SHORTCHANGING THE VULNERABLE?
AN EXAMINATION OF THE EFFECT OF CONTINGENT FACULTY ON REMEDIAL STUDENT SUCCESS

By

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DISCLAIMER

The conclusions of this research do not necessarily
reflect the opinion or official position of the
Texas Education Agency,
the Texas Higher Education Coordinating Board,
or the State of Texas

To Al and Sweetcheeks

and

To NCLB, the Girls' Club, and Team TX

With love and gratitude

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CHAPTER I

INTRODUCTION

Access to higher education remains a salient issue in the United States likely because having a bachelor's degree is widely recognized as a piece of the American dream and the key to attaining or sustaining middle class status. Higher education degrees offer benefits to both individuals and society in the forms of human and social capital. For individuals, there is a positive correlation between education and earnings. This correlation is evident for both genders and all racial groups. Although there are high monetary and opportunity costs to postsecondary education, the return to investment outweighs these over time (Baum & Payea, 2004). Initial investments in college education are usually recouped in a fairly short period of time. Additionally, for individuals, some college is better than none, but there is a significant sheepskin effect with earning a bachelor's degree (Baum & Payea, 2004). Students also benefit from the access and interaction with diverse peers, strengthening their social networks.

For society, an increase in human capital among its citizens is associated with lower levels of poverty and unemployment. Educated individuals are less likely to depend on government programs and contribute more to the tax base. College graduates also have lower rates of incarceration and higher levels of personal health (Baum & Payea, 2004). Finally, civic participation benefits when the population is better educated. This includes increases in volunteerism and voting (Skocpol & Fiorina, 1999; Putnam, 1995). The benefits of higher education also transfer to the next generation. Children of college graduates have higher levels of school readiness than those of non-college graduates. In

high school, even after controlling for income, students whose parents have a college degree are more likely to attend college than students whose parents did not graduate from college (Baum & Payea, 2004).

President Obama's higher education initiatives center on ensuring that by 2020 the United States has the highest proportion of students graduating from college in the world. Further, he proposes that upon graduation from high school, all citizens be prepared to enroll in at least one additional year of schooling, be that in higher education or a job training program (Office of the Press Secretary, The White House, 2009). As community colleges are the gateway to higher education for the majority of students, and as they are also a primary source of certificates and coursework for vocational careers, if the President's goals are to be realized, it is the community colleges' burden to accommodate and facilitate coursework completion for students in higher education that may be lacking the appropriate preparation to succeed.

The President's postsecondary plan echoes those of his predecessors and of higher education policy making more generally. When regulating higher education, both state and federal governments have prioritized access. Students, regardless of background or preparation, have a pathway for pursuing higher education, the open-admissions institution (Bastedo & Gumport, 2003). This open access can be at both the two- and four- year institutions, with two-year community colleges likely to have articulation or credit transfer agreements such that there is a pathway to the baccalaureate degree if the student chooses to strive for one. It appears as if higher education is open to all those that wish to enter, but what happens when a student enters college without the necessary preparation to be successful? For this circumstance, colleges have implemented remedial, also called developmental, education courses to fill the void.

One of the central debates in higher education today is the impact of the increasing usage of non-tenure track and part-time faculty on student outcomes. This group of non-tenured faculty is referred to in the literature as contingent faculty, as a nod to their reliance on contract renewal. Some argue that the switch to more non-tenured positions saves the institution money and provides the same product for students, while others argue that the tenure system is necessary to ensure academic freedom which benefits students and faculty alike (Schuster, 2003; Thompson, 2003). The increase in part-time faculty is generally regarded as negative by faculty members and not beneficial to students (Benjamin, 2002). Public colleges and universities are under constant pressure to reduce budgets and diminish spending. One of the few ways to cut the personnel budget is to transition more faculty positions from those including tenure to ones that are on a contract only basis. But, does this come at the expense of student success? The purpose of this study is to evaluate the impact of an institution's faculty characteristics on student outcomes in general, and more specifically for remedial education students.

When it comes to addressing the effect of college on students, the majority of research is conducted on traditional age students at four year colleges and universities (Strage, 2008). More recently, researchers are paying attention to the effects of college on racial and ethnic minorities and those students in the community college. Lesser attention is given to the college's most vulnerable students, those assigned to remedial education. Studies concerned with remedial education students are mostly regression discontinuity designs testing the effect of assignment to remedial education on various outcome measures (Jacob, 2004; Moss, 2006; Lesik, 2006; Calcagno, 2008; Calcagno & Long, 2008). While these studies often include controls for some individual and institutional characteristics, measuring their impact on remedial education students was not the primary

objective. This study breaks new ground by studying the impact of institutional characteristics, specifically those relating to faculty, on remedial education students.

This research seeks to uncover if institutional resource distribution, specifically the percentage of adjunct versus tenure-track faculty, part-time versus full-time faculty, and education level of faculty members affects the success of students who enter college needing remedial assistance. Success here will be defined as associate's degree completion for those who begin at the community college; and bachelor's degree completion for students who begin at both 2- and 4- year institutions.

The usage of aggregate faculty characteristics at the course level is new to the literature. Studies before this have had the ability to match student to professor (Bettinger & Long, 2005; Calcagno, 2007; Calcagno & Long, 2008). The data set utilized here does not enable those capabilities, but I have embarked on this project anyway because I believe that faculty members can shape the campus environment. Baldwin and Chronister (2001) discuss the potential perils of contingent faculty. Contingency supports less time spent on campus and less opportunity for student and faculty interaction. In this analysis, looking at the rates of contingency for students taking specific curricula is like conceptualizing the ambience experienced by the student on the campus. Different types of faculty may be assigned to teach different types of courses (remedial versus college-level) so the campus ambience experienced by remedial students who are likely to be assigned to contingent faculty is going to be markedly different than a student taking a college-level curriculum with tenured faculty.

A campus ambience and having a faculty dedicated to making the ambience favorable to student learning is critical for student success. Faculty members are the primary guides to academic and social integration the first semester (Braxton &

McClendon, 2002; Kennedy, Sheckley & Kehrhahn, 2000; Mangold et al., 2003; Wycoff, 1988) and academic and social integration can facilitate persistence and completion. The importance of faculty is supported in the K-12 education literature, which notes both the importance of teachers to student learning, and also the great variation in teacher quality (Boyd et al., 2008; Sanders & Rivers, 1996; Aaronson, Barrow, & Sander, 2007; Rockoff, 2004; Rivkin, Hanushek, & Kain, 2005; Kane, Rockoff, & Staiger, 2007).

I hypothesize that students will have more favorable outcomes when the majority of the faculty at their institution are full-time and tenure-track for the following reasons: tenure-track faculty will likely have more experience and a greater commitment to the profession; tenure-track faculty are also likely more committed to the institution; the institution invests more resources into tenure-track faculty such as offices, secretaries, and supplies; adjunct faculty are less likely to be on campus to hold office hours or advise students; and adjunct faculty are more likely to have jobs at other institutions or other work commitments. Further, it is common for adjunct faculty to be left out of important department and institutional meetings and decisions, further alienating them from their peers (Benjamin, 2002).

From the perspective of the student, tenure-track faculty members have a greater knowledge of institutional resources that may be of assistance to the student. Also, these faculty members are more likely to have a presence on campus and be more available for meetings and extra help if the student asks. This seems to be especially important for the developmental student, who may need a personal guide to be successful in higher education.

Arguably, however, it will be the most skilled teachers who will have the most success helping remedial students gain the knowledge that they require to be successful.

Since the tenure-track faculty member is expected to be engaged in a program of research, teaching and service, teaching may go by the wayside in favor of the other areas. In this respect, adjuncts may have an advantage. They are oftentimes hired purely for teaching, and if they are particularly skilled, students could benefit from their service (Jaeger, 2008; Schuster & Finkelstein, 2006). Also, it may be the case that adjunct faculty are professionals in their field and college teaching is a way to give back to the profession. Students may benefit highly from someone in touch with the day-to-day landscape of the profession to make decisions on if that career path is right for them. A contingent faculty member is likely to also have many job connections, so the students may be in a better position to transfer their degree into practice having made connections from faculty members in the workforce (Jaeger, 2008).

The setting of this study is the public institutions of higher education in the state of Texas. Texas is the ideal state to research contingent faculty members and remedial education for multiple reasons. First, Texas has seen large amounts of growth in their higher education landscape of late (THECB, 2010). This growth has necessitated an expansion of the higher education infrastructure to include many more institutions. Most of these are of a non-selective nature, meaning all high school graduates qualify for admission (THECB, 2010). Consequently, there are large populations of remedial education students seeking higher education. Further, Texas, like most other states is budget conscious. Contingent faculty members may be one option utilized to reduce personnel costs.

Overall, the effect of contingent faculty members on student success does not anecdotally appear to have either a clear positive or a clear negative direction. This study builds on those of the past to add to the literature of faculty outcomes on student success.

It is unique for its focus on remedial education students and use of hierarchical linear modeling.

Research Questions

This study will answer the following questions for public institutions in the state of Texas.

For universities and community colleges:

1. What changes to the type of faculty who teach remedial coursework occurred between 2000 and 2004 in Texas institutions?

For students who begin at the community college:

2. What is the impact of rank (professor or tenure track; not professor; or no ranking system) on the success of remedial students?
3. How does the percentage of part-time faculty who teach remedial coursework at an institution affect the success of that institution's remedial students?
4. What is the impact of the average educational level of faculty on remedial education students in the community college?
5. How does the effect of (a) tenure track, (b) part-time faculty and (c) education level differ for remedial students and their non-remedial peers?

Successful outcomes include:

- Completion of an associate's degree within in three years of the first fall enrollment

- Completion of a bachelor's degree within six years of the first fall enrollment

For students who begin at the four-year college:

6. What is the impact of rank (professor or tenure track; instructor (contingent); or TA) on the success of remedial students?

7. How does the percentage of part-time faculty who teach remedial coursework at an institution affect the success of that institution's remedial students?

8. How does the effect of (a) tenure track and (b) part-time faculty differ for remedial students and their non-remedial peers?

Successful outcomes include:

- Completion of a bachelor's degree within six years of the first fall enrollment

Overview of Remaining Chapters

The organization of the remainder of this dissertation is as follows. Chapter II is a review of the relevant literature regarding contingent faculty and developmental education students. Over the course of the review, an argument is made that the most vulnerable students, those requiring remediation, are oftentimes neglected in the literature. Further, these students could be the ones for which a highly competent faculty would garner the greatest returns. Chapter II also explores what is known to date about the impact of faculty and institutional characteristics on different student success outcomes. The

chapter concludes by restating the research questions that will be addressed in the dissertation.

Chapter III outlines the research methodology to be utilized in the dissertation. An introduction to the dataset will be followed by a discussion of the construction of the sampling frame. Also included is an outline of all the variables utilized in the analysis. Following is the data analysis plan with the statistical methods that will be utilized to estimate the impact of faculty characteristics on remedial education students.

Chapter IV contains the results of the analysis for the students who begin at the community colleges. The findings for research questions 1-5 are in Chapter IV. This is followed by Chapter V which is the results for the students who begin college at four-year schools. This chapter contains the results of research questions 1 and 6-8.

This dissertation concludes with Chapter VI. Chapter VI is a summary of the findings and a discussion of the results. There is also a disclaimer regarding the limitations of this study. Finally, policy and practice recommendations are discussed along with implications for future research.

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Introduction

The goal of this chapter is to review the relevant areas of literature which serve as the foundation of this study. First, the chapter begins with a presentation of the research related to the impact of contingent faculty on college campuses. The contingent faculty section addresses both the merits and disadvantages of the abundance of contract employees both theoretically and empirically. Next, the chapter addresses the remedial, or developmental education, student. The chapter gives a general overview as to the prevalence of remedial education and the typical process a remedial education student will face in college. Further the chapter will outline the state and institutional policy decisions that have been made regarding remedial education students. Finally, the chapter concludes with a restatement of the research questions.

Research on Contingent Faculty

Studying the potential impact on student outcomes evolving from the overabundance of contingency faculty in U.S. postsecondary institutions has a lengthy tradition. As the composition of the student body has changed, so has the composition of the faculty entrusted with teaching them. Contingent faculty are as diverse as both their institutions and disciplines and these faculty cannot be described nor recommendations

delivered without an appropriate analysis of context. This section will assess the current utilization of contingent faculty in tertiary institutions. A particular eye will go toward synthesizing research on the costs and benefits that contingency faculty have on students. This focus is important because states are increasingly holding institutions accountable for various student outcome measures such as retention and graduation rates. (McLendon, Hearn & Deaton, 2006) Undergraduates are increasingly being taught by contingent faculty members with little known about the overall effect. As little research exists regarding the effect of faculty on remedial education students, all student outcomes will be given here with inferences made as to how the effect would translate to those needing extra academic assistance.

Before introducing research, I will provide a definition to guide the discussion of contingent faculty. Contingent faculty can be full- or part-time teachers at any level of postsecondary institution. Their common thread is that the institution makes no long-term commitment to them (AAUP, 2008). These faculty are referred to as adjuncts, lecturers, and at the most impersonal, staff (Baldwin & Chronister, 2001). The research differs on whether or not graduate students are lumped into the category of contingent faculty (Benjamin, 2003a). For these purposes, graduate students will not be included unless specifically mentioned.

The lack of a long-term commitment to contingent faculty is troublesome for a few reasons. First, the lack of job security limits the contingent faculty's ability to have a career comprised of all three of the dimensions of university appointment: teaching, research, and service (Townsend, 2003). Security, or lack thereof, can also threaten the contingent faculty's academic freedom. One who is beholden to a term or yearly contract is not as free to speak their mind in the classroom (Thompson, 2003). Further, contingent

faculty are rarely afforded the benefits, both monetarily and otherwise of their tenured peers. Contingent faculty can also be excluded from the university governance structure and decisions on curricular matters (Thompson, 2003).

Non-tenure track appointments have a storied history in colleges and universities. Benjamin (2003) explains the use of non-tenure track faculty was actually very common at the beginning of the twentieth century because institutions were focused primarily on teaching. When institutions began to differentiate between research and teaching was when the designation of tenure track versus non-tenure-track began to take hold. The G.I. Bill and the introduction of higher education to the masses necessitated more teachers (Benjamin, 2003). The tenure system applied to the scholar-teachers and others not performing research became contingent faculty. The chasm between researchers and teachers grew as the number of community colleges grew, and now the gap exists within institutions between those who are tenured and have the full responsibilities of research, teaching and service, and those who are untenured and have a more limited role (Thompson, 2003).

With mention of a chasm and non-tenured faculty appearing to be cast as second-class faculty of sorts, one might be led to believe that they are small in number. This is not the case. From 1975 through 2005, the number of full-time tenured faculty declined from 36.5% of the faculty to 21.8% of faculty (AAUP, 2009). The decline in tenured and tenure-track faculty is matched and surpassed by the increase in both full-time and part-time non-tenure-track professors. Full-time non-tenure-track faculty now comprises 20% of the faculty in U.S. institutions and part-time non-tenure-track faculty comprises 48% of the faculty (AAUP, 2009).

What has contributed to this meteoric rise in contingent faculty? Baldwin and Chronister (2001) attribute this growth to factors internal and external to the institution. Internally, they cite the rising costs of universities. Increasing costs of faculty salaries, benefits, and other institutional needs are not offset by increases in tuition revenues. Contingent faculty are of lower cost than their tenured peers which makes them an attractive cost saving measure (Benjamin, 2003). Further complicating this, once a position is off the tenure track, the money saved is then reallocated with little hope that position will shift to one with tenure. Tough economic times have also contributed to the increase in contingent faculty. In difficult times trustees and governments can be reluctant to fund tenured faculty time that might be devoted to research. Hiring contingent faculty guarantees money will be spent in the classroom (Thompson, 2003).

Another internal factor that has contributed to the rise in non-tenure-track faculty is the changing nature of the college student (Baldwin & Chronister, 2001). Higher education has become more accessible to all members of the population. There are more students in general and also more non-traditional students wanting to acquire postsecondary education. This, coupled with the rise in students with special needs and the decline of quality secondary education in some areas, means that more is being demanded of professors. In some cases contingent faculty are hired to meet the needs of these new types of students (Baldwin & Chronister, 2001).

It is not just the population of students that is changing; the demographics of the faculty are changing as well (Baldwin & Chronister, 2001). The suspension of mandatory retirement has aged the faculty. Administrators are no longer able to plan for faculty retirement like they could in the past. This uncertainty leads to more contingent faculty. Conditions of the academic labor market have also contributed to this rise. Universities

are churning out more Ph.D. degrees and these graduates are grasping for a place in the academe. A contingent position is as, if not more, attractive than no position at all, so the newest doctorates clamor for these and send the signal that institutions need not offer tenure to attract credentialed candidates.

Internally, contingent faculty members are allowing institutions to be more nimble in adapting to changing revenues, and student enrollments. However, there are also factors external to the institution contributing to the rise in contingent faculty. The first external factor cited by Baldwin and Chronister (2001) is a loss of public confidence and trust. There is an overwhelming public perception that undergraduate education is being sacrificed to research. The public is also inundated with frequent news of tuition hikes and the high cost of a college education and meanwhile parents hear their children are being taught by graduate students. Under these conditions, one can see public perception either tilting toward having only full-time teaching faculty or retaining contingent faculty who focus on teaching and undergraduates.

Other factors influencing the rise of contingent faculty are the decline in government funding and the rise of new technology (Baldwin & Chronister, 2001). Government funding in the areas of capital projects, research and financial aid can diminish in times of economic distress. When institutions have less funding they have to make choices and contingent faculty can be a money saver. In addition, the constant progress in technology requires institutions to invest money in staying up-to-date. This investment can divert funds away from faculty. Also included in technology upgrading is distance learning. Contingent faculty are often retained to teach these courses because institutions are reluctant to hire tenured individuals for a potential fad.

Institutions are also faced with a new competitor. For-profit institutions are aggressively marketing to obtain the potential college students. These institutions do not traditionally offer tenure and are more agile in offering courses that students request through the use of contingent faculty (Shuster & Finkelstein, 2006). This new institutional model resonates with the business people that serve on college and university boards. Tertiary institutions are one of the last bastions of tenure. The modern workplace is one of contingency and those engrossed in business see this model as the most profitable (Baldwin & Chronister, 2001).

It appears as if factors both internal and external to the institution are pointing to the elimination of the tenure system in favor of a more flexible and cost effective contingent faculty system. If this is the case, is this a terrible thing? From the administration's perspective at an institution, probably not, but the real threat of an overabundance of contingent faculty is the threat it can potentially provide to the quality of the undergraduate education. In 1984, the Study Group on the Conditions of Excellence in Higher Education issued their final report detailing qualities that facilitate excellent undergraduate education being student involvement, high expectations, and assessment and feedback. Faculty are vital in all three of these components. However, as the commission states, "Strong faculty identification with the institution and intense faculty involvement with students requires a primary commitment" (p. 36). By nature, contingent faculty do not have a primary commitment from the institution, if the reverse is also true, then use of contingent faculty may be eroding at the quality of undergraduate education.

Empirical research on contingent faculty

This section will review empirical research conducted regarding contingency faculty and their effect on students across institutional types. In general, three different student outcome variables are addressed in the literature: persistence, graduation rates, and student learning. Student outcome variables of persistence and graduation are most popular, probably as a result of the relative ease of acquisition. Bolge (1995) and Umbach (2007) add to the literature by attempting to assess contingent faculty effects on student learning. Studies differ in their focus on part- versus full-time contingency faculty and institutional type, but all serve to expand our understanding of the consequences related to the expansion of non-tenured faculty on students.

One of the first studies to empirically address the issue of the effect of faculty status on student learning was done by Bolge (1995). He randomly sampled 100 students at a community college in New Jersey into two groups. 50 of the students were enrolled in basic mathematics courses taught by full-time faculty members and the other 50 by part-time faculty members. The students were all given both a pre and posttest where no significant difference in the amount of learning between the two groups was found. The study has quite a few limitations. First, there was no differentiation between tenured and non-tenure track professors. Second, the study encompasses only one developmental math course at one community college. It is difficult to generalize these findings, but knowing that in this case student learning is not affected by having a part-time faculty member as a remediation teacher is promising given the shifting nature of the faculty.

Umbach (2007) set out to investigate the impact of the use of contingent faculty on the undergraduate education. Specifically, he set out to answer three research questions. First, he investigates the degree that contingent faculty members engaged students in good practices as compared to their tenured and tenure-track counterparts. Second, he asked to

what effect the proportion of contingent faculty on a campus influences the frequency that faculty engage in good practices. Finally, he wanted to investigate the effect having a contingent appointment varied between institutions and if these differences could be explained by institutional characteristics. He analyzed the Faculty Survey of Student Engagement of 2004 and after narrowing the responses to both full- and part-time faculty members who taught at least one class he had responses from 17,914 faculty members covering 130 institutions.

Umbach (2007) created six composites to embody practices influencing increases in student learning to use as dependent variables. These composites were: interactions with students, course-related interactions, non-course-related interactions, active and collaborative learning techniques, academic challenge, and time spent preparing for class. Umbach used a series of hierarchical linear models to do his analysis and concluded that "contingent status, particularly part-time status, is negatively related with faculty job performance related to undergraduate education" (p. 102). Undergraduates were impacted in the area of faculty interaction most severely. Non-tenure-track faculty interacted with students less outside of class than their tenured or tenure-track peers. This interaction lacked in regards to both academic and nonacademic matters. This is an important conclusion to note because the undergraduate experience is often made richer through interaction with faculty outside of the classroom setting. Students need faculty to advise on career matters, write letters of recommendation, and further clarify concepts discussed in class. It seems as if students whose teachers are off the tenure track are at a disadvantage to cultivating rich faculty interaction.

The studies of student persistence vary widely on what it means to persist. Persistence can mean taking another course in a subject, continuing on to the next

semester or year, or dropping a class. Harrington and Schibik (2001) examined the relationship between student retention into the spring semester and their having had courses taught by part-time faculty in the fall. The data came from a Midwestern comprehensive university and was available for 7,174 first-time freshmen from 1997 through 2001. One of the first factors the authors found surprising was that in the first semester at least 85 percent of the students had 75% or more of their course load taught by part-time faculty. Furthermore, they found a negative and significant relationship between the exposure of students to part-time faculty in their first semester of college and their retention to the second semester. Again, these results encompass only one university in the Midwest. However, this analysis points to the potential importance of departmental administration in assigning courses. Further investigation is needed on the effect of part-time faculty on students not in their first semester of college.

In 2004, Bettinger and Long used both value-added and course fixed effect models to quantify how a student's having a course taught by an adjunct professor or a graduate student affected their subsequent enrollment in other courses of that subject and their success in those courses. The authors used a dataset of public four-year colleges in Ohio to conduct the analysis. The dataset includes 12 colleges and almost 25,000 first-time freshmen with student level records of each course they took from the Fall of 1998 through the Spring of 2002 and the instructors who taught those courses. In addition, students were able to be tracked across multiple campuses within the state of Ohio.

Bettinger and Long find that students are less inclined to take another course in a discipline or major in that discipline after having an adjunct or graduate student as a professor as opposed to having a full-time tenure-track faculty member instructing the course. Their findings also indicate a difference by discipline. In the sciences and

humanities graduate assistants and adjuncts had a negative effect on subsequent course enrollment. In the professional fields (business, computer science, and architecture) these types of faculty seem to improve outcomes for students as measured by pass rates of subsequent courses. Furthermore, when the researchers differentiated the adjunct professors and graduate students based on age, they found that much of the negative results were being driven by contingent faculty under the age of forty. Overall, their conclusion was that adjuncts and graduate students have a negative effect on enrollments, but not on student success in subsequent courses. Bettinger and Long caution that before these results are used to understand the tradeoffs between the different types of faculty, the effects of research and service must also be studied.

Eagan and Jaeger (2008) further examined part-time faculty instruction in gatekeeper courses and the effect that having a part-time instructor had on student persistence. Using data from four cohorts of first-year students in four universities (a doctoral-extensive, two doctoral-intensive, and a master's comprehensive) Eagan and Jaeger devised a model with the assumption that students enrolled in gatekeeper courses with part-time faculty will have less opportunity to interact with these faculty and thereby form less of a relationship with the academic culture at the institution. After controlling for student characteristics, the authors found exposure to part-time faculty had a negative effect across institutions on student persistence into the second year. But, the more gatekeeper classes a student completed the more likely they were to persist. This suggests that institutions should not staff introductory courses with part-time faculty.

To lend an international perspective, Hoffman and Oreopoulos (2007) use administrative data from a large Canadian university from 1996 through 2005. The dataset included 41,402 students that enrolled in a full-time undergraduate Arts and

Science program; however this number was reduced to 36,144 students with reported high school grades. These students were all of traditional age, 17-20, during the year of entry. The authors investigate a student's probability of taking another course in the same subject or dropping a course based on instructor characteristics. They found that whether the professor is full- or part-time, tenured or not, or highly paid has no effect on student course patterns. When they evaluated student's perceived effectiveness of the professor this also was found to have no effect on course dropping or future course enrollment. However, the researchers did note that, "subjective teacher evaluations perform much better in reflecting an instructor's influence on students compared to objective characteristics such as rank and salary. This influence, however, is smaller than that implied of elementary and secondary school teachers in earlier research" (p. 4).

Hoffman and Oreopoulos also found that if a student enrolled in a course taught by a lecturer hired full-time to teach, they were .8 percentage points less likely to drop a course compared to a course taught by research faculty. Also interesting from a policy perspective is that students' high school grades quartile seems to have an effect on subject interest. "Lecturers have a significant negative impact on subject interest for students among the lowest quartile, but a positive impact among students from the highest quartile. Compared with full professors, students from the lowest high school grade quartile are less likely to be interested in a subject after taking an introductory course with an assistant or associate professor, or an adjunct or emeritus professor" (p. 17).

Jacoby (2006) recognized that part-time faculty provide nearly all instruction in community colleges and he went about investigating the effect of part-time faculty employment on community college graduation rates. Deciding to investigate this at an institutional rather than student level, Jacoby employed IPEDS data from all 1,209 public

two-year colleges in the United States, Washington, DC, and Puerto Rico for 2001. His models included three different measures of graduation rate as the dependent variables, IPEDS graduation rate, the net graduation rate, and the overall degree ratio. He found that increasing the ratio of part-time professors at two-year colleges had a negative and highly significant impact on graduation rates as measured in all three ways. The author presents an informative table (provided here in Appendix A) where he has separated 935 community colleges from the study (those with adequate data) into quadrants representing low and high part-time faculty ratios and faculty-student ratios. Colleges were separated into thirds in both categories, producing nine groups total, the four extremes of which are presented in the table. Quadrants 1 and 3 show that schools with low part-time faculty ratios have higher graduation rates than then their comparison schools with comparable faculty-student ratios and different part-time faculty ratios. Schools with the highest faculty-student ratios and low part-time faculty ratios have the highest graduation rates at 34.6 percent. To compare, schools in the highest third of part-time faculty ratios and the lowest third of faculty-student ratios have a graduation rate of 21.1 percent.

Following Jacoby, Ehrenberg and Zhang (2004) investigate the effect that non-tenure-track faculty (both full-and part-time) have on the graduation rates of undergraduate students. This study uses data from the College Board from both two-year and four-year colleges and universities across the United States in the years from 1986 through 2001. They also incorporated IPEDS data to quantify the faculty characteristics. The researchers found that either increasing the percentage of faculty that are part-time or increasing the percentage of full-time faculty not on the tenure track is associated with a decline in graduation rates, all else being held constant. The association is larger at public institutions than in private ones and greatest at master's level institutions. They found,

"Other factors held constant, a 10 percentage point increase in the percentage of faculty that is part-time at a public academic institution is associated with a 2.65 percentage point reduction in the institution's graduation rate. Similarly, a 10 percentage point increase in the percentage of full-time faculty that are not on the tenure-track lines at a public college or university is associated with a 2.22 percentage point reduction in the institution's graduation rate" (p. 654). When they differentiated by both type of faculty and type of institution they found that for every 10 percentage point increase in full-time faculty not on the tenure track at master's level public institutions, a 4.4 percentage point decline in graduation rates was found.

Ehrenberg and Zhang (2004) extended their study to account for the differing SAT scores of college students, hypothesizing that those scoring lowest might be impacted most in relying on non-tenured faculty. They found no evidence of SAT scores of students indicating a differentiated impact of non-tenure-track faculty. Further, like previous studies, Ehrenberg and Zhang used their dataset to test the first-year completion rate and return-for-second-year rate of students. They found effects that were not to the magnitude of the graduation rate effects and fewer were statistically significant. The authors note that one of the reasons given for the increase in non-tenure-track faculty is that tenured and tenure-track faculty members are spending more time on research and less time in the classroom. They tested research expenditures and found employing more full-time non-tenure-track faculty is associated with greater research productivity among the tenured and tenure-track (especially in doctoral institutions), but the employment of more part-time faculty had no effect.

One of the few examples of teacher quality in higher education is Carrell and West's 2010 study of entering students at the United States Air Force Academy (USAFA).

Their study, encompassing over 10,000 students and seven academic years, used a HLM model of students within courses within professor. Upon admission students were given an initial placements test and then randomly assigned to a course within their placement level. Carrell and West choose to analyze data from the introductory calculus courses as they are all taught with a common syllabus and assessments. Professors have no latitude in adding assignments and grading is done departmentally. As such, they were able to measure the added value of assignment to an individual professor.

The study capitalized on the selectivity of the USAFA by utilizing a rich set of student covariates collected during the admissions process. These include SAT scores and composites of a student's academic, athletic and leadership aptitude. The latter incorporate items like class rank, high school quality, fitness scores, leadership positions and community service activities. The faculty covariates were rank, gender, education level, years of experience at USAFA and scores on subjective student evaluations.

The dependent variable in this study was a normalization of the percentage of points earned during the semester. The authors measure a professor's effect at two points in time, first, at the end of the initial calculus course and second, at the end of the next course in the sequence. They are able to disentangle the professor's effect on the initial calculus test and their effect on "deeper learning" which they define as information that may not be on the first test, but is beneficial to performance in subsequent courses in the sequence.

The study found that a professor's value added in the initial course is negatively correlated with performance value in the next course. In other words, professors whose students did not do well in the first course performed better in the second course. This

suggests that these professors were teaching not just the skills necessary to pass the initial course, but also subsequent content in that subject.

Discussion on the effect of contingent faculty on student outcomes

The amount of empirical research investigating the impact of contingent faculty on undergraduates has increased markedly over the past decade. This may correspond to the increase in accountability at the primary and secondary levels trickling up to affect higher education, or it could be just an interest in making sure that students are being properly supported at post-secondary institutions. The research performed thus far has found mixed results, and not all studies are comparable as some fail to differentiate between all combinations of full- and part-time, tenured and not, and type of institution. However, there do seem to be some initial conclusions that can be tentatively drawn. First, the importance of the first-year experience for students is fundamental. It is in the initial introductory courses that students are exposed to subject matter for the first time and the instructor delivering the course material has a significant impact. Departments wishing to increase subsequent course taking in their subject matter would be wise to assign introductory courses to full-time, tenured professors, whom initially seem to have the most impact on freshmen. Second, it appears as if graduation rates are indeed impacted by the increase in contingent faculty that institutions are employing. This effect is evident in both the study of all types of institutions by Ehrenberg and Zhang (2004) and Jacoby's (2006) study of community colleges.

The anecdotal evidence would indicate that at some institutions contingent faculty are not incorporated into departments fully and as such their commitment and trust in the institution may not have the motivation to develop (Benjamin, 2003). Whether different

levels of institutional commitment amongst contingent faculty have an impact on their effectiveness as teachers would be fascinating. If there is an impact, then doing more to ensure contingent faculty are a cohesive part of their departments could be beneficial. Important to this would be to differentiate between part- and full-time contingent faculty members.

Both internal and external factors are driving the institutional switch from tenure-track to non-tenure-track faculty. Institutions face uncertain budgets and enrollments and need to be nimble enough to adjust to changes. However, it would appear that institutions are acquiring more contingent faculty with little thought to the impact on students and on the tenure-track faculty. This analysis has ignored the impact of contingent faculty on tenured faculty for the most part to this point. However, it seems that the decline in the number of tenured faculty would require those remaining to spend even more time on institutional committees and other university service. This shift in responsibilities can result in a larger workload overall or a shift toward service and away from research and teaching. If teaching levels decline then it would seem that more contingent faculty would be required to fill the gap, exacerbating the problem. That is not to say that contingent faculty are necessarily bad altogether, but research seems to indicate that the large number of non-tenure track faculty is eroding the postsecondary experience for students. Institutional administrators need to take note of students when deciding the balance among tenure track and non-tenure track faculty, particularly with regards to part-time professors.

It could just be the case that only small changes are necessary to increase effectiveness of contingent faculty. Things like office space and pay for conducting office hours will afford more contact between contingent faculty, students, and other faculty. Regardless, contingent faculty are now structurally a part of American institutions. Our

postsecondary institutions are changing with regards to the composition of both faculty and students. More students than ever are taking advantage of the high quality higher education that America has to offer and it is the responsibility of institutions to make sure that the quality of and access to the undergraduate experience does not erode with the changing composition of the faculty. This might be especially relevant to the academically underprepared students.

Remedial Education

The American higher education system has prided itself on being meritocratic. The open access nature of most colleges and universities can mean that students who are underprepared for the college experience are enrolling anyhow. Greene and Foster (2003) assert that of all high school graduates, only one-third possess the qualifications necessary for a four-year college. This massive unpreparedness is seen as one of the contributing factors to the large proportion of college students who do not obtain a degree (Venezia et al., 2003).

Colleges most commonly deal with incoming student underpreparedness through remedial, or developmental, education. Remedial courses are those administered by the college in order to impart knowledge and skills that should have been conferred at the high school level. These courses may or may not contribute toward credits required for a degree (Attewell, Lavin, Domina & Levey, 2006). Most colleges and universities offer some remedial coursework due to the widespread need. According to NCES (2003), of the freshman class of 2000, 42 percent of community college students and 30 percent of students in four-year schools were enrolled in at least one remedial course in their first fall

semester. These numbers do not capture other students who may need remediation, but do not enroll in coursework in their first semester.

The nature of remedial classes is as diverse as the institutions that offer them. Some colleges choose to centralize all remediation in a center devoted to supplemental academic help, while others charge individual departments with offering the courses. The type of faculty charged with teaching remedial courses also differs within and between institutions. For example, in Texas public institutions, full-time faculty taught 48 percent of remedial math classes. However, college-level math courses were taught by full-time faculty 70 percent of the time (Martorell & McFarlin, 2010). If full-time faculty are more effective teachers, this resource allocation could have major implications for the success of remedial education students.

History of remediation in higher education

Those who espouse a golden age of higher education where all students entering colleges and universities were prepared for the curriculum are mistaken. This time period has never existed in American higher education, and indeed since the founding of the first colleges some form of remedial education has existed (Phipps, 1999; Merisotis & Phipps, 2000). For example, in the 17th century, Harvard College offered Latin and Greek tutoring for those students who did not want to study for the ministry and were unprepared for other fields. The advent of the land-grant colleges in the mid-18th century again saw the offering of preparatory programs for students who enrolled unprepared in reading, writing, or arithmetic for the rigor of the agriculture and mechanical courses being offered at the time (Phipps, 1999). The first official remedial program was in 1849 at the University of Wisconsin in reading, writing, and mathematics (Breneman & Haarlow,

1998). According to Ignash (1997), in 1894 there were about 240,000 students enrolled in higher education in the U.S. and more than 40 percent of them needed and enrolled in a pre-collegiate program of studies.

Underprepared students continued to be an issue into the 20th century, even in the most elite colleges and universities. In four of the Ivy League schools, for example, over half of the students enrolling did not meet entrance requirements and needed to enroll in remedial coursework (Phipps, 1999). As higher education expanded to the masses the need for developmental education did not decrease. The G.I. Bill after World War II enrolled veterans, many who lacked adequate pre-college preparation, and some who needed an academic refresher. Remedial education continued to be in demand following the Civil Rights Act of 1964 and the Higher Education Act of 1965 (Merisotis & Phipps, 2000). These policies created more open admissions policies and funneled funding into giving opportunities to students not traditionally served by higher education.

The attitude that higher education should be available to all continues today as the demand for higher education is at its highest levels. The increased value of a higher education degree in the labor market has made going to college after high school and returning to college to get a degree or obtain additional skills more popular. College has ceased being an activity for the elite and is now virtually expected in many communities.

The scope of remediation today

Using data from the national Postsecondary Student Aid Study administered by the National Center for Education Statistics, Strong American Schools (2008) calculated that in 2004, 34 percent of all students enrolled in remedial courses. At four-year public colleges and universities, 29 percent of students were enrolled in remediation, while in

two-year public colleges 43 percent of students were enrolled in remedial coursework (Strong American Schools, 2008). This represents a growth in students requiring remediation as compared to both 1995 and 2000. In 1995 and 2000, 28 percent of all entering freshman enrolled in remedial courses. The numbers in four-year public colleges were 21 percent in 1995 and 20 percent in 2000. Public community colleges had 40 percent of their entering freshman enrolled in remediation in 1995 and 42 percent in 2000. As demonstrated, the demand for remediation in public institutions has stayed relatively steady if not experienced a small amount of growth in recent years.

In a 2003 report by Parstad and Lewis, they compared the percentage of institutions that offered remedial courses in reading, writing, and mathematics. Overall, between 1995 and 2000 the number of degree granting postsecondary education institutions that enrolled freshman had increased by 240 during this time period, most of these being public two-year and private four-year institutions. However on the whole, the percentage of institutions that offered a remedial course in reading, writing, or mathematics stayed consistent at about 76 percent. One trend that was evident was the decline in the percentage of four-year institutions, both public and private, to offer reading and writing remediation; this follows the trend of four-year colleges eliminating or decreasing their remedial offerings which is increasing in popularity (Parsad, Lewis, & Greene, 2003). Remediation standards differ across two- and four-year institutions. A student may have differing remediation paths depending on the institution chosen (Attewell, Levin, Domina & Levey, 2006).

Despite the expanse of students remedial education assists, the voices opposing it are widespread and strong. One argument against remedial education is that students who require a pre-college course curriculum are lacking in skills and should not have been

admitted to college (Trombley, 1998). This argument is especially touted by those opposing remediation at four-year institutions. A second argument against remediation flows naturally from the first: if colleges are admitting students that require remediation and subsequently administering remedial coursework it is likely that these colleges have reduced the rigor in courses so that the remedial students, otherwise unprepared for postsecondary education, will be able to complete a college degree (Attewell, Lavin, Domina, & Levey, 2006). This argument is supported by the main method of assessing colleges, their persistence or completion rates. If students are initially admitted into an institution, it is to the institution's best interests to shepherd those students through to graduation such that when an examination of the institution's completion rates commences the institution will be looked upon favorably.

In a 2002 report issued by the Center for Community College Policy at the Education Commission of the States, the results of a national survey regarding state policies toward remediation are presented (Jenkins & Boswell, 2002). They found that states are shifting the burden of higher education increasingly onto the community colleges. Arizona, Colorado, Georgia, Florida, Indiana, Kansas, New Mexico, South Carolina, Utah and Virginia all have policies that discourage four-year institutions from offering remedial education. In Colorado, New Mexico and Utah no funding is provided to four-year colleges to offer any type of developmental education. Even stricter, in Louisiana, a 2005 plan prohibits four-year institutions from enrolling students in need of remediation (Jenkins & Boswell, 2002). Massachusetts has capped the percentage of students a university is allowed to remediate at 10 percent. All additional students requiring remediation are sent to the community colleges.

Deil-Amen and Rosenbaum (2002) present a student-centered argument against remediation. They argue students are being placed in so many remedial courses that they spend time and money in college with little or no credits to show. Further, in an effort to remove the stigma from remedial courses, the effort required and potential consequences of remedial education are not adequately conveyed to the student. Bogged down in remediation, students give up and "cool out" of the system (Deil-Amen & Rosenbaum, 2002; Attewell, Lavin, Domina, & Levey, 2006). Another prong of this cooling out argument is that students are not given the information initially to make informed decisions about remedial education placement. As remedial education disproportionately affects students without a familial college going tradition, they are many times unaware that remedial education may not provide credits toward requirements.

Supporters of remedial education programs argue that colleges have been providing developmental education throughout their history and it is a vital component of the recruitment and retention of promising students (Attewell, Lavin, Domina, & Levey, 2006). Students, they argue, have strengths and weaknesses, the former which the college should seek out and the latter which a developmental course can address. A well-structured, effective remedial education program will benefit not just the student, but also the institution as these students will then have the training and skills necessary to succeed and earn a degree.

Attewell and colleagues (2006) note that supporters of developmental education regard the attack on remedial education as an attack on access for students who need colleges the most. Remedial education courses are overrepresented with students from poor performing high schools and poor performing high schools are disproportionately serving poor families and racial and ethnic minorities. With the increasing relegation of

developmental education to community colleges and the traditionally poor rates of transfer and completion at those community colleges, supporters of developmental education argue that denying remedial education is an attack on access to college for the students who need it most (Attewell, Lavin, Domina, & Levey, 2006).

Former president of Harvard University, Derek Bok, contends that universities are better (in 1982) than they were in previous generations in areas such as accessibility for applicants of all socioeconomic levels, quality of students and achievements in scholarship (Bok, 1982). Although it may be true that higher education institutions have become more accessible to the underserved, others argue that in order for minorities and low-income students to truly have access, policies need to be enacted that favor minorities in college admissions in selective institutions. And, in the less selective colleges, programs such as remedial education need to be in place to ensure the underprepared succeed in their coursework and persist onto earn a diploma.

The prerequisite for college going is a high school diploma. The overall high school dropout rate has declined from 14.1% in 1980 to 8.7% in 2007, but differentials exist by race. In 2007, 5.3 percent of white students dropped out of high school (this is the percentage of 16-24 year olds who are not enrolled in high school who lack a high school diploma or GED), 8.4 percent of blacks and 21.4 percent of Hispanic students. Males are more likely to drop out than females (National Center for Education Statistics, 2009). Of the high school completers, the college going rate has been between 62 and 69 percent for the past 10 years. In 2006, 69 percent of white high school graduates went onto postsecondary education. This number was 55 percent for black graduates and 58 percent for Hispanic graduates (National Center for Education Statistics, 2009).

As noted above, though there are benefits to just attending college, the primary incentives come as a result of degree attainment. The most recent 6-year bachelor's degree completion rates provided by NCES show that overall 58 percent of first-time freshman complete a degree. 60 percent of white students, 42 percent of black students and 49 percent of Hispanic students complete in six years (National Center for Education Statistics, 2009). Again, there is a gender gap, with females completing higher education at a rate greater than their male peers at every level except advanced degrees. But why are there differences in higher education completion across groups?

One reason minority students are underrepresented in higher education is because of their lack of academic preparation. Academic preparation is consistently cited in the research as the greatest predictor of a student's enrolling directly in higher education after graduation from high school (Adelman, 2002; Perna, 2005; McDonough & Fann, 2007). But does one attribute the academic deficiency to the individual student or to the structural context of their secondary school? High achieving students from underperforming high schools often find themselves overwhelmed by college material. Scholars find that many high schools that serve low-income and minority students have lower standards and are less rigorous than schools serving more advantaged students (Adelman, 2002).

Inside the high school, minority students are much more likely to be stratified into vocational and non-college preparatory tracks (Oakes, Rogers, Lipton, & Morrell, 2002). Tracking minority students into low rigor courses not only leaves them underprepared academically for college, it sends the message that the high school does not believe that they are able to succeed in college level work so they may as well not even try (Hallinan & Oakes, 1994). The issue of tracking is especially important for students who could be the first generation of their family to attend college. First-generation students lack critical

information regarding how to apply, be admitted to and finance higher education (McDonough, 1997). Notably, these are the students who do not have access to information about college at home and need high schools to be the bridge to postsecondary success (McDonough, 2004).

According to McDonough (2004), the clearest priorities for shrinking the college access gap lie in lowering financial barriers and increasing affordability of college, increasing academic preparation for college, encouraging guidance counselors to make college more of a focus in their advising, focusing schools on a college preparatory mission, and increasing the dissemination quantity and quality of entrance and aid information. With shortages of guidance counselors prevalent in schools that serve the neediest students, there is likely to be little change in the level of information students receive. Unless community groups, dedicated teachers or other members of the student's social network are there to fill the gap, college access will remain a problem.

However, the situation is not all dire. Higher education institutions have made efforts to reach out to minority students and students who are underprepared to enter college in the forms remedial education and affirmative action programs, which target the lowest and highest achieving students, respectively.

Who are remedial education students?

There are many misconceptions about just who are the students enrolled in remedial education courses. One of the most permeating myths about the developmental education student is that they are predominately minorities. In fact, it is estimated that two-thirds of the students participating in remedial education are white while the remaining third are from minority groups with African Americans and Hispanics making

up the majority of this category (Boylan, Bonham, & White, 1999). Remedial education is neither a simple racial issue nor a simple issue of class. The need for developmental course work extends to students from a broad spectrum of backgrounds and experiences. A typology for the different categories of students who are enrolled in remedial education courses has been developed by Hardin (1998). As summarized by Boylan et al. (1999), the seven categories are:

> "*The poor chooser*—those who have made poor academic decisions that have adversely affected their academic future, such as not taking a full battery of college preparatory courses in high school
>
> *The adult student*—those over twenty-five years old who have been out of school for several years and must cope with managing adult roles and responsibilities while adjusting to college-level academic expectations
>
> *The student with a disability*—those who suffer from physical or learning disabilities that prevent them from performing as well in the present as nondisabled students and have often kept them from learning as much as other students in the past
>
> *The ignored*—those whose physical or psychological disabilities or other learning problems have gone undiagnosed or whose learning needs have consistently been ignored in prior schooling
>
> *The limited English proficiency student*—those who acquired their early schooling in foreign countries and, as a consequence, have limited English language and verbal skills to apply to college-level settings
>
> *The user*—those who attend college simply to attain the benefits thereof and who often have no clear academic goals, objectives, or purposes
>
> *The extreme case*—those who have severe emotional, psychological, or social problems that have prevented them from being successful in academic situations in the past and continue to do so in the present" (Boylan, Bonham, & White, 1999, p. 89)

Remedial education programs have the task of now simply bringing students who do not meet the academic standard up to level, but also accommodating the different needs and objectives of the students who are seeking a college education.

Structural concerns

In 1998, it was estimated that public colleges and universities spent between one and two billion U.S. dollars on remedial education each year (Breneman & Haarlow, 1998). Higher education leaders and some lawmakers argue that the money spent on remedial education is essentially the public having to pay twice for a good that the student should have received before arriving at the college campus (Boylan, Bonham, & White, 1999). Although costs of remedial education are indeed a factor for decision makers to consider when making choices regarding the curriculum for underprepared students, is anyone really willing to deny higher education to the bevy of students whose high schools are not adequately serving them? For remedial education to become completely unnecessary, two conditions would need to be facilitated. First, the quality of high schools in the United States would have to measurably improve to provide students with the skills that colleges and universities believe they need to be successful. The only other scenario that can potentially eliminate remedial education from the college sector is to drastically constrict the admission to postsecondary education to students able to pass initial placement exams (Boylan, Bonham, & White, 1999). The consequences of a change in higher education policy of this magnitude would disproportionately affect minorities and the economically disadvantaged and completely discredit the notion of higher education as a public good.

With more students entering higher education without the necessary skills to be successful, remedial education is an increasingly important topic. Public college systems, both state and urban, are contentiously debating where remediation should take place or, if developmental education has a place in college at all. In the United States, public higher

education institutions likely do not operate in solitude. Each institution is likely part of a larger state college system. State university systems are a group of colleges and/or universities supported by an individual state, or the District of Columbia. It is also the case where university systems can have subsystems corresponding to urban area, for example, the City University of New York or the City Colleges of Chicago. State university systems typically exist with a unified governing board holding legal powers with each institution operating with its own identity (Bastedo & Gumport, 2003). Governing boards collect and distribute funding and set policies by which the institutions must abide. Most states support one state university system, but states like California and Texas operate two or more (Bastedo & Gumport, 2003).

Effectiveness of remedial education

One of the reasons that remedial education is such a controversial policy issue in higher education is that there is little definitive evidence that confirms that remedial education is actually remediating students' deficiencies. When a student arrives to college, especially the community college, unprepared, it is the charge of the college to give them the academic skills necessary to be successful in subsequent courses. But is developmental education doing this effectively?

Using a sample of California community college students, Jepsen (2006) compares students who were recommended to and enrolled in remedial education courses versus students who were recommended to remediation and chose not to enroll. He finds that in this situation choosing to enroll in remedial classes garnered positive effects for both college persistence and degree completion. However, a potentially confounding factor

could exist if the students who enrolled in remediation differed from their peers in academic motivation.

Thomas Bailey (2008) investigated this topic using a longitudinal dataset of 250,000 first-time freshmen who were tracked over the course of three years. Descriptively, in this sample, 59 percent of the students were enrolled in at least one developmental education course over the time they were tracked. The major finding of this study was that although many students were referred to developmental education, many did not even enroll in the first course of the sequence and of those who did, a majority did not complete all of the courses for which they were referred. Specifically, of those who were referred to a developmental reading sequence, 44 percent completed the full sequence of courses, and this is about two-thirds of all students who actually enrolled in the first course. In math, the situation is worse. 44 percent of students who enroll in the initial developmental math course complete the full sequence which is 31 percent of the overall population of students who were referred to take developmental math initially (Bailey, 2008). The percent of students completing prescribed developmental education diminishes the greater the number of developmental courses recommended. However, his evidence is not all bleak. Students who completed their recommended developmental course sequence were as likely to graduate as those not recommended for remediation.

One difficulty in assessing the effectiveness of remedial education is that it is difficult to predict how developmental education students, those with weaker skills to begin, would perform without the services provided by the college or university. Overall, students who are enrolled in developmental education are less likely to complete a college degree than those students who are not required to enroll in remedial education, but this is not accounting for the counterfactual. It is difficult to draw conclusions or attribute worse

outcomes to the developmental education courses (Bailey, 2008). Recent research by Paul Attewell and colleagues suggests that after controlling for the entering skill levels of students and their demographic characteristics, students not participating in developmental education and those who do not have statistically significant differences in many educational outcomes in the community college setting (Attewell, Lavin, Domina, & Levey, 2006). Specifically, they found students enrolled in reading remedial education are more likely to attain a degree than those not enrolled in the developmental education reading course, after controlling for demographics. Math developmental education had the opposite effect, the difference in levels of degree attainment between math remedial education takers and those not enrolled was statistically significant, but of a small magnitude.

One of the major difficulties in studies of developmental education is the need to correct for selection bias among those that enroll in developmental education and those that do not. As discussed earlier, placement in developmental education is often a suggestion and not a requirement. The argument surrounding the potential selection bias states that students with more educational capital are likely to be more informed about the course placement process and likely opt out of a developmental education placement. Those lacking such capital may believe that enrolling in developmental education is required to progress, so to begin there are already differences in the students who enroll in remedial education and the ones that do not even after controlling for initial placement score. Recent studies in Florida, Ohio and Texas are attempting to control for the selection bias and what follows are descriptions of the studies and the results.

Eric Bettinger and Bridget Terry Long (2005) analyzed a group of first time degree seeking community college students in Ohio. The authors exploited the knowledge that

community colleges across Ohio had different cutoff scores for developmental education across campuses. They rationalized that a student placed in remedial education at one campus could have the same characteristics of a student at another campus that was not required or recommended to take developmental education (Bettinger & Long, 2005). This relies on the assumption that students do not choose campuses based on their remedial education placement score. This assumption is supported by literature and antidotal evidence that in choosing which school to attend, students prioritize locations close to home over other things like institutional policies toward remediation (Bailey, 2008). In their study of eighteen, nineteen and twenty year olds, they measured two dependent variables. The first was transfer to a four-year campus and the second was number of credit hours earned. In contrast to the Attewell et.al study discussed earlier, Bettinger and Long found encouraging outcomes for math remediation. They found that students placed in math remediation earned about 10 more credit hours than those students not enrolled in remedial education with similar demographic characteristics. Developmental education students in the Bettinger & Long study were also about 15 percent more likely to make the transfer to a four-year college (Bettinger & Long, 2005). They found no statistically significant results for developmental English courses.

In Texas, Martorell & McFarlin (2007) exploited a policy of the Texas Higher Education Coordinating Board of mandatory unified cutscores for developmental education. The study used regression discontinuity to analyze students that fell just above and just below the mandatory remedial education cutoff score rationalizing that students close to the cutoff were essentially the same academically. The dependent variables in this study were grades in the first college-level course taken, probability of passing a college-level course, transferring to a four-year college and completing a degree. The

results were only for developmental education students in math. While the authors found a small positive effect of remedial education in math on the grades earned in the first college-level math course they found no statistically significant results for the other dependent variables (Martorell & McFarlin, 2007).

Like Bettinger and Long, Calcagno (2007) and Calcagno and Long (2008) utilized the regression discontinuity approach in Florida. In math remediation, students scoring just below the test cut score have a slightly better chance of persisting into the second year of college. Developmental math students are also besting their similar non-remedial peers in the total number of credits earned (Calcagno, 2007; Calcagno & Long, 2008). Further, for math remediation, there was no effect on passing or completing additional college-level courses in subject, completing a degree or transferring. In reading, the results were worse. Remedial reading students were negatively affected by their remedial reading coursework. These students were less likely to complete their first college-level reading course, less likely to complete a degree at the community college, less likely to transfer to a four-year institution and earned fewer non-remedial credits than their peers just above the placement test cut score (Calcagno, 2007; Calcagno & Long, 2008).

Research on developmental education that attempts to account for selection bias is only very recently becoming available. Those studies using large scale longitudinal datasets are even less common with the four current exemplars detailed above. What we can take away from the research that has been done applies to students straddling the cut score. The Ohio data finds small positive results while the picture coming out of Texas and Florida shows remedial education contributing little to student outcomes (Bailey, 2008).

Suggestions for remedial education

Thomas Bailey (2008), Director of the Community College Research Center at Columbia University, offers up a few suggestions that may assist colleges and universities in structuring their remedial education programs to best benefit students and for policy makers and the general public, to implement a more cohesive program that can provide measureable results. First, he suggests that colleges need to rethink remedial education to focus on the needs of the student rather than the pre-established sequence of courses. He argues that placement tests, the cutoff scores associated with them, and the subsequent often optional nature of remedial course taking is suggestive of colleges' lack of consensus on what makes a student "college ready" and in light of this lack of an overall definition, colleges should focus on the assistance an individual student needs. Further, he says, the type of remediation two students with identical scores on a placement test may need will likely differ and it isn't clear that traditional whole class teaching approaches are the best way to ameliorate the problem (Bailey, 2008).

Bailey's second suggestion for colleges and universities to improve their developmental education programs is for the colleges to consider abandoning "the dichotomy between developmental and college-ready students" (Bailey, 2008, p. 18). This applies especially to students who are around the arbitrary cutoff score of the placement exam. Students who place a small distance above or below the cutoff are arguably in a similar position academically. In placing students who are below the cutoff into developmental education they are making a dubious distinction and relegating these students to remedial courses without proven effectiveness. To counteract this problem, Bailey supports colleges and universities opening up college-level courses for all students and offering supplemental academic services to those who find themselves with a need.

He cites three different approaches to college-level course inclusion currently being used at community colleges that may prove promising. First, some colleges choose to supplement entry level college courses with the supplemental instruction model which is primarily facilitated through the use of peer tutoring. This is the most common practice. More experimentally, taking a cue from K-12 education, the Digital Bridge Academy at Cabrillo College in Aptos, California uses "a variety of experiential learning and other pedagogic strategies to incorporate learning into the pedagogy" of college- level courses (Bailey, 2008, p. 19). The third approach, dual enrollment, allows high school students to enroll concurrently in college-level coursework. Giving students an early exposure to the rigor that is expected in college is supposed to encourage the students to advanced academic levels. Dual enrollment is a popular topic in higher education today and various studies testing its success on different measures are underway.

Bailey's final suggestion for colleges and universities to improve their developmental education strategies is specific to students who are in need of the most remediation. These student, who would probably not be successful in a more inclusive college-level course should be placed on a plan such that they can become remediated as quick as possible, Bailey says (2008). Speaking from a community college perspective, it is within the college's mission to be open access and offer coursework for all who seek it. However, for underprepared students in need of extensive remediation it is best to make sure that the students complete the entire stream of remediation necessary in the least amount of time for the smallest expense. Some popular ways of accelerating remediation are through the offering of summer bridge programs or the collapsing of a sequence of remedial programs into fewer or one course.

Discussion

The approach of this section has been to present remedial education today in the larger context of its historical past and the issues and factors that frame the developmental education debate. As shown, teaching remedial skills to college students is not a new endeavor. However, the environment that higher education systems have traditionally operated in has changed dramatically over the years. Globalization and advances in technology have altered the demographics and educational expectations of the United States. This along with greater educational accountability as a result of lower education's No Child Left Behind Act and the increased importance in higher education on outcomes based measures, developmental education policies are under strict scrutiny.

Remedial education is ripe for concern because it is at the intersection of access and meritocracy. On one hand, higher education has prioritized access for all students as evidenced by the existence of nonselective community colleges and some four-year institutions. On the other hand, there is a strong ethos in America that if one works hard they can succeed and accomplish their goals. Student affected by remediation are those who are meeting societal expectations and going onto to pursue higher education. However, they find themselves underprepared as a result of faults in the secondary education system and/or personal work habits. Should higher education offer these students services to get them on level with the capabilities to be successful and attain a degree or have these students had their chance and now the onus is on them?

I have found little evidence that the higher education system is willing to abolish remedial education completely. There have been instances where remediation has been relegated to only the community colleges and other places where what used to be

considered remedial is now rebranded and open to all students (examples include peer tutoring and writing centers). But, overall, the notion of higher education being a public good and the tradition of open access means that remediation in some capacity is here to stay. The focus is now increasingly toward being able to assess whether or not remedial and developmental education is achieving its stated aims. More comprehensive data is finally allowing research to quantify how good or bad remedial education programs are doing. With this data, I foresee remedial and developmental education programs undergoing a transformation to implement what are found to be the best practices. I also anticipate an increase in programs that link secondary schools to higher education institutions. Whether in the form of early college high schools, pre college programs, articulation agreements or some other form there is now an emphasis on making sure that students are informed of the expectations and demands of colleges before they arrive.

The benefits of higher education are both personal and societal. It is not an accident when the recommendations of the chief executive of our nation involve postsecondary education. In addition to creating a more educated society overall, higher education is linked to increased tax revenues, lower levels of social ills and greater levels of civic engagement. Personally, higher education is a means of social mobility and an avenue for networking. The "college experience" is a cultural marker of the middle class that the poor and minorities are only recently being allowed to experience. For many, remedial education is the gateway to college. Higher education institutions are already stratified such that allowing remediation in some of the institutions will not impact the rigor of the curriculum that is being offered elsewhere. Remedial education does not have to mean the dilution of rigor. Rather, it can mean the offering of schooling beyond high school to those who need it most.

Contingent Faculty and Remedial Education in Texas

Texas is currently on a quest to bring itself on par to other large states (California, New York, Florida) in higher education achievement. Texas currently falls short of these competitors in enrollment rates, degrees awarded, and nationally recognized programs (Closing the Gaps, 2009). As such, Texas higher education is in a period of growth, and needing more facilities to accomplish its goals. Texas higher education now includes 50 community college districts comprised of 74 campuses and 35 universities. This is a growth of 42 community and technical colleges and 12 universities since 1965 (Closing the Gaps, 2009). Today, higher education enrollment in Texas is almost one million students. This makes it an ideal place to study both faculty and students.

Texas was also at the forefront of data collection in higher education. The UTD-ERC with the Texas Schools Project house and maintain a wealth of data pertaining to the students in Texas. They have differentiated themselves from other data collection projects through their possession of elementary and secondary school data along with higher education and workforce data. I am able to include data from as far back as 2000 in this analysis thanks to the comprehensive nature of Texas data collection.

A wealth of data has provided Texas with a wealth of both internal and external researchers. Their results have prompted Texas to produce a number of reports and policy initiatives as a result of this research. I have provided the latest edition of the Texas Developmental Education Plan (graphic version) in Appendix B to show where Texas is now with regards to developmental programs, the following is a historical look into Texas remediation outlining how we arrived at the current state.

Developmental education has been a concern of the Texas Legislature since the latter part of the 20th century. In fact, almost every Legislature since 1985 has made developmental education a concern it at least a minor capacity. This concern is motivated by a few different lines of thought. First, there has always been concern that developmental education might be having the wrong effect on student success. The purpose of the program has always been to increase college success rates, but for some, that has never happened (THECB, 2005). Secondly, legislators have expressed concern that the percentage of students who actually complete their developmental education sequence is disappointingly low (THECB, 2005).

Recently, the state's newest higher education plan, Closing the Gaps by 2015, calls for greater participation in higher education. The plan specifically targets potentially underprepared students, so legislators are interested in the developmental education programs to be both effective and efficient (THECB, 2005). Finally, the Legislature takes a continued interest in the costs of developmental education. It is important for THECB and institutions to demonstrate that developmental education is a viable program deserving of funding (THECB, 2005).

The development of remediation in Texas was essentially accidental. In the early 1980s, Texas, like other states, began requiring admissions testing for students entering teacher education programs. With this test, the PPST (Pre-Professional Skills Test), 30-percent failed the first time they took the exam and half failed at the next administration (THECB, 1986). SAT and ACT scores of the PPST takers were compared to the student body as a whole and it was extrapolated that 30 percent of Texas students were unprepared for college (Alpert, Gorth & Allen, 1989; Griffith & Meyer, 1999). This was the impetus for the establishment of developmental education.

Developmental education in Texas began with the creation of the Texas Academic Skills Program (TASP) in 1987 and its implementation in 1989 (Cook, 1998; TASP, 2005). TASP created a state-wide higher education readiness exam that was mandated for most incoming college students. If a student did not pass the TASP he was required to enroll in developmental education prior to beginning college-level work. Passing the exam was a condition of enrollment in college-level courses (TASP, 2005). If a student continually failed the TASP exam they were never deemed eligible for on-level college courses. Like the high failure rate of the PPST, in the earliest years, the TASP test identified 50 percent of nonexempt students needing at least some level of developmental education (THECB, 1995; Boylan & Saxon, 1998).

An evaluation of the TASP sponsored by the Coordinating Board revealed the following concerns: "(1) Texas institutions emphasized compliance with the law rather than the outcomes and quality of remedial programs; (2) there was a significant lack of early remediation efforts in high school and articulation between postsecondary and secondary education; and (3) developmental education had become a repository for many "problem" students" (Cook, 1998). Of particular note with relation to this study, the report finds, "In too many programs, there was an over-reliance on adjunct and poorly-trained faculty who did not participate in professional associations or utilize the latest research and best practices as reported in the professional literature" (Cook, 1998).

In 1997, as a result of the evaluation, the Legislature changed developmental education requirements to give students more options to complete their TASP requirements without strictly passing the TASP test. If a student continually failed the TASP test, these new options allowed them to enroll in college-level coursework after completing their developmental education requirements. If they earned a "B" or better in

the first college-level course the student had passed their TASP requirement (CCR, 2001). Students were also able to gain exemption for high school achievement. Further, the legislation offered earlier TASP testing (students could take the exam in high school) and capped state reimbursement for remedial courses (Cook, 1998).

In 2003, the legislature in Texas implemented the Texas Success Initiative (TSI) to replace the TASP. TSI shifted more power to institutions in determining the college readiness standards (THECB, 2005). TSI also strived to make developmental education less of a burden to the students placed in it. With the adoption of TSI, the Texas Higher Education Coordinating Board (THECB) became responsible for collecting data on developmental education. This made information on the individual institution's programs easily available to other campuses.

Institutions must make a conscious choice to assist remedial education students so that they will be able to succeed. This study aims to inform this discussion by adding to the literature of the impact of faculty characteristics on remedial education students. This dissertation will answer the following research questions:

Research Questions

For universities and community colleges:

1. What changes to the type of faculty who teach remedial coursework occurred between 2000 and 2004 in Texas institutions?

For students who begin at the community college:

2. What is the impact of rank (professor or tenure track; not professor; or no ranking system) on the success of remedial students?

3. How does the percentage of part-time faculty who teach remedial coursework at an institution affect the success of that institution's remedial students?

4. What is the impact of the average educational level of faculty on remedial education students in the community college?

5. How does the effect of (a) tenure track, (b) part-time faculty and (c) education level differ for remedial students and their non-remedial peers?

Successful outcomes include:

- Completion of an associate's degree within in three years of the first fall enrollment
- Completion of a bachelor's degree within six years of the first fall enrollment

For students who begin at the four-year college:

6. What is the impact of rank (professor or tenure track; instructor (contingent); or TA) on the success of remedial students?

7. How does the percentage of part-time faculty who teach remedial coursework at an institution affect the success of that institution's remedial students?

8. How does the effect of (a) tenure track and (b) part-time faculty differ for remedial students and their non-remedial peers?

Successful outcomes include:

- Completion of a bachelor's degree within six years of the first fall enrollment

Chapter Summary

This chapter began with an overview of the research centered on contingent faculty. A brief history of the utilization of contingent faculty was offered along with the empirical research judging the effectiveness of different types of faculty on student success. Next, the chapter delved into the subject of remedial education. Again, a brief history on the subject was provided along with some of the policy debates surrounding the topic. Also, a discussion of the scope of the remedial education problem was presented with empirical research surrounding the effectiveness of remedial education for students.

After the more general discussion of contingent faculty and remedial education, a section specific to the landscape of these issues in Texas was presented. In conclusion, the chapter finished with a statement of the research questions to be addressed in the dissertation. These questions were chosen to address gaps in the literature with regard to the impact of different faculty characteristics on remedial education students.

CHAPTER III

METHODOLOGY AND RESEARCH DESIGN

This section will discuss data and research methodology of this study of the impact of faculty characteristics on remedial education students. The section will begin with a discussion of the sample used and how it was obtained. Following, will be a description of the outcome variables, the variables of interest and the control variables. Then, the research methodology will be discussed. The section concludes with a discussion of the limitations of this research.

Data and Sample

The sample for this study includes all students enrolled in public higher education in the state of Texas for the years 2000, 2002 and 2004. For the purpose of this analysis, the sample is split between students who begin their higher education at a community college and those who begin at a four-year institution. This divide is important because of the fundamental differences between the students who initially enroll in community colleges and those who enroll in four-year schools (Gianoutsos, 2011). The sample is further restricted to students who enroll or express an interest in a degree seeking field and are roughly college aged (17-23). The former is important as the outcome variable of this study is degree attainment. The latter was decided because the data revealed more missing cells for students outside this "traditional" age. Specifically, the students of the most interest to this analysis are those students requiring remediation upon college enrollment.

Students enrolled in institutions which serve a primarily vocational or technical role are also eliminated.

The primary data to be used in this study is maintained by the Texas Schools Project at the University of Texas at Dallas Education Research Center (UTD-ERC). The data center serves as a home for pre-kindergarten through twelfth grade data collected by the Texas Education Agency and postsecondary data from the Texas Higher Education Coordinating Board. This unique set of student record level data allows incorporation of both an individual student's college characteristics, and also pre college characteristics, such as high school attended and standardized test scores.

The UTD-ERC data also contains faculty files. These files denote individual faculty member, the courses they teach, their academic status and personal characteristics. However, one limitation of the data is that there is currently no record indicating specific student course taking patterns, so professors and students cannot be linked at this time. Instead, the faculty files will be used to calculate the percentage of remedial and college-level courses taught by full and part-time faculty and tenured and non-tenured faculty in the subject areas where developmental education is offered (math, reading and writing). This characterization frames this analysis as one at the institutional level. Within the institution and course type these faculty characteristics create an ambiance that affects the student experience. For example, a remedial student enrolled in a school where the faculty are all full-time may have a different experience than a student enrolled in a school where the faculty is mostly employed part-time. As academic and social integration to the institution affects persistence (Braxton, 2000; O'Brien & Shedd, 2001), this ambience may affect likelihood of graduation as well.

Further, institutional characteristics were obtained from the National Center for Education Statistics' Integrated Postsecondary Education Data System. As mandated by the Higher Education Act of 1965, all institutions that participate in federal student aid programs must report data on their campus and students. For variables contained in both the UTD-ERC data and IPEDS, the data was compared to ensure validity.

Variables

Two outcome (dependent) variables are used for this analysis along with multiple independent variables. Each outcome measure is described below followed by the independent variables of interest (faculty status) and each of the control variables.

Dependent Variables

Associate's degree completion [AADEGREE] - If a student successfully completes an associate's degree within three years of first enrollment in Texas higher education this indicator will be equal to one in the analysis. This outcome measure will only be applicable for students beginning their higher education in a community college. Three years was chosen as it is the standard time and a half for an Associate's degree, a measure also utilized by the National Center for Education Statistics (NCES, 2010). This time period allows for a short stop-out period and/or time for remediation.

Bachelor's degree completion [BADEGREE] - If a student successfully completes a bachelor's degree within six years of first enrollment in Texas higher education this indicator will be equal to one in the analysis. Six years was chosen as it is the standard time and a half period for a Bachelor's degree, a measure also utilized by the National

Center for Education Statistics (NCES, 2010). This allows time for remediation, minimal stop-out, and possible potential complications due to transfer from a two- to four- year institution.

This three and six year allowance for completion is common in higher education research. The National Center for Education Statistics (NCES) publishes both three and six year graduation rates for institutions as part of the Student's Right to Know initiative. Specifically with regards to Texas, McFarlin (2010) utilized this completion definition as a covariate in his remediation study of Texas colleges.

The remainder of the variables chosen are informed by two primary sources. First, I drew from Bailey and colleagues (2005) study on the impact of institutional and individual characteristics on community college graduation. The authors performed the first institutional study specifically on community colleges which examined the impact of student characteristics, student enrollment characteristics, institution fixed characteristics, institution compositional characteristics and institution financial characteristics on student graduation. Both this study and the Bailey et al. utilize student race, economic status, major type, and full time status. The study also accounts for the proportion of part-time faculty as one of the institutional characteristics. This study differs from Bailey (2005) in that a student's remediation status is included. Further, instead of faculty characteristics at the wholly institutional level, here faculty characteristics are calculated within courses inside department. This means that each institution will have six unique faculty characteristic levels. Taking percent of part-time faculty as an example, each institution's developmental and at level English (reading), math and writing courses were identified as was the status of the faculty members assigned to teach each course. Using this

information, I calculated the percentage of remedial and (separately) on level courses that were taught by part-time faculty members in each subject.

This study also borrows heavily from Titus' 2004 multilevel analysis of the influence of institutional context on persistence at four-year colleges. He was able to distinguish the effects of variables operating within institutions from variables operating between institutions on student persistence. This study also has an excellent conceptual framework that he sets out to test which borrows elements from both Bean's (1990) student attrition model and Berger and Millem's (2000) college impact model. The Titus conceptual framework is shown in Appendix C. This analysis features many of the variables from the student background and student experiences portion of the model. However, this analysis and the Titus model differ with regards to the variables at the institutional level. He focuses mostly on aggregate student characteristics, while this study utilizes the aggregate faculty characteristics detailed below.

Variables of Interest

Percentage tenure track faculty - This variable will be constructed using the UTD-ERC faculty file. The courses each faculty member teaches are listed along with their tenure status. The percentage tenured is calculated for each subject's (math, reading and writing) remedial and general education courses. Each student is then assigned a faculty percentage based upon what type of course they are enrolled in (remedial or not). In the analysis for community colleges, the tenure track faculty are further broken down into professors (or on the tenure track), non-professors (the contingent faculty) and faculty members in schools without a ranking system. For the four-year colleges the categories are tenure track, non-tenure track, and TA. I hypothesize that tenure track faculty should

have a positive impact on student graduation rates while non-tenure track and TAs should have a negative impact based on the ambience created on campuses with a large percentage of tenure track faculty.

Percentage part-time faculty - This variable will be constructed using the UTD-ERC faculty file. The courses each faculty member teaches are listed along with their part or full-time status. Percentage part-time faculty is calculated for each subject's (math, reading and writing) remedial and general education courses. Each student is then assigned a faculty percentage based upon what type of course they are enrolled in (remedial or not). Bailey et al. (2005) hypothesize that the proportion of part-time faculty at an institution will negatively impact graduation, as such; I carry that to the departmental and curriculum level and hypothesize negative impacts for students in curriculums with high proportions of part-time faculty.

Education level - Additionally, for community colleges, there is an indication of education level of the faculty. For these schools, the percentage of the faculty (within subject and remedial status) that have PhDs, Masters, Bachelor's, and less than a Bachelor's degree are calculated. There is no evidence to support directionality of the impact of faculty education level on graduation. However, I hypothesized above that greater proportions of faculty on the tenure track should have a positive impact on students. Tenure track faculty have doctorates, so higher levels of education should also be associated with greater a likelihood of completion. Therefore, I hypothesize that greater levels of lower educated faculty will negatively impact students.

Institutional controls (Level 2)

HBCU - This is a dichotomous variable indicating that the institution is a Historically Black College or University. This variable was garnered from IPEDS.

HSI - This is a dichotomous variable indicating that the institution enrolled Hispanic students as 25% or more of their total student population. This variable was calculated from data available in IPEDS.

It is widely recognized the minority serving institutions have a different set of challenges than their primarily white counterparts. The campus context of a primarily white institution versus an minority serving institution differentially influences retention (Allen, 1992; Feagin, Vera & Imani, 1996; Fischer, 2007; Gloria et al., 1999; Nora & Cabrera, 1996; Steele 1997, 1998). Many of the academic challenges stem from the fact that minority students are less likely to enter college academically prepared, mostly as a result of attending underperforming high schools (Cabrera, Burkum & La Nasa (2005). As such, it is hypothesized that both HSI and HBCU will have a negative impact on graduation likelihood.

Student controls (Level 1)

Gender - The gender variable will be equal to one if the student is male.

Studies suggest that females experience greater rates of degree completion than do their male counterparts (Pascarella et al., 1983; Astin, Korn & Green, 1987; Morgaman et al., 2002; Murtha, Blumberg, O'Dell & Crook, 1989). Overall, females earn about 58% of all bachelor's degrees awarded nationally (NCES, 2004). This roughly aligns to their enrollment percentage in four-year institutions (Gianoutsos, 2011).

Race/Ethnicity - Race and ethnicity will be indicated through a series of dichotomous variables (African American, White, Hispanic, or other)

Race is one of the most commonly utilized measures in college persistence and completion models (Gianoutsos, 2011). Early studies (Astin, 1975, 1977; Bean, 1981) used race as a foundational component of the models. More recently, race and ethnicity are placed in models as a significant characteristic (Nora, Barlow & Crisp, 2005; Pascarella & Terrenzini, 2005). Research has noted that completion rates are not equal between the different racial and ethnic groups (Nora, Barlow & Crisp, 2005; Astin, 1997; Murtaugh, Burns & Schuster, 1999; NCES, 2010).

Economic status - This variable comes from the student file's indicator of economic disadvantage. Economic status is coded as dichotomous. Institutions are instructed to code an individual as economically disadvantaged if one of more of the following applies:

> "1. Annual income at or below the federal poverty line,
> 2. Eligibility for Aid to Families with Dependent Children or other public assistance programs (includes WIC program participants),
> 3. Receipt of a Pell Grant or comparable state program of need-based financial assistance,
> 4. Participation or eligible for JTPA programs included under Title II, and
> 5. Eligible for benefits under the Food Stamp Act of 1977 or the Health and Humans Services (HHS) Poverty Guidelines" (THECB, 2001)

Economic status is included in the model as studies have shown that socioeconomic status has the potential to impact retention, completion and performance for college students (Hossler & Vesper, 1993; Pathways to College, 2004; Stage, 1988; Cabrera, Burkum & La Nasa, 2005).

Academic disadvantage - This variable comes from the student file's indicator. Institutions are instructed to code and individual as academically disadvantaged if "based on TASP or a local placement test, do not have college entry level skills in reading, writing, or math. Colleges should also report students who are enrolled in remedial courses based on the results of TASP or local

placement tests. The Interim Evaluation Report definition may also be applied for students who did not receive a high school diploma nor did not receive a GED certificate." (THECB, 2001). This variable is coded dichotomously.

Academic preparedness is positively associated with both academic performance and persistence (Adelman, 1999; Bean 1980, 1983, 1985; Fletcher, 1988; Ishitani & DesJardins, 2002; Tinto, 1975, 1997). The higher the academic competence a student possesses, the better he will perform academically and the more likely he is to persist through to graduation (Lotkowski, Robins & Noeth, 2004).

Major - This variable comes from the student file's indicator. The categorical variable is decomposed into three dichotomous variables: academic, technical, and other. Academic is for students declaring an academic major toward a degree. Technical is for students declaring a technical major toward a degree or certificate and other is for student pursuing job retraining or another situation not covered in academic or technical (THECB, 2000; THECB, 2001).

Primary reason for college attendance- This variable comes from the student file's indicator. The categorical variable is decomposed into three dichotomous variables: degree seeking, job training, or personal enrichment (THECB, 2000; THECB, 2001).

Credit hours - This variable is the total number of credit hours the student took in a semester centered on 12. Since 12 is considered full time status, any student with negative credit hours is, in this case, part time and students whose credit hour total is zero or positive are full time students. This variable was centered for ease of data interpretation (Rabe-Hesketh & Skrondal, 2008; Raudenbush & Byrk, 2002).

Curriculum - There are eight dichotomous curriculum variables indicating how much developmental education the student enrolled in during the first semester: No DE, DE math, DE reading, DE writing, DE math and reading, DE math and writing, DE reading and writing, DE in all three subjects. These are inputted into the model as a series of dichotomous variables. When this analysis refers to curriculum level, it is referring to these remedial designations. Table 1 is provided for easy reference.

For the purpose of this analysis, the data will be treated as cross-sectional. All individual and institutional controls will be set to the level they are at the student's initial enrollment in an institution and will not be allowed to vary over the period of enrollment. The dependent variables are dichotomous and will be indicated as met or unmet after a certain period of time (varying for each outcome).

Remedial Curriculum Course Coding

The state of Texas has implemented a common course numbering system in the community colleges. The purpose of this system is to streamline credit transfer from the two to four year campuses. As such, it is the case that all of the two year campuses have adopted this numbering system while only select four year campuses utilize common course numbering. In the common course numbering system any course that is below college level would begin with the number zero, a course meant for first year students would start with a one and so on. This system is relevant to this study because thin the UTD-ERC data files there is not a variable denoting whether or not a course is below college level, or remedial. As a part of this project, it was my responsibility to code all of the courses offered in Texas higher education as remedial or not.

Further, it is also the case that the common course numbering system designates a consistent coding for courses in individual fields. For example, any course in the math department would be denoted as MATH-XXXX where the X designates the course number. As is the case with course numbers, course subject codes are fairly consistent in the community colleges and vary more at the universities. In order for the analysis to be completed properly it is important for me to know two things: First, which courses are in the subject areas where remedial education is offered (Reading/English, Writing, and Math) and second which of these courses were remedial and which were on level.

I created four new dummy variables in the dataset: DE which is the indicator for courses that are developmental education, or remedial. MATH for courses in the math department. ENGLISH for courses offered in the English department. ENGLISH is also inclusive for courses designated as reading, which is often what developmental English courses are called. Finally, WRITING for courses specifically for courses that teach writing skills.

The four new dummy variables were all garnered through an extensive search of course catalogs and listings at all universities and the common course numbering system. The procedure is outlined below.

Defining English, Writing and Math Courses

1) First, the course listings data set was sorted by course code. I examined all course codes that began with EN-, RE-, WR-, MA-, and MT.
2) A list was made with all course codes that were definitely English, Reading, Math or Writing. These included ENGL, ENG, WRIT, MATH and MTH.

3) Code was written to make flags for the three subject areas of English, Math and Writing. Any courses that were designated as Reading were lumped into the English flag because while reading into course descriptions it was determined that campuses often had a Reading department that was charged with teaching students requiring developmental education and this department taught no on-level courses. Reading here was a signal for below-level English course.

Defining Remedial Education

1) All courses in the data set that had a course number that was four digits and began with a zero was designated a remedial course.
2) The data was then sorted by school. Any school that did not contain at least two remedial courses (one math, one English) was placed on a list of schools to investigate.
3) The websites for schools in need of investigating were searched for course codes and numbers for remedial education. I looked in catalogs, schedules and in subject departments. There was also helpful information in the school information regarding the Texas Success Initiative.
4) Code was written to incorporate the garnered information into the dataset. Then step two was repeated to double check that the remedial courses in all schools had a flag in the dataset.
5) There were a few instances where remedial education course codes and numbers could not be located for a campus. In these cases it was determined that the campus was either an upper-division campus that did not offer introductory

courses or the campus assigned all of their students requiring remedial education to take the coursework at the affiliated community college.

Data Analysis Plan

The data analysis will begin by calculating the simple descriptive statistics for each variable. It will continue by calculating the following to answer research question one and inform this research about the current state of higher education in Texas:

- Graduation rates (AA and BA) for remedial and non-remedial students, by sector, over time
- Percentage of students assigned to remediation, by sector, over time
- Percentage of assigned students who enroll in remediation, by sector, over time
- Percentage of full-time faculty, by sector, over time
- Percentage of tenure-track faculty, by sector, over time
- Percentage of remedial education classes taught by full-time faculty, by sector, over time
- Percentage of remedial education classes taught by tenure-track faculty, by sector, over time

In this case, sector will be separated into two categories, community colleges and four-year colleges. This separation is informed by the arguments of Bailey and colleagues (2005) who reference both the different missions and selectivity levels as reasons why community colleges should be studied separate from their four-year peers. Over time will be in the years 2000, 2002, and 2004. 2004 is the most recent year of data available where six-year graduation rates can be calculated.

Why HLM?

In this analysis and in much of education research in general, we are interested in whether certain student experience or background characteristics can predict an educational outcome, here, graduation. The most common statistical model used for making predictions is linear regression (Harrison & Raudenbush, 2006). However, linear regression does not take into account that relationships between outcomes and predictors may vary across school settings. For example, financial aid received may predict graduation in one school, but not in another. For this, researchers utilize hierarchical linear models (Raudenbush & Bryk, 2002), which are sometimes referred to as multilevel models (Goldstein, 2003).

Research questions two through eight will be investigated using a series of hierarchical linear models (HLM) to investigate the individual and institutional characteristics related to the dependent variables of interest[1]. Central to questions two and three is the idea that the students are nested within the institutions they choose to attend. For this reason, I decided against using individual-level regression models with institutional characteristics included because this strategy has the potential to result in inaccurate parameter estimates (Ethington, 1997; Heck & Thomas, 2000; Raudenbush & Bryk, 2002; Umbach, 2007).

An HLM analysis will concurrently estimate the individual and institutional level effects, reducing the problem. Further, since the dependent variables are dichotomous, a random-coefficient logistic regression will be used (Rabe-Hesketh & Skrondal, 2008). HLM analyses are supported by the work of Titus (2004, 2006) in his analyses of the institutional factors predicting persistence.

[1] Technically, as these models have binomial outcome variables, they are nonlinear. However, convention allows referring to all multilevel models as HLM.

Each analysis will be run in three steps as recommended by Raudenbush and Bryk (2002): the null model, the within model, and the full model. The analysis presented here will closely model that performed by Umbach (2007) in his research on the usage of good practices by contingent faculty members.

This study utilizes hierarchical linear modeling to compute a series of repeated cross-sectional designs. In other words, individual iterations of the models below were run for each cohort of students (2000, 2002, 2004). The goal of this design is that I am looking for replication of sign and significance of coefficients across years. These patterns reveal important variables predicting student completion.

Null model

The null model is a model with no predictor variables. The intercept in this model is allowed to vary and serves to partition the variance within and between institutions. The results of the null model serve to be able to estimate the proportion of the variance existing between and within institutions (Raudenbush & Bryk, 2002).

Within model (Level 1)

The within-institution model includes all of the student level variables (Raudenbush & Bryk, 2002). Of primary interest at this level is the curriculum variable which indicates if the student has been assigned to remedial coursework. Also included are the controls for gender, race, academic disadvantage and economic status.

Full model (Level 2)

The full model is also known as the between institution model because at this level the intercept is allowed to vary by institution. The analysis at Level 2 will be done in two steps. First, all institutional controls and the variables of interest: percent part-time, percent tenure-track and educational level will be added to the model. Second, the variables of interest will be interacted with the student curriculum variable.

Model Equations

This analysis was performed using the xtmelogit command in STATA 11. As each year of the analysis contains many students, the sample size is very large for a multilevel analysis. As such, the models took an extraordinary amount of time to converge. In order to attempt to eliminate some of the time required, each step below was first run with the option of the Laplacian approximation which set the initial number of integration points at one. The convergence point of the initial Laplacian estimation was used as the starting point for a model with the standard number of integration points (8) in STATA (Rabe-Hesketh & Skrondal, 2008).

Model 1: Unconditional Variance Components Model

This is a two level (students within schools) model with a fixed intercept and random effects at the school level.

$$\text{Prob}(\textit{Outcome} = 1)_{si} = b_{0\,i} + \varepsilon_{si} \qquad (1)$$

Model 2: Builds on Model 1 by Adding Level 1 Covariates

$$\text{Prob}(\textit{Outcome} = 1)_{si} = b_{0\,i} + B_1\ \text{male}_{si} + B_2\ \text{credit12}_{si} + B_3\ \text{race}_{si} + B_4\ \text{AcadDis}_{si} + B_5\ \text{EconDis}_{si} + B_6\ \text{major}_{si} + B_7\ \text{ReasonForCollege}_{si} + B_8\ \text{curriculum}_{si} + \varepsilon_{si} \quad (2)$$

Please note that in the equation above and those forthcoming: race, major, intent and curriculum are vectors for multiple dichotomous variables outlined above.

At this point, model 2 is tested against model 1 using a likelihood ratio test to ensure that the fixed effects at the student level are not all zero and that model 2 is a better fit for the data than is model 1. These likelihood ratio tests will be performed for each subsequent model to test if that model is a better fit for the data than the one prior.

Model 3: Adding Faculty and School Covariates

$$\text{Prob}(\textit{Outcome} = 1)_{si} = b_{0\,i} + B_1\ \text{male}_{si} + B_2\ \text{credit12}_{si} + B_3\ \text{race}_{si} + B_4\ \text{AcadDis}_{si} + B_5\ \text{EconDis}_{si} + B_6\ \text{major}_{si} + B_7\ \text{ReasonForCollege}_{si} + B_8\ \text{curriculum}_{si} + B_9\ \text{Fulltime}_{si} + B_{10}\ \text{Rank}_{si} + B_{11}\ \text{Edlevel}_{si} + B_{12}\ \text{HSI}_{si} + B_{13}\ \text{HBCU}_{si} + \varepsilon_{si} \quad (3)$$

This model adds the school and faculty characteristics to the model. As with above, Rank and Edlevel are placeholders for a series of dichotomous variables outlined above.

Model 4: Adding Interactions Between Student Curriculum and Faculty Characteristics

$$\text{Prob}(\textit{Outcome} = 1)_{si} = b_{0\,i} + B_1\ \text{male}_{si} + B_2\ \text{credit12}_{si} + B_3\ \text{race}_{si} + B_4\ \text{AcadDis}_{si} + B_5\ \text{EconDis}_{si} + B_6\ \text{major}_{si} + B_7\ \text{ReasonForCollege}_{si} + B_8\ \text{curriculum}_{si} + B_9\ \text{Fulltime}_{si} + B_{10}\ \text{Rank}_{si} + B_{11}\ \text{Edlevel}_{si} + B_{12}\ \text{HSI}_{si} + B_{13}\ \text{HBCU}_{si} + B_{14}$$

$\text{Curriculum*Fulltime}_{si} + B_{15}\ \text{Curriculum*Rank}_{si} + B_{16}\ \text{Curriculum*Edlevel}_{si} + \varepsilon_{si}$

(4)

Model 4 is the model of primary interest. Specifically, the significance levels of the interaction terms will determine whether there is an effect of faculty characteristics on student outcomes by the curriculum the student has taken in the first semester of their first year. Significance levels are noted in the tables with asterisks. * corresponds to $p<0.05$, ** corresponds to $p<0.01$ and *** corresponds to $p<0.001$.

All of the models above are for community colleges. The ones for four-year schools will differ a bit as the four-year data files are limited to the following variables: For students: race, sex and credit hours and curriculum taken. For faculty: full time status and rank and for schools: HSI and HBCU designation.

CHAPTER IV

RESULTS FOR STUDENTS WHO BEGIN IN COMMUNITY COLLEGES

Research question 1 asks whether there have been changes in time in the type of faculty who are assigned to teach remedial education courses. As this analysis covers multiple policy periods in Texas remediation policy, this question is important to investigate if there were changes to the kinds of faculty teaching remediation. The answer to this question was investigated by taking an overall snapshot of remedial education courses in the years 2000, 2002, and 2004. These years were chosen based on both availability of data and the policy context in Texas at the time (for more information on this, see the section in Chapter II on Texas remediation policy).

Table 2 shows the proportion of students, courses or professors meeting certain criteria across the years 2000, 2002 and 2004. The table provides some insight into the characteristics of remedial education across this time period.

The far left column refers to the level of curriculum in which students are enrolled. The levels range from 0 for students whose course schedules have no remedial education courses in it during the first semester of their first year to 7 for students whose course schedules include math, reading and writing remedial courses. Curriculum levels 1, 2 and 3 are students whose schedule has math (1), reading (2) or writing (3) as their singular remedial course. Curriculum 4 includes students who have both math and reading remedial education. Curriculum 5's students are enrolled in remedial math and writing and finally, Curriculum 6 is for students in remedial reading and writing. This is detailed in Table 1 below.

Table 1
Curriculum Designations

Curriculum #	Curriculum content
0	No remedial education
1	Remedial Math
2	Remedial Reading
3	Remedial Writing
4	Remedial Math & Reading
5	Remedial Math & Writing
6	Remedial Reading & Writing
7	Remedial Math, Reading & Writing

RQ1: Faculty Teaching Remediation

Proportion of students taking the correct curriculum:

From the "Correct Curriculum" column in Table 2 can glean a few insights into Texas remediation placement. This column details the proportion of students in each Curriculum number who are correctly placed. For example, if a student's test scores dictate they should be in math remediation and the student enrolls in math remediation during the fall semester they would be coded a 1 in the dataset. If a student either (a) fails to enroll in the remediation curriculum assigned, (b) enrolls in remedial courses when they are not assigned or (c) does not enroll in their complete remediation assignment they would be coded as a 0.

This column shows that students who do not need remediation (curriculum 0) and students who need remediation in all subjects (curriculum 7) are the most likely to be

enrolled in the correct curriculum. For most combinations of year and curriculum not in the extremes, **students are not taking the correct courses in their first semester**. Students assigned to reading and/or writing remediation (curriculums 2 & 3) are less than 50% likely to be enrolled in the proper courses in their first semester. It also appears to be the case that in the most recent year, 2004, students were systematically less likely to be enrolled in the correct curriculum then they were in the two previous time periods.

2004 is the only year in our dataset which falls into the Texas Success Initiative policy period. It seems as if during this time students were given more latitude in choosing the courses in which they were to enroll. Consequently, it appears that students were choosing out of remediation or delaying enrollment even though it was prescribed.

Table 2
Proportion of Students in College Context by Curriculum and Year

Curriculum Taken	Students in		Degree Attainment		Students taught by							
	Correct curriculum	HSI	AA 3yrs	BA 6yrs	Part Time	PhD	Masters	BA	AA or other	Professor	Not Professor	No ranking
0												
2000	.80	.38	.18	.19	.44	.19	.73	.07	.02	.15	.35	.50
2002	.84	.32	.21	.18	.42	.19	.74	.03	.04	.14	.39	.47
2004	.74	.33	.21	.18	.44	.19	.71	.03	.08	.13	.42	.45
1												
2000	.67	.39	.14	.08	.55	.09	.58	.30	.03	.13	.45	.42
2002	.70	.40	.14	.07	.55	.07	.56	.31	.06	.12	.51	.37
2004	.49	.35	.17	.08	.57	.07	.55	.30	.07	.10	.48	.42
2												
2000	.40	.26	.14	.07	.49	.11	.60	.25	.03	.16	.36	.48
2002	.45	.32	.15	.06	.48	.09	.65	.21	.05	.16	.39	.46
2004	.25	.42	.16	.04	.47	.08	.64	.20	.07	.12	.44	.44
3												
2000	.44	.36	.17	.09	.48	.13	.60	.25	.02	.16	.34	.50
2002	.48	.35	.15	.06	.46	.10	.65	.21	.04	.18	.44	.39
2004	.25	.45	.18	.04	.45	.09	.62	.20	.10	.14	.50	.36
4												
2000	.74	.42	.12	.04	.53	.09	.63	.25	.03	.15	.48	.37
2002	.75	.50	.10	.03	.52	.07	.62	.25	.05	.12	.45	.43
2004	.52	.48	.13	.03	.55	.07	.57	.26	.09	.09	.40	.51
5												
2000	.54	.51	.14	.05	.49	.10	.63	.24	.02	.15	.43	.41
2002	.63	.52	.10	.04	.49	.08	.64	.24	.04	.17	.48	.35
2004	.30	.48	.13	.04	.55	.08	.59	.25	.08	.15	.48	.37
6												
2000	.34	.43	.13	.05	.43	.12	.63	.22	.03	.15	.36	.48
2002	.38	.43	.12	.04	.47	.12	.64	.20	.05	.19	.40	.41
2004	.16	.45	.13	.03	.53	.07	.61	.19	.12	.13	.39	.48
7												
2000	1.00	.56	.12	.03	.47	.11	.65	.22	.03	.16	.48	.36
2002	1.00	.54	.10	.02	.48	.08	.66	.22	.05	.14	.48	.38
2004	.61	.52	.10	.03	.54	.07	.63	.24	.06	.13	.45	.41

Proportion in an HSI

The purpose of this column is to determine the distribution of remedial students between institutions. 33 percent of students not requiring remediation were enrolled in Hispanic Serving Institutions in 2004. 67 percent were in non-HSIs. Those requiring total remediation (curriculum 7) are more evenly split between HSIs and non-HSIs. This indicates that **HSIs seem to be the recipients of a greater proportion of the students who have the greatest academic deficiencies**.

There could be many explanations for this phenomenon, but the most likely is that minority students are segregated in underperforming high schools (Lankford, Loeb & Wycoff, 2002). As Lankford and colleagues find, "Urban schools, in particular, have lesser-qualified teachers... Low-income, low-achieving and non-white students, particularly those in urban areas, find themselves in classes with many of the least skilled teachers" (p. 37). At HSIs, there are, by definition, large concentrations of Hispanic students. If students from segregated underperforming high schools follow the typical path of a college student to attend an institution that is close to home (Hurtado, Inkelas, Briggs & Rhee, 1997), than it follows that the colleges will also have high levels of non-white students. It is therefore more likely that greater levels of remediation will be required in these schools than in primarily white institutions.

Graduation Rates

The next two columns display the proportion of students in each curriculum category who graduate with a community college degree in three years or a university degree in six years from the first fall enrollment. The most prepared students graduate about 20% of the time with a community college degree and slightly less with a university

degree. One would likely expect an incoming student in need of remediation would be less likely to graduate. This is the case; and the more remediation required the less likely graduation. Depending on curriculum level and year, between 10 and 18% of remedial students earn an AA degree. For the BA, between 2 and 9% of remedial students are able to graduate within 6 years. While the proportion of students earning degrees is quite low, community college degree awarding is steady and in some cases slightly increasing. University degree earning is stagnant across curriculum levels from 2000-2004.

What is most noticeable in these columns is the amount of area there is for improvement in all respects. Texas community colleges need to do more to increase the degree completion rates for both remedial and non-remedial students. Most traditional students enter community college with the intention of degree completion, likely Bachelor's degree completion. Community colleges have much work to be done in this arena.

Part-time professors

As discussed in the literature review, part-time instructors may not be present on campus enough to provide the support remedial education students may need. The data indicates that non-remedial courses are less likely to be taught by part-time faculty than remedial courses. Remedial education students have about a 50 percent chance of having their remedial coursework taught by part-time professors. Non-remedial students' courses are taught by part-timers 44 percent of the time. There is also a slight indication that part-time professors are teaching a larger proportion of students in 2004 than they did in 2000.

Education levels

The next four columns should be read in tandem. These columns provide the starkest contrast between remedial and non-remedial classes. **Students in the remedial courses are much more likely to be taught by professors whose educational background consists of a Bachelor's degree or less**. Students in the non-remedial curriculum are taught by professors with PhDs and Masters' degrees 90 percent of the time. The figure is between 62 and 75 percent for students in any remedial course track. One trend across curriculums was that 2004 saw an increase in the usage of professors with an Associate's degree or less in both remedial and non-remedial tracks. Community colleges in Texas are increasing their reliance on professors with lower educational levels.

Rank

Finally, the last three columns deal with the rankings of professors teaching at each curriculum level. It is most common in Texas community college to have no ranking system for professors. In schools with ranking systems, students were more likely to have an untenured professor. The proportion of courses taught by tenured professors is consistent across remedial and non-remedial courses.

To provide further evidence of changes in the type of faculty who teach both remedial and non-remedial courses, I have made graphics expressing the faculty characteristics presented in Table 2, but for the aggregate of remedial students versus non remedial students. Table 2 is primarily student focused and concentrates on the experiences of students in different types of curricular tracks. Figures 1-6, below, depict the separation of courses between math and language arts (reading/English and writing) and within subject between remedial courses and not.

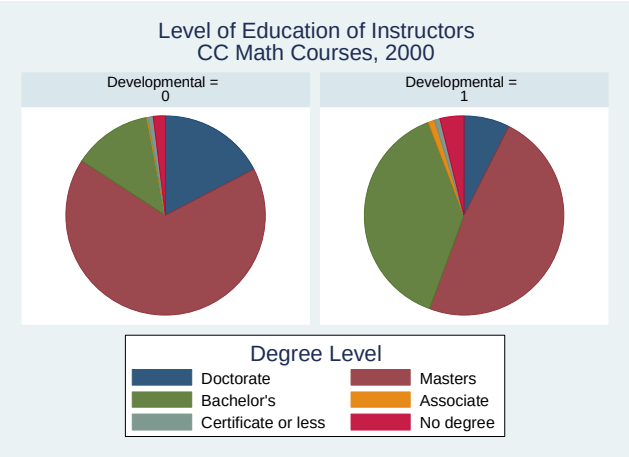


Figure 1: CC Education of Math Faculty in 2000

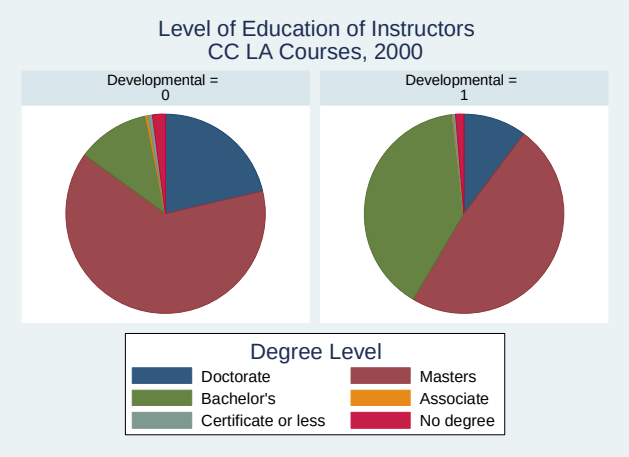


Figure 2: CC Education of LA Faculty in 2000

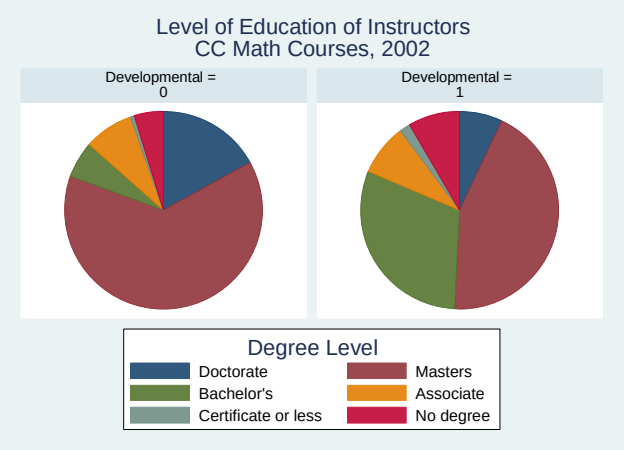


Figure 3: CC Education of Math Faculty in 2002

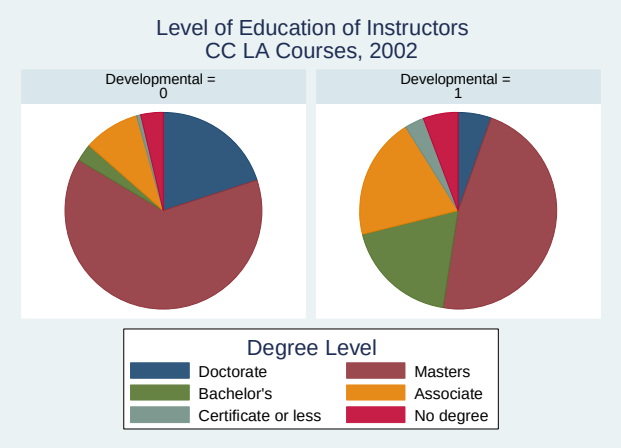


Figure 4: CC Education of LA Faculty in 2002

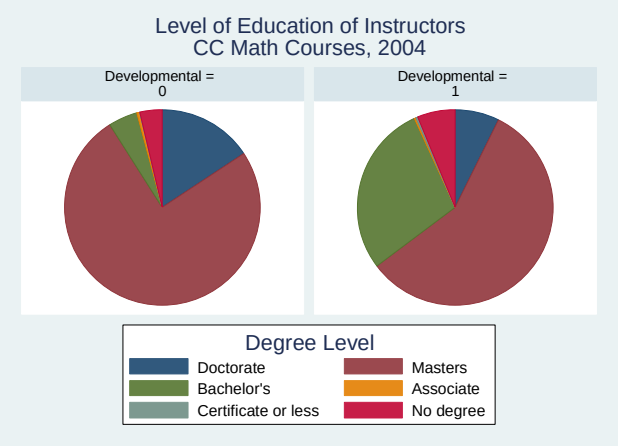


Figure 5: CC Education of Math Faculty in 2004

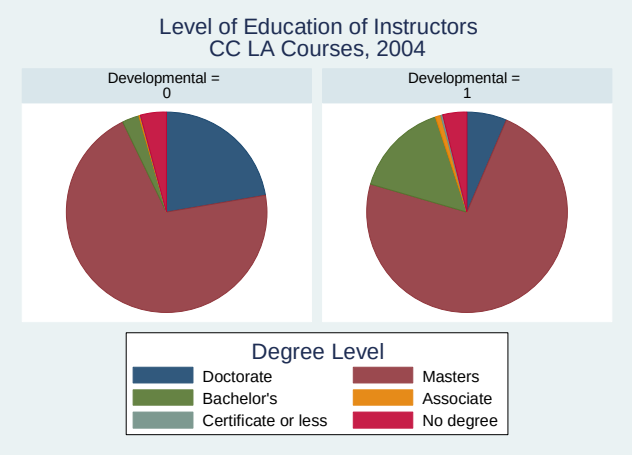


Figure 6: CC Education of LA Faculty in 2004

Figures 1-6 show the level of education of instructors of math (upper) and language arts (lower) in college level (developmental = 0) and remedial (developmental = 1). This presentation reiterates that remedial courses are taught by professors with lower

educational credentials. In 2002 schools reported many more professors with an Associate's degree as their terminal degree. Yet as per Table 2 above, in 2004 students had the greatest likelihood of having a course taught by an educator with a lower education level. This discrepancy may indicate that there may be lower educated professors teaching courses, but the number of students enrolled in their classes is few.

Further, from Figures 1-6 notice that on-college-level (non-remedial) courses in community college are primarily taught by professors with Master's degrees. On-college-level courses are taught by PhDs roughly 15% of the time; remedial courses between 5-10%. On-college-level courses are taught by professors with BA degrees or less roughly 15% of the time; remedial courses hovering around 35% of the time. Overall, the professors of college level courses are more educated than professors who teach remedial courses.

The full and part time and tenure status story is very similar for math and language arts courses and has not changed much during the period of interest. As such, I will only present the 2004 figures for math courses in Figure 7 below.

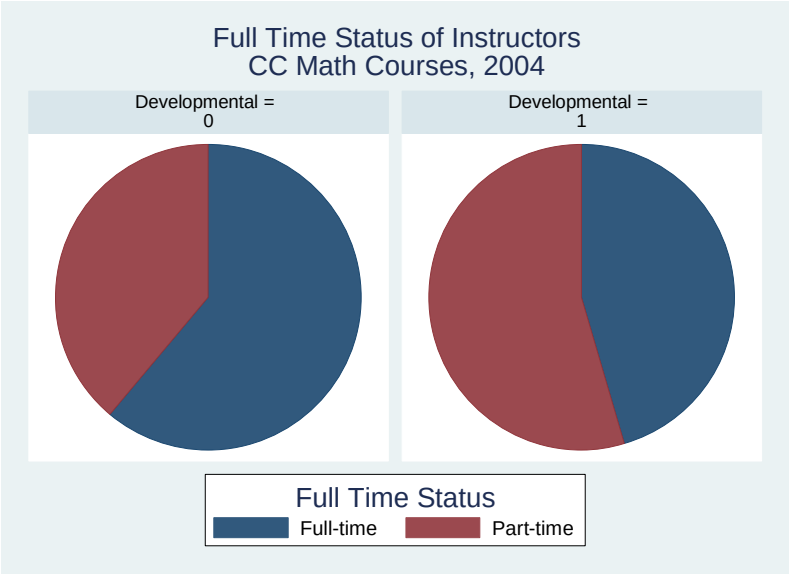


Figure 7: FT Status of Professors in CC Math, 2004

The graph above demonstrates the almost opposite pattern between developmental and non-developmental courses. College level courses are more likely to be taught by full time professors. Developmental courses are more likely to be taught by professors who are only on campus part time. As cited frequently in the literature, part-time status is negatively related to student contact (Benjamin, 2002).

Figure 8 shows the ranking of instructors in community colleges that have a ranking system. Recall, that this is only about half of the campuses. The first difference between college level and remedial courses is that there is a greater likelihood of a student having a professor who is tenured or on the tenure track in non-developmental courses. The orange (Instructor) portions of the figure are each roughly 40%. Instructors in this case are full-time non-tenured faculty. It is the adjunct portion of the graphic that differs most. This is not surprising because in this case adjunct is the Texas way of saying part-time non-tenured and we saw in the figure above, more part time faculty teach developmental courses.

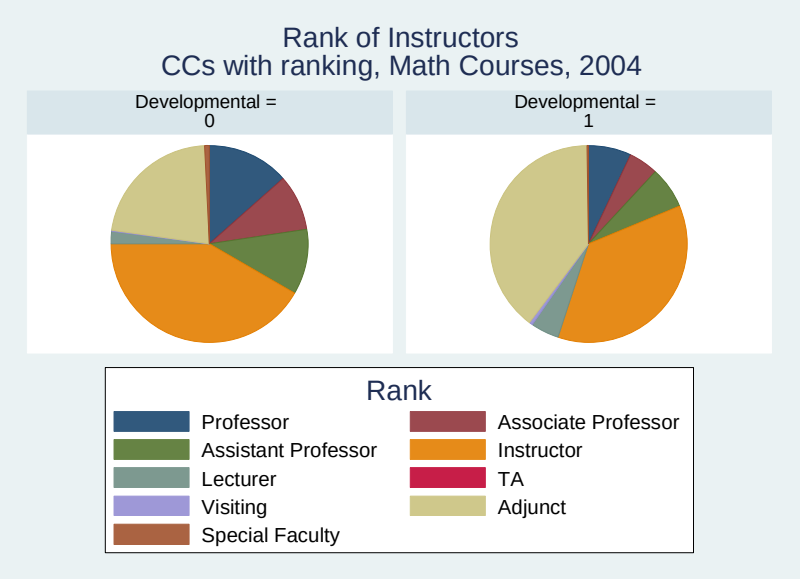


Figure 8: Rank of Instructors CC Math, 2004

Tables 3-8 below use a 2-level model (students within institutions) to evaluate the impact of particular professor characteristics on successful outcomes. The tables present four models discussed in the Methods chapter. In sum, Model 1 is the Null model with no covariates. Model 2 adds covariates relating to the student including the impact of different curriculums. Model 3 includes the covariates associated with professor and school. Finally, Model 4 introduces interactive terms to evaluate the impact of faculty characteristics on different curriculums. The full set of models is presented for each of the investigative years. The analysis for all models was done using repeated cross-sectional HLM design.

Ostensibly, for degree aspiring students a successful outcome for community college students would involve earning a credential. This is the outcome variable we begin with, a successful outcome is earning any academic degree or certificate from a community college within three years of the first fall enrollment.

RQ2: What is the impact of rank on the success of remedial students?

The three different options for rank that a professor could have are (a) Professor, (b) Not Professor and (c) No Rank. (a) means tenured or on the tenure track while (b) is not on the tenure track at all.

Model 3 provides no evidence that non-tenure track faculty or faculty at schools without a ranking system have a significant impact on CC degree completion. Across all years, the coefficients lack significance. In the full model (4) with interactive terms there is weak evidence, especially in 2004, that remedial education students have a slightly lower rate of completion when they are exposed to non-tenure track faculty (vs. no

ranking system). Significant coefficients are seen in the interaction terms of Not Professor and Curriculum 1, 4, and 7 and should be interpreted as such: For each additional percentage of faculty with the rank of not a Professor teaching in a student's curriculum, the odds of completion decrease by .369% for students in curriculum 4, holding all other variables constant. The fact that significance appears in Curriculums 1, 4 and 7 of Tables 3-5 signals the impact could be remedial math driven.

RQ 3: How does the percentage of part-time faculty who teach remedial courses affect degree completion?

Model 4 provides scattered evidence that part-time faculty have a small and positive impact on CC degree completion for select groups of remedial students as compared to their college level peers, most evident for students in Curriculum 7, those who take all three remedial courses. In 2004, for each additional percentage of part-time faculty teaching in a curriculum 1, the odds of completion for a remedial math student increase by .511%, holding all other variables constant. This is counter intuitive and against what was hypothesized. Perhaps this could be driven by schools who centralize their developmental education in learning centers staffed by mostly part-time faculty. For future research, it would be helpful to note not just the type of faculty member, but also how the curriculum is administered.

RQ 4: What is the impact of average educational level of faculty on degree completion for remedial students?

As presented above, remedial students are more likely to be in courses taught by professors with a lower educational attainment. In this analysis, the reference group is

faculty members with doctorates. Throughout the three years of the analysis there is only one moderately specific pattern relating faculty education with differential educational results. In 2002, there is a small negative impact on community college degree completion from the relationship between faculty members with an AA degree or less and students in the language arts remediation. For each additional percentage of faculty with an AA degree or less teaching in curriculum 3, the odds of completion decrease by 2.34% for students in curriculum 3, holding all other variables constant. This pattern is not present in either of the other two years of the analysis. This null result was not what was hypothesized, but reassuring in that students who are assigned to professors with lower education levels do not seem to be performing any worse.

RQ 5: How does the effect of tenure, part-time status and education level differ for remedial students and their on level peers?

In this analysis, students who were not enrolled in any remedial courses were the reference group. As there were no persisting patterns with respect to remediation students and faculty characteristics as compared to the reference group, it appears that faculty characteristics impact both groups similarly, that is without much impact at all.
This is not a particularly striking research finding, but policy-wise it is better than to see than huge differential achievements.

Table 3

Summary of Analysis for Variables Predicting AA Degree Completion within 3 Years for Students Beginning at Community Colleges in Fall 2000

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
Academic Disadvantage		-10.3	***	-9.94	***	-9.59	***
Economic Disadvantage		18.6	***	18.98	***	18.17	***
African American		-23.9	***	-24.03	***	-23.64	***
Hispanic		25.2	***	25.63	***	26.01	***
Asian, Other, Unknown		13.8	**	13.67	**	13.67	**
Technical		27.6	***	27.18	***	26.63	***
Tech Prep		24.7	***	24.65	***	24.58	***
Male		-36.5	***	-36.50	***	-36.58	***
Certificate		15.5	***	15.40	***	15.24	***
Unknown		24.5	***	24.31	***	23.66	***
Credit Hours (12)		11.6	***	11.63	***	11.59	***
Remedial Status							
DE Math		-33.7	***	-36.83	***		
DE Reading		-37.4	***	-39.93	***		
DE Writing		-18.6	**	-21.14	**		
DE Math & Reading		-48.0	***	-50.30	***		
DE Math & Writing		-36.5	***	-39.05	***		
DE Reading & Writing		-44.6	***	-46.95	***		
DE All		-52.4	***	-54.21	***		
Faculty covariates							
Part time				-0.11		-0.48	**
Not Professor				-0.06		-0.12	
No Ranking System				0.02			
Masters				0.49	**	1.01	***
BA				0.50	*	0.61	*
AA or less				1.05	*	1.38	
Institutional covariates							
HBCU				-29.52		-28.13	
HSI				-9.98		-10.50	
Curriculum # * Faculty Interaction							
C1*Part						0.24	
C2*Part						0.52	
C3*Part						0.10	
C4*Part						0.88	**
C5*Part						0.82	
C6*Part						1.41	**
C7*Part						1.39	***
Professor						0.14	
C1*Prof						-0.26	

	C2*Prof							-0.26	
	C3*Prof							-0.21	
	C4*Prof							-0.22	
	C5*Prof							-0.79	
	C6*Prof							-0.77	
	C7*Prof							0.07	
	C1*NotProf							0.11	
	C2*NotProf							0.19	
	C3*NotProf							0.12	
	C4*NotProf							0.03	
	C5*NotProf							-0.14	
	C6*NotProf							0.01	
	C7*NotProf							-0.49	**
	C1*Masters							-0.94	
	C2*Masters							-0.66	
	C3*Masters							-1.79	**
	C4*Masters							0.28	
	C5*Masters							-0.02	
	C6*Masters							-1.60	*
	C7*Masters							-0.24	
	C1*BA							-0.33	
	C2*BA							-0.83	
	C3*BA							-1.13	
	C4*BA							1.23	
	C5*BA							0.86	
	C6*BA							-1.64	
	C7*BA							0.16	
	C1*AA							-1.37	
	C2*AA							-0.57	
	C3*AA							-2.22	
	C4*AA							0.19	
	C5*AA							-1.35	
	C6*AA							-1.07	
	C7*AA							1.30	
	_constant	-79.28	***	-71.22	***	-78.98	***	-83.11	***
	L1 _constant	-56.19	***	-67.64	***	-69.30	***	-71.02	***
	Statistics								
	N	67683		67683		67683		67683	
	chi2			2457		2477		2550	
	p			.000		.000		.000	

legend * p<0.05 ** p<0.01 *** p<0.001

Table 4

Summary of Analysis for Variables Predicting AA Degree Completion within 3 Years for Students Beginning at Community Colleges in Fall 2002

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
Academic Disadvantage		-14.985	***	-15.820	***	-16.443	***
Economic Disadvantage		-1.630		-1.292		-1.703	
African American		-26.809	***	-26.776	***	-26.270	***
Hispanic		19.109	***	19.466	***	19.594	***
Asian, Other, Unknown		-3.264		-3.012		-2.766	
Technical		21.508	***	21.370	***	21.235	***
Tech Prep		24.526	***	24.082	***	24.806	***
Male		-32.423	***	-32.411	***	-32.404	***
Certificate		11.885	***	11.960	***	12.061	***
Unknown		6.934		6.936		6.073	
Credit Hours (12)		10.799	***	10.821	***	10.831	***
Remedial Curriculum							
DE Math		-38.413	***	-38.759	***		
DE Reading		-36.921	***	-37.560	***		
DE Writing		-34.861	***	-35.344	***		
DE Math & Reading		-58.905	***	-59.188	***		
DE Math & Writing		-57.766	***	-58.017	***		
DE Reading & Writing		-49.801	***	-49.889	***		
DE All		-61.320	***	-61.670	***		
Faculty Covariates							
Part time				-.199	*	-.286	*
Not Professor				.071		.014	
No Ranking System				.069			
Masters				.594	***	1.136	***
BA				.445	*	-1.571	*
AA or less				.596	*	1.063	*
Institutional Covariates							
HBCU				.888		1.548	
HSI				-7.180		-5.944	
Curriculum x Faculty Interaction							
C1*Part						.312	*
C2*Part						.254	
C3*Part						.095	
C4*Part						.135	
C5*Part						.117	
C6*Part						.243	
C7*Part						.501	
Professor						-.042	
C1*Prof						-.416	*
C2*Prof						-.690	**

C3*Prof							-.449	
C4*Prof							-.179	
C5*Prof							.605	
C6*Prof							.207	
C7*Prof							.496	
C1*NotProf							-.084	
C2*NotProf							.194	
C3*NotProf							.023	
C4*NotProf							-.033	
C5*NotProf							-.219	
C6*NotProf							.011	
C7*NotProf							-.344	*
C1*Masters							-.749	
C2*Masters							-1.341	**
C3*Masters							-1.412	*
C4*Masters							-2.016	*
C5*Masters							.077	
C6*Masters							-.820	
C7*Masters							.806	
C1*BA							1.665	*
C2*BA							.958	
C3*BA							1.337	
C4*BA							.838	
C5*BA							2.311	
C6*BA							2.200	*
C7*BA							3.020	**
C1*AA							-1.213	
C2*AA							-.597	
C3*AA							-2.340	*
C4*AA							-1.881	*
C5*AA							-.076	
C6*AA							-3.903	*
C7*AA							.317	
_constant	-77.436	***	-63.959	***	-76.692	***	-82.106	***
L1 _constant	-64.554	***	-70.578	***	-71.910	***	-72.621	***
Statistics								
N	68663		68663		68663		68663	
chi2			2633		2652		2714	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

Table 5

Summary of Analysis for Variables Predicting AA Degree Completion within 3 Years for Students Beginning at Community Colleges in Fall 2004

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
Academic Disadvantage		-25.751	***	-24.985	***	-23.734	***
Economic Disadvantage		8.004	**	8.474	**	9.054	***
African American		-32.887	***	-32.819	***	-32.597	***
Hispanic		23.112	***	23.625	***	23.366	***
Asian, Other, Unknown		31.912	***	31.945	***	32.744	***
Technical		15.041	***	15.070	***	15.206	***
Tech Prep		9.782	**	9.875	**	10.296	**
Male		-27.926	***	-27.908	***	-27.950	***
Certificate		3.509		3.287		2.454	
Unknown		-11.739	***	-11.663	***	-11.513	***
Credit Hours (12)		11.540	***	11.557	***	11.596	***
Remedial Curriculum							
DE Math		-22.488	***	-31.609	***		
DE Reading		-31.623	***	-36.487	***		
DE Writing		-15.107	*	-21.468	**		
DE Math & Reading		-45.751	***	-51.098	***		
DE Math & Writing		-42.360	***	-47.990	***		
DE Reading & Writing		-43.844	***	-48.432	***		
DE All		-58.885	***	-62.685	***		
Faculty Covariates							
Part time				.130		-.183	
Not Professor				.095		.170	
No Ranking System				.000			
Masters				.232		.183	
BA				.513	*	.539	
AA or less				.482	*	.355	
Institutional Covariates							
HBCU				-23.206		-19.686	
HSI				-11.373		-11.755	
Curriculum x Faculty Interaction							
C1*Part						.511	***
C2*Part						-.046	
C3*Part						.652	
C4*Part						.330	
C5*Part						.696	
C6*Part						-.037	
C7*Part						.753	*
Professor						-.068	
C1*Prof						-.091	
C2*Prof						-.128	

C3*Prof							.388	
C4*Prof							.262	
C5*Prof							-.117	
C6*Prof							.391	
C7*Prof							.187	
C1*NotProf							-.184	**
C2*NotProf							-.100	
C3*NotProf							-.083	
C4*NotProf							-.369	***
C5*NotProf							-.161	
C6*NotProf							-.025	
C7*NotProf							-.344	**
C1*Masters							-.466	
C2*Masters							.303	
C3*Masters							.917	
C4*Masters							-.154	
C5*Masters							-.378	
C6*Masters							-1.724	
C7*Masters							-1.209	
C1*BA							-.654	
C2*BA							.236	
C3*BA							.271	
C4*BA							-.355	
C5*BA							-.583	
C6*BA							-2.033	
C7*BA							-1.815	
C1*AA							-.706	
C2*AA							-.233	
C3*AA							.852	
C4*AA							-.280	
C5*AA							-.687	
C6*AA							-1.785	
C7*AA							-1.414	
_constant	-77.436	***	-60.090	***	-70.222	***	-65.398	***
L1 _constant	-64.554	***	-70.491	***	-71.479	***	-71.452	***
Statistics								
N	75554		75554		75554		75554	
chi2			2905		2923		2989	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

Tables 6-8 below show the results of the analysis for the years of 2000, 2002 and 2004. Here, the dependent variable is the completion of a university degree within six years of the first fall enrolled in the Texas community college. The format of the table and variable definitions are the same as in the previous chapter.

RQ2: What is the impact of rank on the success of remedial students?

The three different options for rank that a professor could have are (a) Professor, (b) Not Professor and (c) No Rank. (a) means tenured or on the tenure track while (b) is not on the tenure track at all.

Model 3 in all three years provides no evidence that non-tenure track faculty or faculty at schools without a ranking system have a significant impact on University degree completion. There is the occasional significant coefficient, but no pattern across years or a systematic difference within year to indicate faculty rank in one's first semester affects Bachelor's degree completion. This is not particularly surprising. Unless students are cultivating particularly rich relationships with faculty members in their first semester (and they should!) on a systematic level within institution, being able to discern a relationship that continues to impact through transfer to Bachelor's degree attainment is difficult.

RQ 3: How does the percentage of part-time faculty who teach remedial courses affect degree completion?

Model 4 provides no evidence that part-time faculty have a significantly different impact on university degree completion for remedial students as compared to full time

faculty members. There are a few significant coefficients for the interaction terms between part-time and different curriculum levels, but nothing to suggest either a positive or negative impact of part-time faculty members either over time or curriculum level. For each additional percentage of part-time faculty teaching in curriculum 6 in 2000, the odds of completion increase by 2.49% for students in curriculum 6, holding all other variables constant.

Again, it is reassuring to know that greater proportions of part-time faculty members are not having a differential impact on students in different curriculums in any systematic way. As long as part-time faculty members are incorporated into departments as professionals, with all the rights therein, utilizing more part-timers could be viable cost saving strategy that wouldn't compromise achievement.

RQ 4: What is the impact of average educational level of faculty on degree completion for remedial students?

In 2000 there is a slight pattern of math remedial education students (curriculum 1 & 4) being positively impacted in terms of college degree completion when there are more faculty members in the remedial department with AA degrees or less. For each additional percentage of faculty with an AA degree or less teaching in curriculum 1, the odds of completion increase by 3.771% for students in curriculum 1, holding all other variables constant. This pattern does not repeat in the subsequent years.

There is also a pattern of significant coefficients in 2004 with the interactions of education level and being in math and reading remediation (curriculum level 4). The relationship is positive indicating that in that year a math remediation student had a greater likelihood of earning a college degree when the likelihood of having a course with a non-

doctorate holding faculty member increased. Again, there was no evidence of this pattern in any other years.

RQ 5: How does the effect of tenure, part-time status and education level differ for remedial students and their on level peers?

In this analysis, students who were not enrolled in any remedial courses were the reference group. As there were no persisting patterns with respect to remediation students and faculty characteristics as compared to the reference group, it appears that faculty characteristics impact both groups similarly, that is without much impact at all.

One consistent pattern, and likely the takeaway from this entire analysis is that in this 2-level model of students within curriculum, the individual student characteristics are a better predictor of college degree completion than any of the faculty or school characteristics. In other words, the coefficients introduced in Model 2 are significant and remain significant with the introduction of the institutional factors. The aim of this analysis was to see if institutional faculty characteristics impacted remedial education students differentially, but sadly, it seems as if departmental faculty characteristics are just too far removed from the individual student to see any impact if it exists.

Table 6

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at Community Colleges in Fall 2000

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
Academic Disadvantage		-44.796	***	-44.353	***	-44.585	***
Economic Disadvantage		-19.240	***	-19.165	***	-18.319	***
African American		-42.723	***	-42.682	***	-43.037	***
Hispanic		-41.110	***	-41.596	***	-41.474	***
Asian, Other, Unknown		2.315		2.150		1.812	
Technical		-41.291	***	-41.007	***	-41.040	***
Tech Prep		-48.939	***	-48.947	***	-48.852	***
Male		-35.312	***	-35.275	***	-35.258	***
Certificate		-41.584	***	-41.493	***	-41.534	***
Unknown		-76.461	***	-76.410	***	-76.447	***
Credit Hours (12)		3.202	***	3.263	***	3.322	***
Remedial Curriculum							
DE Math		-47.759	***	-53.819	***		
DE Reading		-54.478	***	-59.067	***		
DE Writing		-31.979	***	-38.308	***		
DE Math & Reading		-69.627	***	-72.922	***		
DE Math & Writing		-67.115	***	-70.472	***		
DE Reading & Writing		-64.536	***	-67.550	***		
DE All		-78.562	***	-80.654	***		
Faculty Covariates							
Part time				.144		-.022	
Not Professor				.022		.187	
No Ranking System				-.081		.000	
Masters				.438		.134	
BA				.758	**	.854	*
AA or less				-.963		-3.290	**
Institutional Covariates							
HBCU				-28.417		-25.637	
HSI				30.808	**	24.222	*
Curriculum x Faculty Interaction							
C1*Part						-.214	
C2*Part						.305	
C3*Part						.453	
C4*Part						.090	
C5*Part						-.553	
C6*Part						2.490	**
C7*Part						.549	
Professor						-.071	
C1*Prof						-.534	*
C2*Prof						-.056	
C3*Prof						-.314	
C4*Prof						-.820	
C5*Prof						-.907	
C6*Prof						1.537	*
C7*Prof						-.066	
C1*NotProf						-.006	
C2*NotProf						-.161	
C3*NotProf						-.465	
C4*NotProf						-.071	
C5*NotProf						.089	
C6*NotProf						-.055	

C7*NotProf							-.210	
C1*Masters							.946	
C2*Masters							.239	
C3*Masters							-.649	
C4*Masters							2.492	
C5*Masters							-.923	
C6*Masters							.714	
C7*Masters							1.313	
C1*BA							.597	
C2*BA							-.984	
C3*BA							-1.164	
C4*BA							1.143	
C5*BA							-.054	
C6*BA							-.590	
C7*BA							.310	
C1*AA							3.771	**
C2*AA							1.687	
C3*AA							-2.552	
C4*AA							8.786	**
C5*AA							-1.753	
C6*AA							-1.570	
C7*AA							6.009	
_constant	-87.456	***	-47.834	***	-66.749	***	-56.942	**
L1 _constant	-39.266	***	-60.478	***	-65.531	***	-65.934	***
Statistics								
N	67683.000		67683.000		67683.000		67683.000	
chi2			3913.639		3937.271		3958.899	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

Table 7

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at Community Colleges in Fall 2002

		Model 1	Model 2		Model 3		Model 4	
Individual Covariates		% Change	% Change		% Change		% Change	
	Academic Disadvantage		-42.105	***	-41.972	***	-41.712	***
	Economic Disadvantage		-13.617	***	-13.465	***	-13.543	***
	African American		-51.044	***	-51.106	***	-51.059	***
	Hispanic		-38.290	***	-38.559	***	-38.565	***
	Asian, Other, Unknown		-10.570	*	-10.744	*	-10.711	*
	Technical		-41.979	***	-42.002	***	-41.969	***
	Tech Prep		-58.374	***	-58.337	***	-58.241	***
	Male		-34.628	***	-34.604	***	-34.606	***
	Certificate		-37.196	***	-37.197	***	-37.226	***
	Unknown		-71.902	***	-71.881	***	-71.909	***
	Credit Hours (12)		3.167	***	3.161	***	3.198	***
Remedial Curriculum								
	DE Math		-46.678	***	-43.161	***		
	DE Reading		-50.057	***	-47.684	***		
	DE Writing		-43.276	***	-40.711	***		
	DE Math & Reading		-72.240	***	-70.701	***		
	DE Math & Writing		-67.752	***	-65.993	***		
	DE Reading & Writing		-63.578	***	-62.068	***		
	DE All		-79.602	***	-78.543	***		
Faculty Covariates								
	Part time				.029		-.060	
	Not Professor				.076		.003	
	No Ranking System				.095		.000	
	Masters				-.156		-.051	
	BA				-.340		1.250	
	AA or less				-.181		.303	
Institutional Covariates								
	HBCU				-66.499	**	-66.473	**
	HSI				13.822		13.764	
Curriculum x Faculty Interaction								
	C1*Part						.004	
	C2*Part						.341	
	C3*Part						.126	
	C4*Part						1.102	*
	C5*Part						-.619	
	C6*Part						1.058	
	C7*Part						.859	
	Professor						-.065	
	C1*Prof						-.035	
	C2*Prof						-.055	
	C3*Prof						-.391	
	C4*Prof						.844	
	C5*Prof						.687	
	C6*Prof						1.839	**

C7*Prof							.661	
C1*NotProf							-.048	
C2*NotProf							.232	
C3*NotProf							.262	
C4*NotProf							-.222	
C5*NotProf							.148	
C6*NotProf							-.462	
C7*NotProf							-.427	
C1*Masters							.091	
C2*Masters							-.117	
C3*Masters							-1.450	
C4*Masters							1.786	
C5*Masters							2.006	
C6*Masters							.434	
C7*Masters							2.037	
C1*BA							-1.894	
C2*BA							-1.815	
C3*BA							-1.556	
C4*BA							.300	
C5*BA							1.826	
C6*BA							.729	
C7*BA							.842	
C1*AA							-.410	
C2*AA							.390	
C3*AA							1.248	
C4*AA							.505	
C5*AA							3.008	
C6*AA							-4.630	
C7*AA							1.038	
_constant	-88.870	***	-52.359	***	-51.009	**	-52.488	*
L1 _constant	-42.231	***	-63.329	***	-65.335	***	-65.358	***
Statistics								
N	68663		68663		68663		68663	
chi2			3560		3573		3567	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

Table 8

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at Community Colleges in Fall 2004

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
Academic Disadvantage		-38.457	***	-38.922	***	-40.051	***
Economic Disadvantage		-22.236	***	-22.327	***	-22.548	***
African American		-37.938	***	-38.062	***	-37.918	***
Hispanic		-37.423	***	-37.542	***	-37.363	***
Asian, Other, Unknown		-5.905		-6.256		-5.914	
Technical		-45.150	***	-45.090	***	-45.028	***
Tech Prep		-50.440	***	-50.411	***	-50.336	***
Male		-32.315	***	-32.341	***	-32.421	***
Certificate		-55.522	***	-55.292	***	-55.118	***
Unknown		74.990	***	75.270	***	75.744	***
Credit Hours (12)		3.769	***	3.683	***	3.658	***
Remedial Curriculum							
DE Math		-44.182	***	-51.156	***		
DE Reading		-62.339	***	-65.201	***		
DE Writing		-63.714	***	-67.023	***		
DE Math & Reading		-73.767	***	-76.390	***		
DE Math & Writing		-71.175	***	-73.999	***		
DE Reading & Writing		-71.972	***	-74.061	***		
DE All		-79.020	***	-80.846	***		
Faculty Covariates							
Part time				-.304	*	-.295	
Not Professor				.073		-.146	
No Ranking System				.234		.000	
Masters				-.038		-.450	
BA				.590		.157	
AA or less				-.452		-.841	*
Institutional Covariates							
HBCU				-63.100	*	-62.279	*
HSI				20.981		20.225	
Curriculum x Faculty Interaction							
C1*Part						.291	
C2*Part						-.085	
C3*Part						.008	
C4*Part						-.367	
C5*Part						-.049	
C6*Part						-.660	
C7*Part						2.133	**
Professor						-.209	
C1*Prof						.074	
C2*Prof						.471	
C3*Prof						.464	
C4*Prof						-.626	
C5*Prof						.694	
C6*Prof						-.219	
C7*Prof						-.386	
C1*NotProf						.021	
C2*NotProf						-.212	
C3*NotProf						.601	
C4*NotProf						.005	

C5*NotProf							-.207	
C6*NotProf							-.217	
C7*NotProf							.193	
C1*Masters							2.611	***
C2*Masters							3.423	*
C3*Masters							1.602	
C4*Masters							-1.407	
C5*Masters							2.573	
C6*Masters							-.403	
C7*Masters							2.213	
C1*BA							2.345	*
C2*BA							2.895	
C3*BA							2.263	
C4*BA							-.881	
C5*BA							3.330	
C6*BA							-.503	
C7*BA							.586	
C1*AA							2.827	***
C2*AA							3.267	*
C3*AA							3.084	
C4*AA							-1.229	
C5*AA							3.670	
C6*AA							-.223	
C7*AA							2.791	
_constant	-90.003	***	-72.238	***	-71.766	***	-50.840	*
L1 _constant	-40.276	***	-54.764	***	-57.859	***	-57.442	***
Statistics								
N	75554		75554		75554		75554	
chi2			3902		3924		3922	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

I have prepared two tables to summarize the results presented above in a concise manner. The first, Table 9 shows us the differences that individual characteristics have in predicting AA and BA degree success. As hypothesized, being a full time student (credit hours (12)) positively influences degree completion. In predicting AA degree success, declaring the a technical or technical preparatory reason for entering the community college seems to positively impact completion. This is likely because the dependent variable includes certificate completion and one should be able to complete a certificate program in three years even with stop-out behavior. One unusual finding, not usually present in the literature is the positive impact being Hispanic has on AA completion. After accounting for all other characteristics, in this case Hispanic heritage is a positive predictor of graduating. This could be attributed to multiple factors. First, it is possible

that most of the predicted negative impact is in the HSI coefficient. Second, it could just be the case that after netting out individual, curricular and institutional characteristics Hispanics fare as well in community colleges as do whites.

As you can see, the story changes for the BA degree outcome. In predicting a BA degree, nothing positively predicts completion except credits taken in the first semester.

Table 9

Summary of Significant Individual Characteristics for Students Beginning at 2-year Schools

	AA			BA		
	2000	2002	2004	2000	2002	2004
Academic Disadvantage	-	-	-	-	-	-
Economic Disadvantage	+		+	-	-	-
African American	-	-	-	-	-	-
Hispanic	+	+	+	-	-	-
Asian, Other, Unknown	+		+		-	
Technical	+	+	+	-	-	-
Tech Prep	+	+	+	-	-	-
Male	-	-	-	-	-	-
Certificate	+	+		-	-	-
Unknown	+		-	-	-	+
Credit Hours (12)	+	+	+	+	+	+

Table 10 below details the impact of faculty characteristics on the different curriculum levels across the years for AA and BA completion. The first thing to notice is that there are many more insignificant interactions between faculty characteristics and curriculum than there are significant. Of these faculty characteristics, Professor status was hypothesized to have a positive impact on degree completion and the rest were thought to impact completion negatively. As you can see, the hypotheses did not predict as planned. Faculty members with AA, BA and MA degrees have positive impacts for students not needing remediation or only needing math remediation in some years and degree combinations. Also unexpected is the positive impact faculty part time status had on degree completion for students in curriculums 6 and 7.

Table 10

Summary of Significant Faculty Characteristics for Students Beginning at 2-year Schools

		0		1		2		3		4		5		6		7	
		AA	BA	AA	BA	AA	BA	AA	BA	AA	BA	AA	BA	AA	BA	AA	BA
Part time	2000	-								+				+	+	+	
	2002	-		+							+						
	2004			+												+	+
Professor	2000				-										+		
	2002			-		-									+		
	2004																
Not Prof	2000															-	
	2002															-	
	2004			-						-						-	
MA	2000	+						-						-			
	2002	+				-		-		-							
	2004				+		+										
BA	2000	+	+														
	2002	-		+										+		+	
	2004				+								+				
AA	2000		-		+												
	2002	+						-		-				-			
	2004		-		+		+										

Bettinger and Long (2005) and Harrington and Schibik (2001) both found a negative relationship between part time faculty and retention. This study saw part time faculty positively impacting the ultimate retention, degree attainment. The result is closer to that of Bolge (1995) who found no difference between students with full and part time professors in developmental math.

The impact of faculty characteristics on student success has had mixed results in this study and ones previous. Much exploration is yet to be done with both the impact of faculty on college-level students and the impact of faculty on students requiring developmental education. The next chapter will delve into this using a sample of students who begin at four-year colleges.

CHAPTER V

RESULTS FOR STUDENTS WHO BEGIN AT UNIVERSITIES AND FOUR-YEAR COLLEGES

Research question 1 asks whether there have been changes in time in the type of faculty who are assigned to teach remedial education courses. The answer to this question was investigated by taking an overall snapshot of remedial education courses in the years 2000, 2002, and 2004. These years were chosen based on both availability of data and the policy context in Texas at the time (for more information on this, see section on Texas remediation policy.

Table 12 shows the proportion of students, courses or professors meeting certain criteria across the years 2000, 2002 and 2004. The table provides some insight into the characteristics of remedial education across this time period.

The far left column refers to the level of curriculum in which students are enrolled. The levels range from 0 for students whose course schedules have no remedial education courses in it during the first semester of their first year to 7 for students whose course schedules include math, reading and writing remedial courses. Curriculum levels 1, 2 and 3 are students whose schedule has math (1), reading (2) or writing (3) as their singular remedial course. Curriculum 4 includes students who have both math and reading remedial education. Curriculum 5's students are enrolled in remedial math and writing and finally, Curriculum 6 is for students in remedial reading and writing. This is detailed for reference in Table 11 below.

Table 11

Curriculum Designations

Curriculum #	Curriculum content
0	No remedial education
1	Remedial Math
2	Remedial Reading
3	Remedial Writing
4	Remedial Math & Reading
5	Remedial Math & Writing
6	Remedial Reading & Writing
7	Remedial Math, Reading & Writing

RQ1: Faculty Teaching Remediation

Proportion of students taking the correct curriculum:

From this column in the table we can glean a few insights into Texas remediation placement. This column details the proportion of students in the Curriculum number who are correctly placed. For example, if a student's test scores dictate they should be in math remediation and the student enrolls in math remediation during the fall semester they would be coded a 1 in the dataset. If a student either (a) fails to enroll in the remediation curriculum assigned, (b) enrolls in remedial courses when they are not assigned or (c) does not enroll in their complete remediation assignment they would be coded as a 0.

This column shows that students who do not need remediation are the most likely to be enrolled in the correct curriculum. Those in need of remediation in all subjects are

correctly placed in the first two years, but in 2004 the percentage of Curriculum 7 students in their correct placement declined. This pattern is evident in the other remedial curriculum levels as well. College level learners are placed in the right courses universally, but in 2004 their remedial peers are likely not in the correct curriculum according to their placement testing. As noted in the last chapter, this may be a result of the implementation of the Texas Success Initiative in 2003. This could also be the result of less academic guidance and counseling or a purposeful attempt to mainstream students who place into remediation. Without more investigation, possibly involving a qualitative study, the reasoning for incorrect course placement in unknown.

Table 12

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at 4-Year Colleges in Fall 2000

		Students in		Degree Attainment	Students taught by			
Curriculum Taken		Correct curriculum	HIS	BA 6yrs	Part Time	Professor	TA	Instructor
0								
	2000	.90	.14	.60	.28	.53	.17	.30
	2002	.95	.14	.61	.25	.53	.14	.33
	2004	.91	.18	.61	.24	.52	.14	.34
1								
	2000	.62	.31	.31	.44	.08	.24	.68
	2002	.84	.51	.28	.38	.03	.14	.83
	2004	.32	.46	.35	.45	.02	.19	.79
2								
	2000	.50	.45	.24	.47	.08	.20	.72
	2002	.69	.54	.25	.44	.08	.18	.74
	2004	.30	.47	.25	.46	.10	.16	.74
3								
	2000	.53	.40	.25	.59	.12	.32	.56
	2002	.67	.39	.27	.49	.15	.28	.57
	2004	.24	.45	.28	.47	.01	.12	.87
4								
	2000	.70	.45	.21	.43	.15	.14	.71
	2002	.78	.52	.18	.33	.10	.08	.81
	2004	.27	.39	.25	.51	.14	.26	.60
5								
	2000	.34	.18	.12	.31	.21	.25	.55
	2002	.72	.37	.22	.41	.10	.20	.70
	2004	.19	.51	.19	.49	.02	.10	.89
6								
	2000	.49	.37	.19	.42	.10	.15	.75
	2002	.51	.38	.20	.31	.15	.14	.71
	2004	.18	.46	.18	.53	.04	.15	.82
7								
	2000	1.00	.41	.24	.45	.13	.10	.77
	2002	1.00	.54	.20	.53	.11	.18	.70
	2004	.48	.55	.12	.56	.07	.07	.85

Proportion in an HSI

The purpose of this column is to determine the distribution of remedial students between institutions. 18 percent of students not requiring remediation were enrolled in Hispanic Serving Institutions in 2004. 82 percent were in non-HSIs. Of the students requiring total remediation, over half were in Hispanic Serving Institutions in both 2002 and 2004. HSIs have a disproportionately high level of the lowest test scorers compared to the other remediation levels. HSI's require special attention from legislators with regards to developmental education. More students requiring academic attention needs to be address with innovative programs and possibly greater financial resources.

Graduation Rates

The next column displays the proportion of students in each curriculum category who graduate with a college (BA) within six years from the first fall enrollment. The most prepared students graduate about 61% of the time with a university degree. One would likely expect an incoming student in need of remediation would be less likely to graduate. This is the case; and the more remediation required the less likely graduation for the most part. Depending on the level of remediation required and the year, an underprepared student has a likelihood of graduation between 12 and 35%. This is a sharp contrast to those not enrolling in remediation their first semester. These numbers do not account for covariates.

Part-time professors

The data indicates that non-remedial courses are less likely to be taught by part-time faculty than remedial courses. Remedial education students have between a 31 and a 56 percent chance of having their remedial coursework taught by part-time professors. Non-remedial students' courses are taught by part-timers roughly 25 percent of the time. As noted earlier, part-time status could mean less attachment to the institution and extended, students (Benjamin, 2003).

Rank

Finally, the last three columns deal with the rankings of professors teaching the course levels. For this table I have split faculty members into three categories: Professor if you are a full-time tenured or tenure track faculty member, Instructor if you are any type of contingent faculty member and finally TA for courses taught by graduate students.

Professors teach over 50 percent of the math, English and writing courses that are college level. Of the remedial courses, Professors teach in the single digit percentages. Most remedial courses are taught by instructors and TAs.

To provide further evidence of changes in the type of faculty who teach both remedial and non-remedial courses, I have made graphics expressing Table 10 in a slightly different manner. Table 12 is primarily student focused and concentrates on the experiences of students in different types of curricular tracks. Figures 9-14 are less detailed; they split the courses between math and language arts (reading/English and writing) and split those subjects between remedial courses and not. The math and

language arts graphs have a very similar story, so only the math figures are presented in Figures 9-14 below.

Figures 9-11 show the stagnant proportions of full and part time faculty members. In all three years of the analysis the split between full and part time teachers in developmental and college level courses has not changed much. In non-developmental math courses about 75% are taught by full-time faculty members. The others are taught by part-timers. For the developmental courses, full-time faculty taught roughly 60% of the remedial courses. The fact that percentages do not change much over time could be indicative that there is not much faculty turn-over even amongst part-time faculty. However, these figures may also imply that there are a stagnant number of positions, full and part-time and there could be turnover within the positions. It is impossible to tell from the information as it is currently compiled.

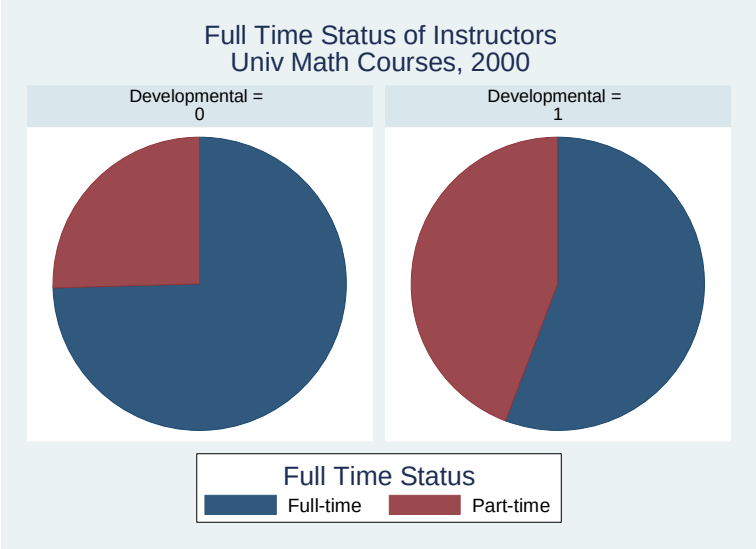


Figure 9: FT Math, 2000

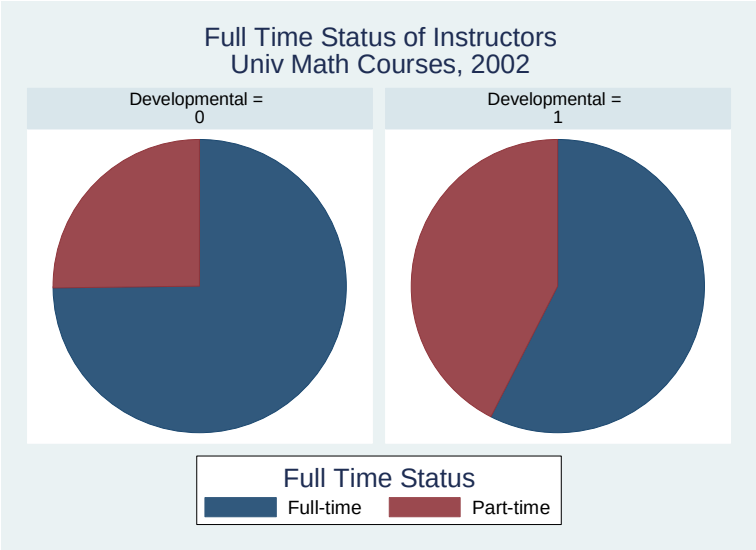


Figure 10: FT Math, 2002

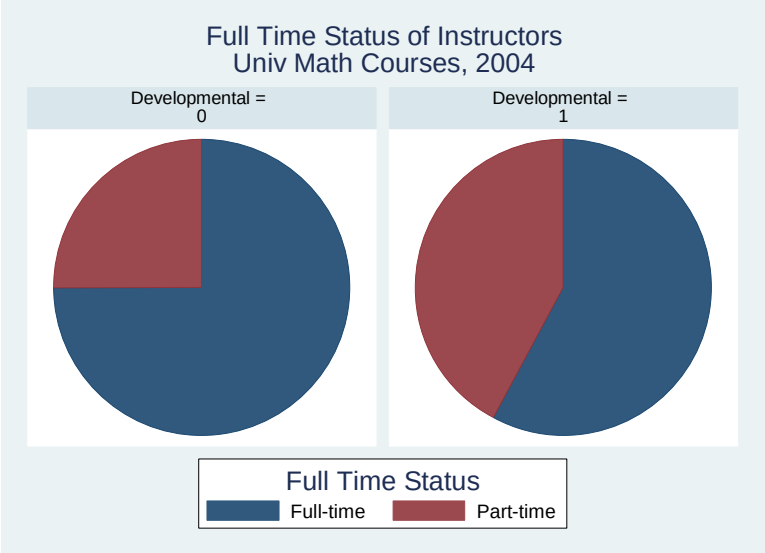


Figure 11: FT Math, 2004

Figures 12-14 below illustrate the distribution of faculty members in on and below level courses by faculty rank. The most obvious difference between the pie charts is that the non-developmental education charts have a more equal distribution of faculty rankings. College level math classes are taught by faculty with a variety of ranks. About 55% are professors on the tenure track with the rest split between Adjunct faculty and TAs.

The developmental story is different. The portions of the chart associated with tenure track faculty are practically nonexistent. Less than 15% of remedial math courses are taught by faculty on the tenure track. Just more than 60% are taught by "other" (read: contingent) faculty and about 15% of remedial courses are taught by TAs. There appears to be a consistent pattern at the college level to staff remedial courses with non-tenure track faculty members.

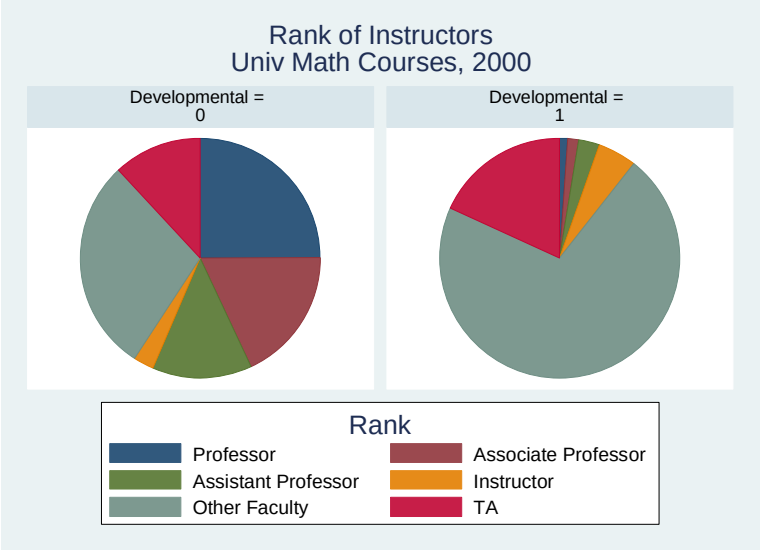


Figure 12: Rank Math, 2000

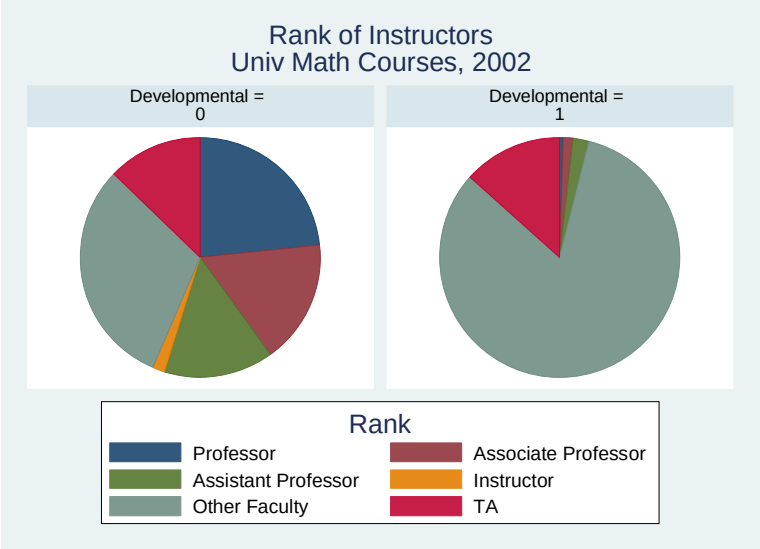


Figure 13: Rank, Math, 2002

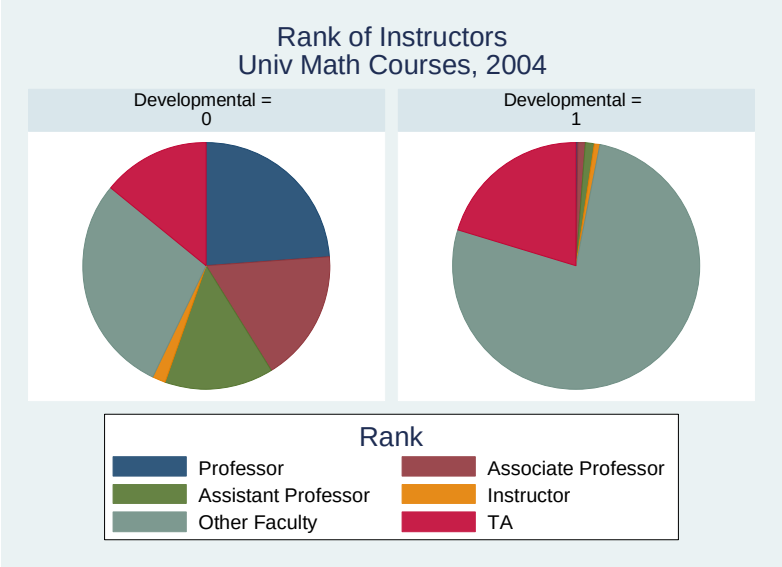


Figure 14: Rank, Math, 2004

Four-Year Degrees

Tables 13-15 below use a 2-level HLM model (students within curriculum) to evaluate the impact of particular professor characteristics on successful outcomes. The tables present four models discussed in the Methods chapter. In sum, Model 1 is the Null model with no covariates. Model 2 adds covariates relating to the student including the impact of different curriculums. Model 3 includes the covariates associated with professor and school. Finally, Model 4 introduces interactive terms to evaluate the impact of faculty characteristics on different curriculums. The full set of models is presented for each of the investigative years.

The outcome variable below is if a student earned a degree from a college or university within six years of their initial enrollment in the college. This is most likely a

Bachelor's degree, but in rare instances a student earned a certificate or a Master's degree (likely with a Bachelor's in passing).

RQ 6: What is the impact of rank on the successful attainment of a degree for remedial education students?

The three different options for rank that a professor could have are (a) Professor, (b) TA and (c) Instructor. (a) means tenured or on the tenure track while (b) refers to graduate students teaching courses and (c) are faculty members who are not on the tenure track. The reference group in the model is (a) Professor.

In the year 2000, the interaction between the likelihood of having a TA teaching one's class and being in a remedial math curriculum (1 & 4) is negatively related to degree attainment as compared to Professor taught curriculum. For each additional percentage of remedial math courses taught by TAs, the odds of completion decrease by 2.5% for the curriculum 1 student, all other variables constant. The same is the case in that year with Instructors and Curriculum 1. For each additional percentage of remedial math courses taught by Instructors, the odds of completion decrease by 1.487% for the Curriculum 1 student, all other variables constant. In this year it appears that students needing math remediation were more likely to be degree earners in the future as the likelihood of having a TA or instructor decreases.

However, this year also shows coefficients with strong statistical significance for the interactions between Curriculum 7 (all three remedial subjects) and both TAs and Instructors. Further, the relationship is positive. For each additional percentage of remedial courses taught by TAs, the odds of completion increase by 11.9% for the

curriculum 7 student, all other variables constant. This indicates that for students needing the most remediation, completion of degrees has a greater likelihood in departments where their course is more likely to be taught by a TA or Instructor. This finding is against what I would have hypothesized, but doesn't repeat in the other two time periods.

In the models for 2002 there are a few significant coefficients with the interaction terms of language arts remediation and TA and Instructor. These relationships are negative and small in magnitude; they also do not repeat in 2002 or 2004. In 2004, the interaction between rank and curriculum taken is insignificant.

RQ 7: How does the percentage of full-time faculty who teach remedial courses affect degree completion?

In 2000, the % change coefficient for Full-time is 1.592 and significant. This indicates that there is small positive impact of greater amounts of full-time faculty for non-remedial students. The interaction terms between full-time and most of the remedial curriculums are negative and significant. For example, for each additional percentage of remedial math courses taught by full time faculty, the odds of completion decrease by 1.676% for the curriculum 1 student, all other variables constant. The same relationship is present in 2002, but the benefit of full-time professors disappears in 2004.

RQ 8: How does the effect of tenure and full-time status differ for remedial students and their college level counterparts?

Overall, the impact of being in a remedial curriculum in the first semester lowers the likelihood of degree completion. The faculty characteristics that were hypothesized

to be favorable (tenure-track and full time status) do have a positive impact on completion (for the most part) but this is not enough to overcome the negative impact on completion that remedial curriculum has. The one exception to this found with the models was the impact of TAs and Instructors on the Curriculum 7 students in 2000. In this year the interaction was strong and positively related to degree completion. Unfortunately, the relationship did not repeat in subsequent years.

Table 13

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at 4-Year Colleges in Fall 2000

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
African American		-23.836	***	-23.305	***	-23.180	***
Hispanic		-21.050	***	-20.681	***	-20.561	***
Asian, Other, Unknown		-2.089		-2.082		-2.066	
Male		-40.581	***	-40.591	***	-40.545	***
Credit Hours (12)		18.162	***	18.115	***	18.082	***
Remedial Curriculum							
DE Math		-48.447	***	-42.212	***		
DE Reading		-60.986	***	-56.020	***		
DE Writing		-54.893	***	-49.914	***		
DE Math & Reading		-64.793	***	-60.911	***		
DE Math & Writing		-72.888	***	-70.142	***		
DE Reading & Writing		-69.675	***	-65.623	***		
DE All		-64.098	***	-59.808	***		
Faculty Covariates							
Full time				.076		1.592	***
TA				-.081		1.434	*
Instructor				-.272		.076	
Institutional Covariates							
HBCU				-57.873	*	-57.390	*
HSI				-33.856	*	-27.225	
Curriculum x Faculty Interaction							
C1*Full						-1.676	***
C2*Full						-1.144	*
C3*Full						-1.613	**
C4*Full						-2.380	***
C5*Full						-2.883	***
C6*Full						-1.694	
C7*Full						-.843	
C1*TA						-2.507	***
C2*TA						-.887	
C3*TA						-1.048	
C4*TA						-3.683	**
C5*TA						-2.827	
C6*TA						-2.031	
C7*TA						11.984	***
C1*Instructor						-1.487	**

C2*Instructor							-.042	
C3*Instructor							.172	
C4*Instructor							-1.456	
C5*Instructor							-.437	
C6*Instructor							.104	
C7*Instructor							14.244	***
_constant	-21.524		4.694		32.057		-68.418	*
L1 _constant	-30.225	**	-46.419	***	-52.787	***	-53.286	***
Statistics								
N	47584		47584		47584		47584	
chi2			2240		2259		2292	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

Table 14

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at 4-Year Colleges in Fall 2002

	Model 1	Model 2		Model 3		Model 4	
Individual Covariates	% Change	% Change		% Change		% Change	
African American		-23.399	***	-23.512	***	-23.210	***
Hispanic		-19.244	***	-18.938	***	-18.784	***
Asian, Other, Unknown		-9.162	**	-9.047	*	-9.148	*
Male		-41.179	***	-41.170	***	-41.179	***
Credit Hours (12)		17.002	***	16.971	***	16.986	***
Remedial Curriculum							
DE Math		-52.001	***	-49.721	***		
DE Reading		-55.768	***	-54.729	***		
DE Writing		-51.129	***	-50.806	***		
DE Math & Reading		-69.014	***	-67.572	***		
DE Math & Writing		-63.781	***	-62.571	***		
DE Reading & Writing		-64.942	***	-63.546	***		
DE All		-69.679	***	-68.832	***		
Faculty Covariates							
Full time				-.123		1.114	**
TA				-.057		2.065	**
Instructor				-.155		.377	
Institutional Covariates							
HBCU				-19.496		-10.498	
HSI				-37.551	*	-26.806	
Curriculum x Faculty Interaction							
C1*Full						-1.269	**
C2*Full						-1.083	*
C3*Full						-.915	
C4*Full						-1.309	*
C5*Full						.262	
C6*Full						-2.737	***
C7*Full						-2.232	**
C1*TA						-1.162	
C2*TA						-3.077	**
C3*TA						-2.194	*
C4*TA						-1.439	

C5*TA							-.612	
C6*TA							-3.015	*
C7*TA							-1.971	
C1*Instructor							.208	
C2*Instructor							-.980	
C3*Instructor							-.925	*
C4*Instructor							-.217	
C5*Instructor							-1.771	*
C6*Instructor							.882	
C7*Instructor							-2.067	
_constant	-16.349		10.155		50.872	*	-61.339	*
L1 _constant	-35.241	***	-48.606	***	-53.212	***	-59.279	***
Statistics								
N	50968		50968		50968		50968	
chi2			2449		2463		2501	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01				*** p<0.001	

Table 15

Summary of Analysis for Variables Predicting BA Degree Completion within 6 Years for Students Beginning at 4-Year Colleges in Fall 2004

	Model 1	Model 2		Model 3		Model 4	
	% Change	% Change		% Change		% Change	
Individual Covariates							
African American		-26.724	***	-26.421	***	-26.494	***
Hispanic		-24.023	***	-23.802	***	-23.869	***
Asian, Other, Unknown		-12.707	***	-12.538	***	-12.454	***
Male		-38.042	***	-38.034	***	-38.001	***
Credit Hours (12)		17.288	***	17.275	***	17.167	***
Remedial Curriculum							
DE Math		-36.862	***	-26.831	**		
DE Reading		-51.679	***	-44.637	***		
DE Writing		-41.725	***	-31.693	**		
DE Math & Reading		-60.426	***	-55.899	***		
DE Math & Writing		-59.114	***	-52.534	***		
DE Reading & Writing		-63.604	***	-57.926	***		
DE All		-70.669	***	-66.329	***		
Faculty Covariates							
Full time				.062		-.142	
TA				-.254		-1.019	*
Instructor				-.272		.093	
Institutional Covariates							
HBCU				-69.287	**	-71.232	**
HSI				-37.848	*	-41.974	*
Curriculum x Faculty Interaction							
C1*Full						.232	
C2*Full						.308	
C3*Full						.031	
C4*Full						-.472	
C5*Full						-.225	
C6*Full						.210	
C7*Full						-.284	
C1*TA						.563	
C2*TA						.856	
C3*TA						-2.111	
C4*TA						.913	
C5*TA						-.779	
C6*TA						-.884	
C7*TA						.986	
C1*Instructor						-.628	
C2*Instructor						-.078	
C3*Instructor						-3.074	
C4*Instructor						-.075	
C5*Instructor						-.903	
C6*Instructor						-1.830	
C7*Instructor						.392	

_constant	-16.200		9.624		47.712	*	67.580	
L1 _constant	-25.852	*	-40.761	***	-50.437	***	-46.873	***
Statistics								
N	54857		54857		54857		54857	
chi2			2437		2458		2468	
p			.000		.000		.000	
legend	* p<0.05		** p<0.01		*** p<0.001			

In summary, it appears that faculty and institutional characteristics do not have the impact that I originally hypothesized. In this institutional analysis the characteristics of the students, especially their academic preparedness as measured through remedial education status are a larger predictor of degree completion than any of the faculty or institutional characteristics. This is demonstrated in Table 16 below.

Table 16

Summary of Significant Individual Characteristics by Year

	BA		
	2000	2002	2004
African American	-	-	-
Hispanic	-	-	-
Asian, Other, Unknown		-	-
Male	-	-	-
Credit Hours (12)	+	+	+

Being African American or Hispanic is negatively predicts completion rates for students beginning at four-year schools. This is the same with being male. Credit hours are a positive predictor of degree completion.

In terms of the impact of faculty characteristics on students in different curriculums, I present Table 17 below.

Table 17

Summary of Significant Coefficients of the Faculty Characteristics by Curriculum

		0	1	2	3	4	5	6	7
Part time									
	2000	+	-	-	-	-	-		
	2002	+	-	-		-		-	-
	2004								
TA									
	2000	+	-			-			+
	2002	+		-	-			-	
	2004	-							
Instructor									
	2000		-						+
	2002				-				
	2004						-		

Table 17 presents the signs of the coefficients from the HLM model of students who begin at a four-year school attaining a bachelor's degree. As you can see, in most of the combinations of year, faculty characteristic and curriculum there is no effect. The exceptions are with the college level curriculum (0) which is positively impacted by part-time instructors and TAs in the years 2000 and 2002. Those needing the most remediation (curriculum 7) were also positively impacted by TAs and Instructors in 2000. This did not repeat in subsequent years. Any other impacts found were negative and mostly occurring in the years 2000 and 2002. The negative relationship between contingent faculty and graduation rates echoes the findings of Ehrenberg and Zhang (2005).

CHAPTER VI

SYNOPSIS AND CONCLUSIONS

The academic challenges faced by remedial education students can impede their ability to complete a college degree. These students enter higher education behind students who are prepared for college level assignments. The professors remedial students have in their initial developmental education courses have a fundamental role in creating a path for success. It is in developmental courses that students learn the building blocks of math, English and writing that will make or break their ability to earn passing grades in college-level courses.

It was the goal of this dissertation to determine if a university's allocation of faculty members influenced remedial education students. Further, I attempted to determine if the impact of faculty on remedial students was different than the influence on their at college-level peers.

Summary and Discussion of Results

This study utilized a two-level HLM analysis of students within institutions. Students were first assigned to a curriculum based on their remedial education status in the first fall semester that they enrolled in a Texas public higher education institution. These curriculums ranged from not needing remediation to needing one, two and three subject levels of remediation. Within each institution and by subject, I was able to determine the percentage of remedial education and general education courses taught by

the different faculty types (rank, full-time status, education level). Thus, I could assign each student a "treatment" based on the institution they attended, their remedial status in each subject and the characteristics of professors. For example, in school X, if 40% of remedial math classes are taught by part-time professors, a student in school X who requires remedial math will be in a remedial math course taught by a full-time professor (the only other option) 60% of the time.

I initially hypothesized that remedial students are the most vulnerable and subject to drop-out and stop-out behavior. As such, I thought that they were the students who would benefit from having professors who are full-time, in the tenure stream and with high levels of education. I assumed that having professors who were highly affiliated with the institution would give remedial students the extra advantage of increased knowledge of institutional resources which could propel remedial students toward a degree. Further, I supported this assumption by noting the ambience that can be created with talented faculty dedicated to the campus and students.

The results of this analysis only minor support that the interaction between remedial curriculum and select faculty characteristics had a positive effect on the likelihood of degree completion given the inconsistent pattern of significance of the coefficients. There were no significant faculty coefficients that persisted through all three years of the analysis in any pattern. It appears that a student's pre-college academic preparation, as measured by enrollment in developmental education courses, is more important than the type of faculty members they are likely to encounter in their courses for predicting graduation. Further, student characteristics like race, gender and full-time

status are consistently stronger predictors of graduation than any other variables in the analysis.

Despite above, there were still some surprising results due note. Of the faculty characteristics, Professor status was hypothesized to have a positive impact on degree completion and the rest were thought to impact completion negatively; the hypotheses was not supported. Faculty members with AA, BA and MA degrees have positive impacts for students not needing remediation or only needing math remediation in some years and degree combinations for students beginning in community colleges. Also unexpected is the positive impact faculty part time status had on degree completion for students in curriculums 6 and 7. The latter finding is contrary to Jacoby (2006) and a promising finding given the shifting of the labor market toward the utilization of more contingent faculty.

As hypothesized, being a full time student positively influences degree completion (Gianoutsos, 2011). In predicting AA degree success, declaring a technical or technical preparatory reason for entering the community college seems to positively impact completion. One unusual finding, not usually present in the literature is the positive impact being Hispanic has on AA completion. After accounting for all other characteristics, in this case Hispanic heritage is a positive predictor of graduating. This could be attributed to multiple factors. First, it is possible that most of the predicted negative impact is in the HSI coefficient. Second, it could just be the case that after netting out individual, curricular and institutional characteristics Hispanics fare as well in community colleges as do whites. This is promising, especially since Hispanics are concentrated in community colleges (Fry, 2002).

Limitations

One of the major limitations to this study is the ability to generalize outside the state of Texas. The UTD-ERC is not a national dataset and as such this analysis will not have the external validity that one would like. However, the state of Texas higher education system is similar to other states in many respects, so what is learned in this analysis can be used to inform future research.

Also, this study would have been helped tremendously by the ability to link students to professors. As this data was not available, one cannot say for certain whether a student was exposed to a contingent faculty member in either remedial or college-level courses, all we know is the proportion of courses that were taught by faculty members of different types. Garnering this data would make possible much of the work being done at the K-12 level (Rockoff, 2004; Lankford, Loeb & Wyckoff, 2002)

Further, since explicit course taking data for individual students was not available, I made the choice to treat the data as cross-sectional rather than as a panel. If there was the ability to see when students took which courses then allowing the institutional controls to vary by time would make sense, but without this I rationalized that most remedial students would be in remedial coursework their first year, so controls are set to their values during this time.

Another limitation of this study is that I only accounted for remedial coursework in a student's first year. The data would be helped substantially if records were kept of the amount of remediation a student is initially assigned to. The data reveals if a student is assigned to remediation and there are records as to if the student completed the

remediation sequence, but there is no way to know how much remediation was assigned. For students who complete their whole sequence, it is fair to assume that the number of courses they took was the amount that was required, but for students who drop or stop out we have no idea how far in the sequence they progressed.

Further, this study was limited by other variables not available to the researcher. Though Texas has one of the premier data systems available, what it has in scale it lacks in context. There are many missing pieces around student experience in and outside of the classroom that should be supplemented in this analysis. In particular, the data is not available, or was not utilized, to properly model the theories regarding college student departure (Tinto, 1975; 1991; Braxton, Hirschy and McClendon, 2004) . The model included an indicator of economic disadvantage, but there is no measure of a student's ability to pay for their education or how much they value the investment. Both factors are hypothesized to contribute to departure (Braxton & Hirschy, 2005; St. John, Cabrera, Nora & Asker, 2000). Also missing are indicators of student motivation and involvement including how institutional factors and the student's interaction with the university affect motivation and involvement (Astin, 1984; Bean & Eaton, 2000; Tinto, 1993). Institutional analyses like this one are important, but equally so are the micro decisions and interactions that shape an individual's decisions to persist or depart.

Directions for Future Research

As noted above, this study was an institutional analysis which has the limitation of not being able to directly match faculty member with student. A data set with the

robust characteristics of the Texas ERC data coupled with the ability to match student to professor may be conducive to findings closer to what was hypothesized. This research endeavored to find if there were faculty characteristics that helped or harm remedial students. The indirect (institutional level) way I was able to measure faculty impact on students did not uncover strong results. This may not be the case with direct professor to student matching.

Another way to go about this research topic that would be a valuable addition to the literature would be through surveys and a qualitative analysis. It could very well be the case that students are not aware that the faculty member teaching their class is a contingent faculty member. Or it could also be that they have noted that the contingent faculty members are less available and have sought help outside of their professor. While this kind of analysis may not be feasible on a state or national scale, it is certainly of value to institutions. Community colleges especially should have a pulse of what faculty members/characteristics consistently have students who stay in school and go on to graduate.

I would also like to see that this study be expanded upon to possibly include high school characteristics. It would be interesting to see the impact of high school faculty on the placement of students into college remedial coursework. This study could be expanded further to include other outcome in addition to degree completion. Remedial sequence completion is likely to be more directly impacted by first semester developmental education than graduation. Along this same line, of the students who complete a developmental education sequence, are there differential results with respect to graduation or workforce outcomes as compared to students who did not take

remediation? Given the Texas data, an analysis could also be done looking specifically at student transfer or time to degree. All of these suggestions would be rich additions to the field of higher education and the practice of higher education in Texas.

Policy Recommendations

There is much that is unknown about contingent faculty and their effect on students; even less in known about the impact of contingent faculty on remedial education students. Yet, Texas and the United States as a whole is in the position where a majority of students enter institutions of higher education unprepared for college level work (NCES, 2004). These students will likely have their first introduction to college taught by a contingent faculty member (Bailey, 2003). It is with this in mind that I offer the following recommendations separated by entity to which they are most applicable: nation, state, institution and student recommendation.

National recommendations

In recent years, the Department of Education and the Presidential administrations have had great success in manipulating state and institutional policy through monetary incentives offered on a competitive basis, for example, Race to the Top. That approach could be useful to continue to encourage higher education data collection and the spread of best practices in remedial education. The White House often sponsors gatherings focusing on aspects of higher education. Forums on developmental education should be held with representatives from state offices and institutions implementing best practices.

Someone, somewhere believes they have found the key to making a difference. It would be helpful if they were sought out and asked to share.

Next, much of the dialog surrounding higher education focuses the onus of access on high schools and completion on colleges. High schools are measured on how many of their graduates enroll in college and colleges are in charge of graduating them. The national dialog needs to shift away from "how to go to college" and toward "being ready to go to college." Readiness is not just application and financial aid, but knowing if you are academically capable. This is supported in this study as students who entered community college with an unknown purpose were less likely to complete as compared to peers who knew they were in college for a degree.

Finally, I would recommend tying financial aid disbursement to academic advising. This would be best if a student was required to meet with an academic counselor to review progress toward completion at least once a year. However, to reduce costs, this could also be done via the internet with institutionally specific programs that perform transcript reviews to inform students if they are academically on track to graduate. This analysis was not able to incorporate financial aid variables, but it did reveal that those who were economically disadvantaged were less likely to complete a BA

State recommendations

Texas should work on enhancing the Texas ERC data set such that students can be directly matched to faculty members. As mentioned earlier, this would enable researchers to identify direct faculty to student effects. Institutions, and departments

especially, could find this data to be very helpful. For example, it would allow for studies to determine if certain professors' students have an increased propensity to declare a major in that professor's department. This would be incredibly helpful in determining who is best suited to teach the initial gatekeeper courses.

As a long-term recommendation, Texas must begin to collect individual level transcript data in a state repository. Having this information available to internal and external researchers will broaden the scope of research questions that can be answered. This will allow the state to observe students and institutions more carefully.

Further, at the high school level, college placement tests should be incorporated with the already existing standardized testing. Texas has recently moved away from a separate high school exit examination and toward end of course evaluations as a requirement for graduation. The new end of course evaluations are, like the previous exit exam, required for graduation. In addition, the end of course evaluations are required to be calculated into a student's course grade and account for at least 15% of the grade (State of Texas Assessments of Academic Readiness, 2012). If these end of course evaluations are aligned with college readiness standards than this could be beneficial for students. However, schools should continue to make available placement testing to high school students at the beginning of their senior year. That way if they do not do as well as hoped they have a whole year while still in high school to gain the needed skills. Early testing would also give students a familiarity with the test. This is helpful to some students in the event they have to take it a second time.

Texas has spent many resources already on shaping and reshaping their developmental education plan. There have been many iterations dating back 30 years and

campuses are supporting innovative programs to bolster student success (see Achieving the Dream). Texas and the developmental education interests need to implement best practices statewide.

Finally, a surprising finding in this study was the disproportionate percentage of students requiring remediation in all three academic subjects who enroll in Hispanic Serving Institutions. Texas must place an emphasis on the developmental education programs in these institutions as they have more of the neediest students. Professors should engage in professional development to learn the best strategies to implement in their classroom when teaching below-level students. The institutional research offices at these institutions conduct an assessment of the remedial programs and implement best practices across departments.

Institutional recommendations

Institutions should be troubled by this study's findings that not all students are being placed in the correct courses their first semester. Whether this is a function of lack of resources or a tacit acceptance of the cooling out function, students need to be put on the path to a degree when the first matriculate (Bailey, 2003). This is especially important for Hispanic Serving Institutions. HSIs enroll a greater proportion of the most underprepared remedial students and will require extra resources from the state to make certain students are enrolling in the correct coursework, passing it, and successfully matriculating to college-level courses.

Institutions should move in the direction of streamlining the process of remedial education. Currently, Texas institutions have a lot of latitude in determining how many

remedial courses comprise a sequence and what cut scores are necessary to place out of remediation as an incoming student. This makes the whole process difficult and confusing for students. Common and transparent standards could demystify the process and encourage more students through.

Multiple testing opportunities should be encouraged. If a student is close to the cut score, he should be counseled to study and come back to take the test. Preparation materials should be readily available and institutionally sponsored study sessions may be beneficial. Further, as some students naturally experience test anxiety, having some familiarity with the testing format may reduce apprehension and enable students to perform to their best.

Following testing, a condensed and intensive developmental education curriculum is recommended. This could happen in the summer before enrollment for traditional students or in the first semester. The idea is to target the specific skills to make students college ready and do that as quickly as possible to put students on the road to graduation.

Finally, it would be remiss to not recommend that Texas institutions take a hard look at hiring practices. It is shocking to see that some instructors have less than an Associate's Degree. In applied fields, this might make sense in some situations, but for remedial math, reading and writing, a degree should be a must. Perhaps this is computer-based instruction being supervised by someone without a degree, but even in this case, students should be assigned to a professor who can answer questions if needed. Further, remedial students are likely to need guidance on the college process. Can that be provided by someone who hasn't done it themselves?

Student recommendations

Students should do everything in their power to avoid being placed in remediation from the start. They should take early action and get the most out of their high school curriculum. Even if students are planning on going to community college, they should take the most rigorous coursework available where they can be successful. It is always better to have choices, and by taking a non-challenging curriculum, students limit college opportunity.

Next, students need to know college requirements. If an entrance exam is required, try to take it while still in high school so you know if you are prepared for college level work or if you should take the last bit of time to do more to prepare. If a student's placement scores are close to the cut-point for developmental education they should avoid non college-level courses if at all possible. The student should be counseled into college-level courses and introduced to the campus resources that can provide supplemental instruction and assistance.

Students must also be counseled to seek out his or her professors and attempt to cultivate a relationship. Having a known contact where a student can seek assistance is a valuable resource. Finally, if a student is required to take developmental education, they need to know exactly the sequence of courses that is required and finish them as quickly as possible. Students should be advised to visit the counseling center before each enrollment period to monitor progress and to repeat placement testing.

Conclusions

The intent of this study was to illuminate the impact of faculty characteristics on remedial education students and their college-ready peers. The impetus of this research stemmed from the growth of higher education in Texas and with that more developmental education students and more contingent faculty. While I was disappointed the analysis did not yield definitive links between faculty characteristics and student success, I am confident it has added to the body of knowledge and optimistic that more work of this nature will be completed in the future.

It is to the advantage of both students and institutions to provide the best learning environments for all students. As more students are entering higher education with academic deficiencies, it is up to institutions and faculty to provide the instruction and resources to shepherd all students through to graduation.

Appendix A

TABLE FROM JACOBY (2006)

TABLE 3

Mean Values of Key Variables For Community Colleges Ranked Within Highest and Lowest Third of Part-Time Faculty Ratios and Faculty Student Ratios

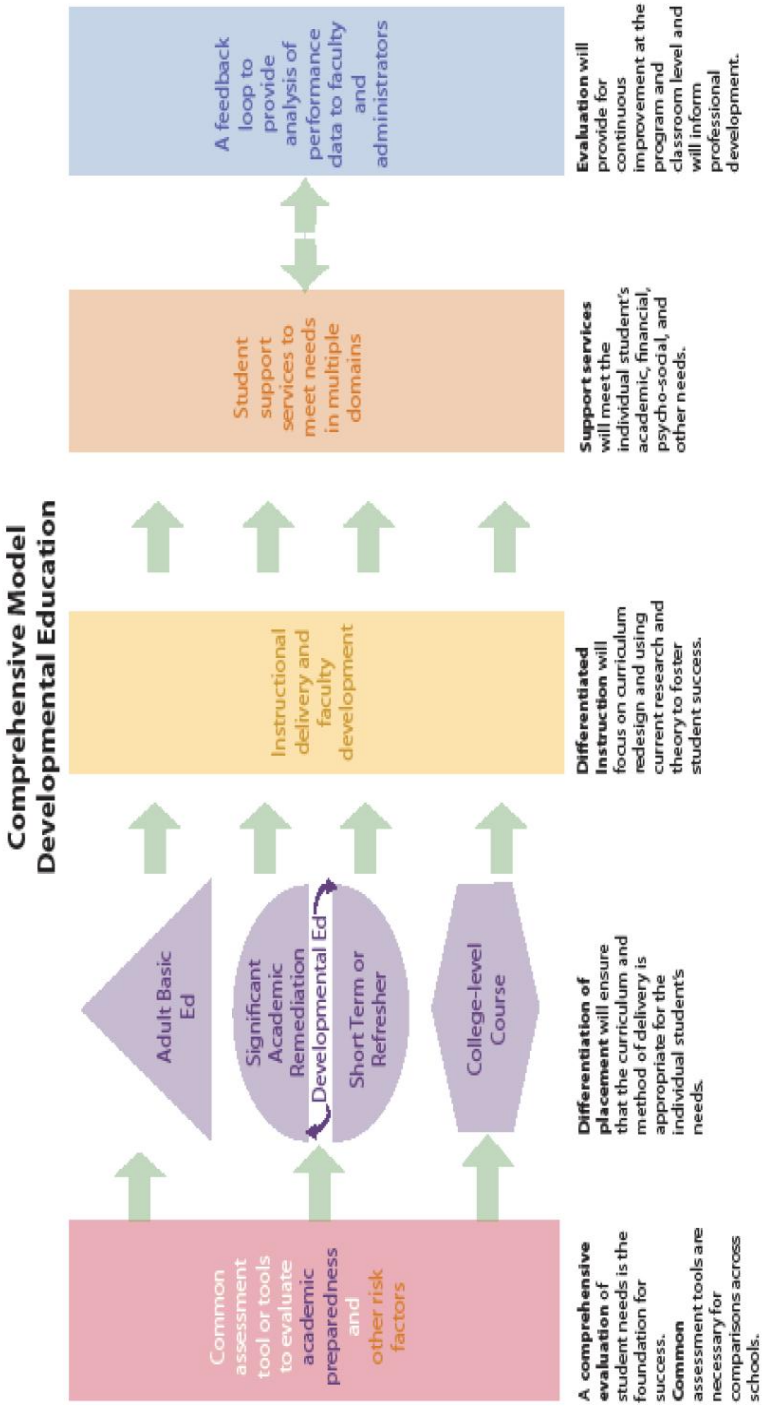
		Part-time Faculty Ratios			
		Low		*High*	
Faculty Student Ratios	*Low*	Quadrant 1		Quadrant 2	
		Part Time Faculty Ratio	0.384	Part Time Faculty Ratio	0.753
		Faculty Student Ratio	0.044	Faculty Student Ratio	0.046
		IPEDS Graduation Rate	0.250	IPEDS Graduation Rate	0.211
		Overall Degree Ratio	0.132	Overall Degree Ratio	0.122
		N in cell	124	N in Cell	78
		% Colleges in Cel	13.3	% Colleges in Cell	8.3
	High	Quadrant 3		Quadrant 4	
		Part Time Faculty Ratio	0.370	Part Time Faculty Ratio	0.785
		Faculty Student Ratio	0.095	Overall Degree Ratio	0.102
		IPEDS Graduation Rate	0.346	IPEDS Graduation Rate	0.260
		Overall Degree Ratio	0.160	Overall Degree Ratio	0.145
		N in cell	96	N in cell	144
		% Colleges in Cell	10.2	% Colleges in Cell	15.4

N = 935

Table omits schools ranked within middle third of Part-time faculty ratios or faculty student ratios.

APPENDIX B

FROM TX DEVELOPMENTAL EDUCATION PLAN (2009)



Appendix C

CONCEPTUAL MODEL FROM TITUS (2004)

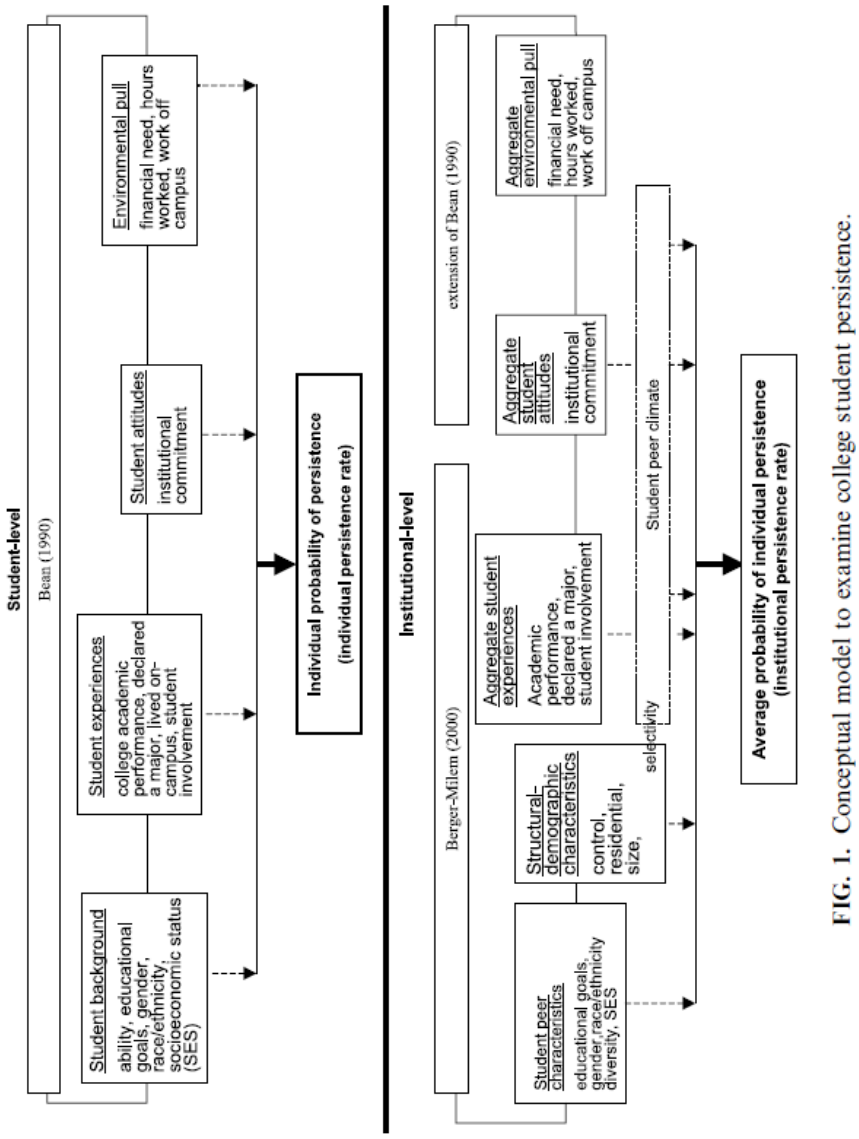


FIG. 1. Conceptual model to examine college student persistence.

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