number of hours taught by a graduate student during the first year divided by the total number of hours attempted during the first year.
Percent Exposure to Part-Time Faculty	Independent	Ratio value ranging 0-100%. The total number of hours taught by a part-time faculty member during the first year divided by the total number of hours attempted during the first year.
Percent Exposure to Full-Time Faculty	Independent	Ratio value ranging 0-100%. The total number of hours taught by a full-time faculty member during the first year divided by the total number of hours attempted during the first year.
SAT Verbal Score	Independent	Ratio value 0-800. The students score on the verbal portion of the Standardized Aptitude Test (SAT).
SAT Math Score	Independent	Ratio value 0-800. The students score on the math portion of the Standardized Aptitude Test (SAT).
Total SAT Score	Independent	Ratio value 0-1600. The students combined score on the verbal and math portions of the Standardized Aptitude Test (SAT).

Data Analysis

In this study, the research question will be answered using logistic regression with the SAS system. Logistic regression is the statistical analysis of choice because of its predictive ability on a dichotomous dependent variable (retained). The analysis

population was first normalized (one key record per student) to produce cumulative totals of the number of first year credit hours taught by each of the three instructor types: full-time faculty, part-time faculty, or graduate student. Each of these cumulative totals was then divided by the total number of hours that student took during their first year to calculate a percentage (0-100%) exposure to each type of instructor. Descriptive statistics for the study variables as well as a logistic regression model (Retain=1) were calculated using SAS software. Multicollinearity was tested for using the REG procedure of SAS software with the TOL (tolerance) and VIF (variance inflation) options (Allison, 1999).

The final analysis dataset had a total of 15,399 unique student records and eleven variables: retained, ethnicity, gender, high school grade point average, high school percentile rank, SAT verbal score, SAT math score, total SAT score, percent exposure to graduate student, percent exposure to part-time faculty, and percent exposure to full-time faculty. Each unique record contained a percentage (0-100%) for the type of instruction (graduate student, part-time, or full-time) that student received during their first year of study at NC State University. Because the logit procedure in SAS is unable to model parameters with missing values, 905 observations were excluded from the logistic model by SAS resulting in an actual analysis population of 14,476. In order to minimize the number of records omitted from the logistic analysis, high school rank was removed as a model parameter due to the high (9.44%) amount of missing data.

Chapter Four

Results

Introduction

The population of 15,399 first-semester freshmen entering North Carolina State University between 1999 and 2003 was first analyzed with descriptive statistics. Table 4.1 lists the standard descriptive statistics for each of the 6 interval variables initially considered as being significant parameters in the logistic model.

Table 4.1 Descriptive Statistics of Analysis Variables

Parameter	N	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
High School Rank					
Percentile	13,945	6	99	83.870	11.560
High School GPA	15,370	2.6	5.25	3.995	0.387
SAT Verbal	14,494	330	800	579	71
SAT Math	14,494	380	800	612	75
SAT Combined	14,494	830	1600	1191	127
Total First Year Credit					
Hours Attempted	15,399	12	40	31	2.282
Percent Exposure to					
Graduate Student	15,399	0	57.143	13.502	10.615
Percent Exposure to					
Part-Time Faculty	15,399	0	100	24.593	16.650
Percent Exposure to					
Full-Time Faculty	15,399	0	100	61.905	17.172

Descriptive statistics were also calculated for two categorical parameters, gender and ethnicity (Figure 4.1). 42.69 % (N=6,574) of the analysis population was female and 57.31% (N=8,825) was male.

Figure 4.1

With the exception of high school rank, which had an unacceptable percentage (9.44%) of missing data, the eleven independent variables were regressed on second year retention (retained=1) using logistic regression with a backward elimination method. Backwards elimination reduced the number of variables in the model from eleven to six. The resulting model (Table 4.2) containing high school gpa, total first year credit hours attempted, SAT verbal, SAT math, gender, and percentage part-time exposure was found to be significant ($X^2=65.7384$, $df=6$, $p<0.0001$). Four of the six model variables (high school gpa, total first year credit hours attempted, gender, and percentage part-time exposure) were found to be significant predictors of being retained into the second year (Table 4.2).

The overall goodness-of-fit for the logistic model was assessed using the Hosmer and Lemeshow (HL) test (Hosmer and Lemeshow, 2000). The HL test has become a popular method for assessing goodness-of-fit for logistic models because it fills a need and has no serious competition (Allison 1999). The HL test has an approximate chi-square distribution under the null hypothesis that the fitted model is correct. The HL test for the logistic model had a p-value of 0.5297, which supports accepting the null hypothesis that this model is a good fit for the data. An alternative method for assessing a model's overall value is to measure its predictive value via the use of the generalized R^2 statistic. The generalized R^2 statistic is similar to the R^2 statistic used in assessing linear regression models; however, the generalized R^2 statistic tests the null hypothesis that all model coefficients are 0. While the generalized R^2 statistic may be similar to the linear R^2 statistic, it cannot be interpreted as a proportion of variance "explained" by the independent variables (Allison, 1999 p.57). The generalized R^2 statistic for the logistic model was 0.0045. R^2 values below 0.70 in linear regression are typically considered unacceptable however, Hosmer and Lemeshow (2000) state,

R^2 values (generalized) are low when compared to R^2 values typically encountered with good linear regression models. Unfortunately low R^2 values in logistic regression are the norm and this presents a problem when reporting their values to an audience accustomed to seeing linear regression values. (p. 167)

Because there is no widely accepted "cutoff" value for generalized R^2 values and the statistics inability to explain variance between dependent and independent variables within a model, generalized R^2 values are usually not an accepted method for assessing a model's predictive value.

The parameter estimates (β) generated from the logistic procedure are difficult to interpret and typically, only their sign (+ or -) is of value. Instead of using the β coefficient to describe the impact of a parameter upon the modeled outcome, the odds ratio is generally used instead (Allison, 1999). The use of the odds ratio in conjunction with the sign of the β coefficient is interpreted as “for every one unit increase in the independent variable X there is a Y increase/decrease in the dependent variable.” For example, using the reported β coefficients and odds-ratios reported in Table 4.2, a one-unit increase in the percentage of instruction from part-time faculty results in a 0.004% decrease in the odds of being retained into the second year.

Table 4.2 Maximum Likelihood Estimates

Parameter	Parameter Estimate (β)	Standard Error	p-value	Odds Ratio	Tolerance	Variance Inflation
Intercept	-0.511	0.593				
High School GPA	0.366	0.103	0.0004	1.443	0.799	1.252
Total First Year Credit Hours Attempted	0.085	0.016	<0.0001	1.088	0.945	1.058
Gender (1=male)	0.141	0.039	0.0003	1.328	0.879	1.138
% Instruction from Part-Time Faculty	-0.004	0.002	0.049	0.996	0.983	1.018
SAT Math	-0.0002	0.0006	0.725	1.000	0.628	1.593
SAT Verbal	-0.0008	0.0006	0.156	0.999	0.759	1.318

Model Likelihood Ratio $X^2=65.7384$, $df=6$, $p<0.0001$

Hosmer-Lemeshow Goodness-of-Fit Test $X^2=7.0642$, $df=8$, $p=0.5297$

Note: p-values in bold are significant at the 0.05 α -level

As with ordinary linear regression, multicollinearity is a concern with logistic regression and occurs when there are strong interdependencies among the independent variables (Allison, 1999). When multicollinear effects are present within a model, parameter estimates become unstable due to the high level of correlation between independent variables. (Allison, 1999). To diagnose for any possible multicollinear effects, an equivalent linear regression model is constructed from the logistic model using the VIF (variance inflation) and TOL (tolerance) options. Low tolerance values (<0.4) correspond to high multicollinearity. The variance inflation is the reciprocal of the tolerance value and is a measure of how exaggerated the variance of the coefficient is in comparison to if it were not correlated with any other variables in the model (Allison, 1999). In the logistic regression analysis, acceptable tolerance values (>0.4) were seen for all independent variables (Table 4.2) eliminating multicollinearity as a possible effecter within the logistic model.

Table 4.3 Results of Harrington and Schibik (2004) Logistic Regression Model One-Semester Student Retention

Parameter	Parameter Estimate (β)	Standard Error	p-value	Log Odds Ratio
SAT Verbal	0.000	0.001	0.626	1.00
SAT Math	0.002	0.001	0.001	1.002
Hours Attempted	0.122	0.011	0.000	1.13
Gender (1=male)	-0.285	0.086	0.001	0.752
Exposure (2 nd)	-0.185	0.128	0.148	0.831
Exposure (3 rd)	-0.255	0.133	0.054	0.775
Exposure (4 th)	-0.382	0.141	0.007	0.683
Intercept	-0.547	0.325	0.093	

Hosmer-Lemeshow Goodness-of-Fit Test $X^2=9.722$, $df=8$, $p=0.285$

Note: p -values in bold are significant at the 0.05 α -level

The logistic regression results of the Harrington and Schibik (2004) study are presented in table 4.3 and show notable difference from this analysis. Contrary to the results of the Harrington and Schibik analysis, this research did not find SAT Math to be statistically significant ($p=0.725$) in predicting retention based upon part-time faculty exposure. As found in the Harrington and Schibik study, this analysis supports that the parameters: gender ($p<0.0003$), number of hours attempted by the student ($p<0.0001$), and the percent to which a student was exposed to part-time faculty ($p=0.049$) all had a statistically significant effect upon predicting retention.

The results of the logistic regression show that of the six parameters modeled, high school gpa, total first year hours attempted, gender, and the percent instruction received from part-time faculty significantly contributed to predicting second year retention. Of the four significant model parameters, only high school gpa (odds ratio=1.443), and gender (odds ratio=1.328) had a substantial impact upon the odds of being retained into the second year of college. Any possible multicollinear effects between the independent variables can be ruled out because of the acceptable tolerance values derived from the linear regression analysis.

Chapter Five

Conclusion

Introduction

The use of logistic regression for predicting a dichotomous categorical outcome from a collection of independent variables has become an accepted practice in the social sciences. This research used logistic regression to explore the impact of several demographic variables in combination with exposure to part-time instructional faculty on second-year retention. As the use of part-time faculty continues to grow within institutions of higher education, quantitative research of this nature becomes an important tool for administrators making educational policy decisions.

Research Question

What is the quantitative impact of part-time faculty instruction upon first-semester freshman retention?

Given the findings of this research, it is reasonable to conclude that while the extent to which a student is exposed to part-time faculty during their first year of college plays a statistically significant roll in predicting retention, it clearly holds little or no substantive impact upon the retention outcome. The results of the logistic regression (table 4.2) show that of the six parameters modeled (gender, high school gpa, total hours attempted, % exposure to part-time faculty, SAT verbal, and SAT math), only high school gpa (odds ratio=1.443) and gender (odds ratio male vs. female=1.328) substantially impact the outcome of a student being retained into the second year.

These findings contradict in part, those of Harrington and Schibik (2004) who found SAT math score, total hours attempted, gender, and a high level (75% or more) of part-time faculty exposure all to be significant parameters for predicting retention. According to the Harrington and Schibik study, students who had 75% or more of their course work taught by part-time faculty had a 32% greater chance of not being retained. They also found male students were 25% more likely to not be retained than females. In contrast, this research found that males were 33% more likely to be retained than females. It should also be noted that Harrington and Schibik found the SAT math score a significant predictor of retention but the parameter had almost no impact upon the retention outcome. This research however, found that neither SAT verbal ($p=0.156$) or SAT math ($p=0.725$) scores had a significant predictive roll in first year retention. In addition, Harrington and Schibik also concluded that while the total hours attempted by a student significantly contributed to the ability of predicting retention, this variable had no significant impact upon the odds of being retained. This research supports that conclusion, the total hours attempted by a student during the first year had a significant ($p<0.0001$) predictive ability on the retention outcome however, the odds of retention increased only 1.088 times for each one hour increase in the total number of hours attempted during the first year (Table 4.1).

While some of the contradictions between the Harrington and Schibik study can possibly be attributed to differences in institutional type (comprehensive Midwestern university vs. large, Southeastern research-extensive) research by Pascarella and Terenzini (2005) suggests otherwise. Pascarella and Terenzini (2005) state,

The overall weight of evidence suggests that the net effects of institutional type on students' general cognitive development are generally trivial in magnitude or inconsistent (pg. 170).

Because institutional type and cognitive development do not appear to be correlated it does little to support the notion that differences between this research and the Harrington & Schibik study are a result of differences in institutional types since educational persistence and cognitive development are correlated (Pascarella & Terenzini 2005; Tinto, 1993). The most likely cause for the difference in findings between the study is the use of quartiles by Harrington and Schibik to quantify part-time faculty exposure. By using this technique, Harrington and Schibik generate clusters within the data because exposure to part-time faculty is collapsed into only four possible categories.

Table 5.1 Results of Harrington and Schibik (2004) Quartile Demographics for the Fall 2000 Cohort (n=1885)

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Gender (0=female, 1=male)	0.40	0.37	0.43	0.49
SAT Total	1013	975	920	855
ACT Composite	22.4	20.7	18.9	18.4
Fall 2000 Hours Attempted	13	13	13	11
Fall 2000 Hours Earned	10	10	8	6
Fall 2000 GPA	2.39	2.46	2.23	1.36

Source: Harrington and Schibik (2004). Caveat emptor: Is there a relationship between part-time faculty utilization and student learning outcomes and retention? *AIR Professional File*. No. 91, Spring. Association of Institutional Research: Tallahassee.

An examination of the quartile demographics (Table 5.1) from the Harrington and Schibik study clearly shows that poorly performing students are clustered with the

highest exposure to part-time faculty. This fact makes it questionable as to whether or not the outcome of not being retained in the Harrington and Schibik study is a result of a high level of part-time faculty exposure or perhaps this finding is a residual methodological effect. The use of a ratio scale for measuring part-time faculty exposure is more appropriate than quartiles because it allows greater quantitative detail than an ordinal scale like quartiles (Hatcher and Stepanski, 1994). In addition, the Harrington and Schibik study fails to clearly define what constitutes part-time faculty status, making it difficult to compare the results of the two studies.

One of the clearest findings of this research study is the lack of quantitative data regarding the effects of part-time faculty instruction upon student retention. In 1978 David Leslie wrote,

As can be readily inferred from the brief descriptions of possible courses of action, there is too much ignorance about both part-time faculty and knowledge production to make confident decisions (p. 109).

Sadly, some twenty-five years later this statement still seems to hold true. Given that in 2001 approximately 45% of all faculty in the United States of America were classified as part-time (NCES, 2003); this void within the literature is troubling. Because of the ever-increasing role that part-time faculty are playing in the education of students and the apparent lack of knowledge regarding possible adverse effects, one is left wondering - are administrators doing their students a disservice?

The results of this research suggest that the use of part-time faculty to instruct first-year students has little or no adverse effect. This research found that a typical first-year student entering NC State University, a large, research-extensive institution,

between 1999 and 2003 received nearly one-third of their total first-year instruction from part-time faculty and graduate students (Figure 4.3). However, instruction by part time-faculty only decreased the odds of being retained by less than 1% for each hour of exposure. It should be emphasized, that while this research found no statistical correlation between exposure to part-time faculty and student retention, it in no way addresses any difference in quality of instruction between part-time and full-time faculty. In addition, the large size of the analysis population ($N=14,476$) gives the logistic analysis enormous statistical power. With this level of statistical power, significant parameters can be detected that have little or no practical meaning. Exposure to part-time faculty is an excellent example of this point. The parameter is statistically significant ($p=0.0486$) but, the odds ratio (0.996) of being retained experiences no practical change for each 1% increase in part-time faculty exposure.

It would also be of scholarly merit for further studies to investigate a potential quantitative difference between the quality of instruction received from part-time faculty compared to that of full-time faculty. As the literature review in this research illustrates, claims of a difference in instructional quality are quite common however, little quantitative data exists to support them. Further research in this field would also do well to examine any potential differences in retention between first and second semester (Harrington & Schibik) compared to retention between first and second year as in this research. Without further research, it is unclear if differences between the Harrington & Schibik study and this research can be attributed to differences in the study's retention time points.

Given the inherent instability in long term institutional planning and the negative public image associated with low retention rates, administrators would be well served in investing further resources in evaluating the impact of part-time faculty upon student retention. Retention is a complex issue and while it may be difficult to describe the impact of broad demographic parameters such as gender, race, ethnicity and age, it certainly should not be difficult to assess the impact of part-time faculty. Because most colleges and universities have some type of institutional research office, quantitative data regarding student-faculty interaction, like that used in this study is typically readily available. Administrators and educational policy makers need to realize that as the use of part-time faculty grows, so should our understanding of this valuable resource.

REFERENCES

- Allison, P. D. (1999). Logistic regression using the SAS system: theory and application. SAS Institute Inc, Cary, NC.
- Baum, S., & Payea, K. (2003). Trends in college pricing, 2003. College Board Publications, New York, NY.
- Bean, J. P. & Kuh, G. D. (1984). The reciprocity between student-faculty informal contact and academic performance of university undergraduate students. *Research in Higher Education*, 21(4), 461-77.
- Blackburn, R. T. (1978). Part-Time Faculty and the Production of Knowledge. In Leslie, D. W. (Ed.), *Employing part-time faculty* (pp. 99-111). San Francisco: Jossey-Bass.
- Cabrera, A., Castaneda, M. B., Nora, A. & Hengstler, D. (1992). The Convergence between two theories of college persistence. *Journal of Higher Education*, 63(2), 143-64.
- Chickering, A., W. (1969). *Education and identity*. San Francisco: Jossey-Bass.
- Endo, J. J., & Harpel, R. (1982). The effect of student-faculty interaction on students' educational outcomes. *Research in Higher Education*, 16(2), 115-138.

- Friedlander, J. (1980). Instructional practices of part-time faculty. *New Directions for Community Colleges*, 8(2), 27-36.
- Gaff, J. G., & Gaff, S. (1981). Student-Faculty Relationships. In Chickering, A. W. & Associates (Eds.), *The modern American college* (pp. 642-656). San Francisco: Jossey-Bass.
- Gappa, Judith M. (1984). *Part-time faculty: Higher education at a crossroads* (Report No. 3). Washington, D.C.: Association for the Study of Higher Education.
- Gappa, J. M. and Leslie, D. W. (1993). *The invisible faculty: Improving the status of part-timers in higher education*. San Francisco: Jossey-Bass
- Haeger, J. D. (1998). Part-Time Faculty, Quality Programs, and Economic Realities. In Leslie, D. W. (Ed.), *The growing use of part-time faculty: Understanding causes and effects*. (pp. 81-88). San Francisco: Jossey-Bass.
- Harrington, C., & Schibik, T. (2004). Caveat emptor: Is there a relationship between part-time faculty utilization and student learning outcomes and retention? *AIR Professional File*. No. 91, Spring. Association of Institutional Research: Tallahassee.

- Hatcher, L., & Stepanski, E. J. (1994). *A step-by-step approach to using the sas system for univariate and multivariate statistics*. SAS Institute Inc., Cary, NC.
- Hosmer, D. W., Lemshow, S. (2000). *Applied logistic regression, Second edition*. John Wiley & Sons, INC. New York.
- Jacobs, F. (1998). Using Part-Time Faculty more Effectively. In Leslie, D. W. (Ed.), *The growing use of part-time faculty: Understanding causes and effects*. (pp. 9-18). San Francisco: Jossey-Bass.
- Knapp, L.G., Kelly, J. E., Whitmore, R. W., Wu, S., Hu, S., Levine, B., Burton, B., Susan G. (2003). *Staff in Post-Secondary Institutions, Fall 2001, and Salaries of Full-Time Instructional Faculty, 2001-02. E.D. Tabs*. National Center for Education Statistics No. 2004-159. Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement.
- Leslie, D. W. (1978). Employing part-time faculty. *New Directions for Institutional Research*, No. 18, San Francisco: Jossey-Bass.
- Leslie, D., Kellams, S., & Gunne, G. M. (1982). *Part-time faculty in American higher education*. New York: Praeger Publishers.

Leslie, D. W. (1998). The growing use of part-time faculty: understanding causes and effects. *New Directions for Institutional Research*, No. 104, San Francisco: Jossey-Bass.

Leslie, D. W. & Gappa, J. M. (2002). Part-time faculty: competent and committed. *New Directions for Community Colleges*, No. 118, 59-67.

Levitz, R., & Noel, L. (1990). Connecting students to institutions: Keys to retention and success. *In Retention Resources: The 1990 National Conference on Student Retention in Washington, D.C.* (pp. 8-14). Iowa City, IA.: Noel*Levitz Centers.

Lucas, C. J. (1994). *American higher education: A history*. New York: St. Martin's Griffin.

McCabe, R. H., & Bezner, J. L. (1978). Part-Time Faculty in Institutional Economics. In Leslie, D. W. (Ed.), *Employing part-time faculty* (pp. 59-72). San Francisco: Jossey-Bass.

Pascarella, E., & Terenzini, P. (1977). Patterns of student-faculty informal interaction beyond the classroom and voluntary freshman attrition. *Journal of Higher Education*, 48(5), 540-552.

Pascarella, E. T. (1980). Student-faculty informal contact and college outcomes. *Review of Educational Research*, 50(4), (pp. 545-595).

Pascarella, E. T. & Terenzini, P. T. (2005). *How College Affects Students: A Third Decade of Research* (2nd ed.). San Francisco: Jossey-Bass.

Plecha, M. (2002). The impact of motivation, student-peer, and student-faculty interaction on academic self-confidence. Paper presented at the annual meeting of the American educational research association, New Orleans, LA.

Stodt, M. M. (1987). Educational Excellence as a Prescription for Retention. In Stodt, M. M. & Klepper, W. M. (Eds.), *Increasing retention: Academic and student affairs administrators in partnership. New Directions for Higher Education*, 15(4) (pp. 5-13). San Francisco: Jossey-Bass.

Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition* (2nd ed.). The University of Chicago Press.

Tuckman, H. P. (1978). Who is part-time in academe? *AAUP Bulletin*, 64, 305-315.

Tuckman, H. P., & Pickerill, K. L. (1988). Part-Time Faculty and Part-Time Academic Careers. In D. W. Breneman & T.I.K Youn (eds.), *Academic labor markets and careers*. New York: Falmer Press.

Appendix A

National Demographic Statistics for Part-Time Faculty

Total (Weighted Sample Sizes (n/1,00s))	456.7
<i>Gender</i>	
Male	239.2
Female	217.5
<i>Age</i>	
Under 35	56.3
35-44	119.1
45-54	154.8
55-64	83.4
65-70	27.2
71+	16.0
<i>Marital Status</i>	
Single, never married	59.2
Married	331.8
Lining in marriage-like relationship	8.6
Separated, divorced, or widowed	57.1
<i>Highest Degree</i>	
Doctorate	80.5
First-Professional	41.5
Master's	239.4
Bachelor's	69.6
Associate's	12.9
Less than an associate's degree	12.6
<i>Race/ethnicity</i>	
White, non-Hispanic	397.6
Black, non-Hispanic	20.6
Asian, non-Hispanic	13.9
American Indian, non-Hispanic	low n
Pacific Islander, non-Hispanic	low n
More than one race, non-Hispanic	2.7
Hispanic	18.0

Source: NCES, National Study of Postsecondary Faculty: 1999 02/08/2005

Appendix B

Institutional Rates of First-Year Attrition among Full-Time Students by Institutional Selectivity

Institution Selectivity		Mean (%)
Highly Selective	SAT > 1100	8.0
Selective	SAT 931-1099	17.5
Traditional	SAT 801-930	26.4
Liberal	SAT 700-800	32.9
Open	SAT < 700	45.5

Source: American College Testing Program, 1992.