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Characteristics of Early Non-persisting Developmental Education Students in the Community College: A Nested Analysis

Joseph George Grailer
University of Missouri-St. Louis, joseph.grailer@gmail.com

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Joseph George Grailer III
M.F.A., Creative Writing, University of Missouri-St. Louis, 2012
B.A., English with emphasis in Literature, Society and Politics, Webster University, 2007
B.A., Religious Studies, Webster University, 2007
A.A., Literature, St. Louis Community College-Meramec, 2005
A.A., Creative Writing, St. Louis Community College-Meramec, 2005

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Advisory Committee

Kathleen Haywood, Ph.D.
Chairperson

Kimberly Allen, Ph.D.
Co-Chairperson

Juliet Scherer, Ph.D.

Abstract

Many first-year, first-semester community college students take multiple developmental education courses, expending significant time, money and opportunity costs, but do not return for a second semester. Students who do not persist past their first semester are unlikely to ever return to post-secondary education, so it is critical to identify and assist these students as early in their postsecondary career as possible. To assist colleges with this effort, this study employed chi-square and logistic regression analyses on data collected during students' application and enrollment processes, as well as students' first semester course performance, to create several nested models of characteristics correlated with first to second semester attrition. These models sought to identify the greatest number of students who did not reenroll as early in students' post-secondary education as possible. Three characteristics were found to be highly predictive of not reenrolling for a second semester, and made up a large percentage of the total students who did not reenroll: (1) students without a high school diploma; (2) students who did not declare a major at the time of application; and (3) students who attempted six or fewer credit hours their first semester. Students in this study having one or more of these characteristics made up nearly forty percent of the total students who did not reenroll. These results indicate that a significant opportunity to intervene, and thereby potentially increase first to second semester retention, is during the application and enrollment process, or before students even enter the classroom.

To my family, for their unwavering love and support.

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Chapter 1: Introduction

Almost two thirds of first-time community college students will be required to take a developmental math course, but only a quarter of these students will ever go on to complete a college-level math course (Bahr, 2013). Of those students who do successfully complete a developmental education sequence, only about ten percent of students will graduate within three years of first enrolling (Complete College America, 2012), and fewer than twenty-five percent will do so within eight years (Bailey, 2009). These results are in spite of the tremendous resources expended on developmental education, which includes over three billion dollars per year (Alliance for Excellent Education, 2011), lost opportunity costs and psychological tolls (Bailey, 2009), and countless hours of effort from students, faculty and staff. Although more than twice as many students now have access to higher education than did thirty years ago (Tinto, 2012), to quote Melinda Gates (2010), "The fact that we lose the majority of students who enroll in a remedial course amounts to a default on our promise of access for everyone."

Due to their commitment to open access admissions policies, community colleges have long served those for whom the selective four-year college pathway is blocked, and are continuing to do so for students lacking the requisite academic skills for success in college-level courses. This has become even more so in the past few decades, as developmental education has come under intense public scrutiny, with many states reducing or eliminating it in their four-year colleges (Phipps, 1998).

Given the 26% growth in community college enrollment (5.9 million to 7.5 million) from 2000 to 2010, community colleges are increasingly viewed as having a

strategic role in the national push for postsecondary credential attainment (Aud, et al., 2011), which includes President Obama's call for five million additional graduates from community colleges by 2020 (White House, 2011). Unfortunately, while decades of research has been conducted to ways of improving retention, consistently forty to fifty percent of community college freshmen still leave college before their second year (ACT, 2013; Bers & Schuetz, 2014); the majority before their second semester (Crosta, 2013).

As states and the federal government continue to look at rates of retention, persistence and graduation to guide funding decisions, it has become vital for community colleges to demonstrate their effectiveness and their proper stewardship of public funds. If community colleges hope to continue their commitment to serving all members of their communities, this work must begin with improving the outcomes of their most underprepared students as early in students' collegiate experience as possible.

Background

In May of 2014, the Higher Education Student Services (HESS) Learning Community at the University of Missouri-St. Louis (UMSL), a ten-member cohort of students working collaboratively towards their doctor of education degree, distributed a Request for Problem in Practice (PiP) (Appendix A) seeking opportunities to implement high-leverage solutions to systemic issues in higher education to several colleges and universities within a 200-mile radius of St. Louis, Missouri. Of the proposals distributed, HESS received three replies and, after review, invited two submitters to present their problem in practice to the learning community. Among these was a proposal from Crowder College, a rural community college located in Neosho, Missouri, serving approximately 5,500 – 6,000 students per year, that was seeking to address what they perceived to be excessively high rates of first-year attrition and students receiving grades of D, F, or W (D/F/W) in general education courses.

In their initial PiP response and subsequent presentation, Crowder College requested that HESS assist with lowering first-to-second semester attrition rates by analyzing several pre-collegiate characteristics of first-year, first-semester students receiving D/F/Ws in the ten general education courses with the highest rates of D/F/Ws to identify what correlations may exist between those characteristics and students who do and do not achieve success.

Included in Crowder College's request was a spreadsheet of the forty courses (twenty for fall enrollments; twenty for spring enrollments) with the highest rates of students earning D/F/W grades for the fall 2011 through spring 2013 semesters (Appendix B), constituting twenty-seven unique courses. Based on Crowder College's

definitions, as well as guidelines established by the Coordinating Board for Higher Education (CBHE), of these twenty-seven unique courses, eleven were classified as developmental (below college-level), eight were classified as general education, seven were college-level, and one was specifically designated for students on academic probation, as can be seen in Table 1. Detailed definitions, rationale and methods for course classifications and course numbers identified for each classification used in this proposal may be found in Appendix C.

Table 1

Crowder College Highest D/F/Ws, Fall 2011 through Spring 2014

Course Code and Title	Classification	On D/F/W List
AND 280: Advanced Pharmacology	College-level	Fall
AGRN 113: Crop Science	College-level	Fall
BIOL 110: General Zoology	College-level	Fall
BIOL 152: Human Anatomy & Phys. I	General Education	Fall, Spring
BMGT 175: Management	College-level	Spring
BSAD 150: Introduction to Business	College-level	Fall, Spring
COLL 101: College Orientation	General Education	Spring
COMM 080: Introduction to Comm.	Developmental Education	Fall, Spring
ECON 201: Principles of Economics I	General Education	Spring
ENGL 100: Mechanics of Composition	Developmental Education	Spring
ENGL 101: English Composition	General Education	Spring
ENGL 102: Advanced English Comp.	General Education	Fall
LOC 040: Reading Enhancement I	Developmental Education	Fall
LOC 050: Reading Enhancement II	Developmental Education	Fall, Spring
LOC 090: Reading Across the Curr.	Developmental Education	Fall, Spring
LOC 100: College Success	Developmental Education	Fall, Spring
LOC 103: College Connections	Other (academic probation)	Fall, Spring
MATH 040: Arithmetic	Developmental Education	Fall, Spring
MATH 050: Basic Algebra	Developmental Education	Fall, Spring
MATH 060: Pre-Collegiate Math I	Developmental Education	Fall, Spring
MATH 070: Pre-Collegiate Math II	Developmental Education	Fall, Spring
MATH 100: Intermediate Algebra	Developmental Education	Fall, Spring
MATH 111: College Algebra	General Education	Spring
MUSC 101: Music Appreciation	College-level	Fall, Spring
PHYS 190: General Physics	College-level	Spring
PLSC 103: National, State, Local Govt.	General Education	Fall
TA 205: Introduction to Theatre	General Education	Fall

Notably, with the exceptions of COMM 090: Developmental Communication Arts and MATH 090: Developmental Mathematics, all developmental education courses offered at Crowder College were included on their list of highest rates of D/F/Ws, constituting over 50% of total D/F/W grades earned in the twenty-seven courses provided, as can be seen in Table 2.

Table 2

Crowder College Highest D/F/Ws, Fall 2011 through Spring 2014, by Classification and Percentage of Total D/F/Ws

Course Classification, Code and Title	Aggregated Grades	Aggregated D/F/Ws	Course % D/F/W	Course % of Total D/F/Ws
Developmental Education Courses				
MATH 050: Basic Algebra	2,173	918	42.25%	10.32%
MATH 100: Intermediate Algebra	2,450	863	35.22%	9.70%
MATH 040: Arithmetic	1,467	611	41.65%	6.87%
LOC 050: Reading Enhancement II	1,364	558	40.91%	6.27%
MATH 060: Pre-Collegiate Math I	590	383	64.92%	4.31%
COMM 080: Intro to Communications	791	283	35.78%	3.18%
LOC 100: College Success	770	261	33.90%	2.93%
MATH 070: Pre-Collegiate Math II	464	254	54.74%	2.86%
LOC 090: Reading Across the Curriculum	669	212	31.69%	2.38%
ENGL 100: Mechanics of Composition	573	183	31.94%	2.06%
LOC 040: Reading Enhancement I	207	81	39.13%	0.91%
Total Developmental Education	11,518	4,607	40.00%	51.79%
General Education Courses				
BIOL 152: Human Anatomy & Physiology I	1,395	589	42.22%	6.62%
ENGL 101: English Composition	1,596	588	36.84%	6.61%
COLL 101: College Orientation	1,421	482	33.92%	5.42%
MATH 111: College Algebra	1,509	455	30.15%	5.11%
ENGL 102: Advanced English Composition	1,038	352	33.91%	3.96%
PLSC 103: National, State, Local Government	990	298	30.10%	3.35%
TA 205: Introduction to Theatre	654	193	29.51%	2.17%

Course Classification, Code and Title	Aggregated Grades	Aggregated D/F/Ws	Course % D/F/W	Course % of Total D/F/Ws
ECON 201: Principles of Economics I	395	123	31.14%	1.38%
Total General Education	8,998	3,080	34.23%	34.62%
College-level Courses				
MUSC 101: Music Appreciation	1,329	474	35.67%	5.33%
BSAD 150: Introduction to Business	859	266	30.97%	2.99%
BMGT 175: Management	136	41	30.15%	0.46%
PHYS 190: General Physics	90	34	37.78%	0.38%
AGRN 113: Crop Science	89	33	37.08%	0.37%
BIOL 110: General Zoology	92	33	35.87%	0.37%
ADN 280: Advanced Pharmacology	88	32	36.36%	0.36%
Total College-level Courses	2,683	913	34.03%	10.26%
Other Courses				
LOC 103: College Connections	868	296	34.10%	3.33%
Total for All Courses	24,067	8,896	36.96%	100.00%

Crowder College's developmental education D/F/W rates are not surprising in light of recent national statistics. Though there is limited data concerning pass, fail, and withdrawal rates at the course level, by at least one estimate (Radford, Pearson, Ho, Chambers, & Ferlazzo, 2012), 15% of students who attempt to do so will never pass a developmental course. National developmental education sequence completions are also comparable to Crowder's course level data, with completion rates ranging from 48% (Bailey, Jeong, & Cho, 2010) to 62% (Complete College America, 2012), depending on study population and research methodologies employed. By some estimates, students who are placed into developmental education sequences show less than a 10% probability of ever successfully completing a degree (Complete College America, 2012).

In light of the preliminary D/F/W data provided, and given the Crowder College leadership team's desire to increase rates of retention and first-semester success while still adhering to the contemporary definition of an open access community college, it became clear that despite their original request that the HESS learning community focus on general education courses, a significant opportunity existed for improving student success outcomes by focusing some effort and resources on improving the outcomes of students placed in developmental education courses. The HESS learning community had previously determined that the best approach to addressing Crowder College's objective of improving first to second semester retention was to divide into teams, with each team addressing a different research focus. This paper is the result of one of these efforts.

Problem in Practice Statement

Like most community colleges, Crowder College uses assessments to help determine which incoming students have the academic skills necessary for success in college-level courses and which students require some level of remediation. Based on these assessment scores, students are placed into English, reading, communications and mathematics courses at either the college-level (101 or above), or into one or more levels of pre-college, developmental courses (100 or below). At present, many first-year, first-semester students at Crowder College are placed into and take multiple developmental education courses, expending significant time, money and opportunity costs, without achieving near-term (passing grades; reenrollment) and/or long-term (earning a credential and/or transferring to a four-year institution) measures of success.

A preponderance of evidence demonstrates that Crowder College is not unique in their situation: nationwide, students who take developmental education courses are

significantly less likely to graduate than their peers who did not take developmental education courses; this is especially true for those students who place at the lowest levels of developmental education. Lower rates of success may not simply be a reflection of students' ability, however, as the additional time, expense and psychological effects of being placed in developmental courses may have a significant impact on whether or not these students persist to graduation.

Many interventions are currently being employed by Crowder College's peer institutions across the nation to increase rates of retention for developmental education students. As with peer institutions, however, Crowder College has limited financial, administrative and student support resources available to identify and implement interventions most appropriate to their student population. For Crowder College to begin the process of improving rates of student success under these constraints, therefore, it was necessary to first identify characteristics associated with students who did not reenroll for a second semester.

Conceptual Framework

Any attempt at improving Crowder College's rates of student success may require a significant redesign of admissions processes, developmental education programs, and student support services, as well as the reallocation of limited available resources. As such, a formal framework and project plan will be necessary to help guide any attempt to do so. To assist Crowder College in addressing their problem in practice, this project will begin the process of employing an ADDIE (Analysis, Design, Development, Implementation, Evaluation) model approach to alternative developmental education pathways at Crowder College by performing analyses of student characteristics as

captured by Crowder College's current application and enrollment process to identify those students most at risk of not reenrolling for a second semester.

Purpose of Project

The purpose of this project is to develop recommendations for improving first to second semester retention of developmental education students at Crowder College informed by an analysis of institutional data collected during first-year, first-semester developmental education students' application and enrollment process.

Research Question

What characteristics of first-year, first-semester developmental education students recorded by Crowder College's current admissions and enrollment process are predictive of a lack of second semester reenrollment?

Significance of the Project

Based on Crowder College's fall 2015 in-district tuition rates and the three years of preliminary D/F/W data provided with the RFP response, Crowder College students expend over $1 million per year on developmental education course tuition and fees alone (see Appendix D). Of that amount, $430,000 will be spent per year on courses for which students do not earn passing grades. In addition to dollars expended, each student will also incur related costs such as books and other course materials estimated at $800 per year (Crowder College, 2015b), personal and transportation expenses estimated at $3,184 per year (Crowder College, 2015b), and inestimable financial and opportunity costs from lost wages and time away from work. They may also incur less quantifiable, but no less significant, psychological costs.

Many of Crowder College's first-time, first-semester developmental education students will not pass their developmental education courses; nor will they persist past their first semester. It should be expected that many of these early non-persisters will also not return to higher education later in their lives. For these students, significant time, money and opportunity costs will have been expended, without earning a meaningful credential, valuable work experience, or immediately applicable workplace skills. By identifying characteristics of students most at risk of not reenrolling, this project will help Crowder College identify interventions appropriate for their student population. In so doing, this project seeks to save all stakeholders valuable time, money and effort.

Limitations

- The results of this study may not be generalizable due to the limited sample size and that the sample is drawn from only one college.
- This study only examines characteristics as captured by Crowder College's current application and enrollment processes, so it is possible that other or even the greatest predictors of students not achieving success will not be included in the analyses.

Definitions

Attempt (a course) – The student signed up for a course, and attended until at least week four of the semester.

College-level course – Courses listed in Crowder College's Course Catalogs as 101-level or higher that do not satisfy a general education requirement, but do count as credits to degree completion.

Developmental education course – Courses listed in Crowder College's Course Catalogs as 100-level or lower that do not satisfy a general education or degree requirement.

Dropped (a course) – The student withdrew or was withdrawn from a course before the fourth week of class due to nonattendance.

Enroll (in a course) – The student signed up for a course, but may not have attended class.

General education course – Any course listed in Crowder College's Course Catalogs as 101-level or higher that satisfies a Crowder College general education requirement and/or is transferable according to the CBHE's (2005) *Credit Transfer Guidelines for Student Transfer and Articulation Among MO Colleges and Universities*.

Other course – Any course listed in Crowder College's Course Catalogs that do not satisfy a general education or program requirement, such as those designated for non-native English speakers or students on academic probation.

Persist / Persister – The student did reenroll for a second semester.

Withdraw (from a course) – The student removed themselves from the course after the fourth week of the semester.

Chapter 2: Review of the Literature

Purpose of Project

The purpose of this project is to develop recommendations for improving first to second semester retention of developmental education students at Crowder College informed by an analysis of institutional data collected during first-year, first-semester developmental education students' application and enrollment process.

Defining Developmental Education

Despite much discussion in the literature, there is no generally agreed upon definition of what knowledge and skills are necessary for students to find success in the college environment (Phipps, 1998), nor of what, exactly, it means to be college ready (Bailey, Jeong, & Cho, 2010). This is in part due to the fact that definitions of readiness are institution-specific: skills and knowledge required for success at one institution may not translate into success at another.

Rather than allow students who the college perceives as arriving unprepared to enroll in college-level communications, mathematics, and science courses,[1] many institutions assign them to developmental education courses, which are intended to prepare them for college-level courses (Bailey, Jeong, & Cho, 2010). Or, as NCES states, developmental courses are those designed for "…college-level students lacking those

[1] Although the term "developmental education" could theoretically apply to any course below that of college-level, it is almost exclusively applied to reading, writing or mathematics courses (Parsad & Lewis, 2003)

skills necessary to perform college-level work at the level required by the institution" (Parsad & Lewis, 2003, p. iii).

Despite widespread belief to the contrary, some form of developmental education has always been a part of American higher education, beginning with Harvard College (now Harvard University) providing tutors in the 17th Century (Phipps, 1998). By the late 20th century, developmental education was ubiquitous: in the 1990s, a National Center for Education Statistics (NCES) survey found that all public two-year colleges surveyed offered developmental courses (Phipps, 1998). More recently, however, developmental education has come under intense scrutiny, with many states reducing or eliminating it in their four-year colleges (Phipps, 1998).

Around this same time, community colleges experienced strong growth in enrollment nationally, from 5.9 million students in 2000 to 7.5 million in 2010 (Aud, et al., 2011). Unsurprisingly, significantly more of these students required some form of remediation than did their peers at four-year colleges (Complete College America, 2012). Both of these trends are likely to continue, especially considering President Obama's call for five million more community college graduates by 2020 (The White House, 2011), and community college's longstanding commitment to welcoming historically underserved and marginalized students through their open access policies.

The Open Access Mission

Community colleges serve incredibly diverse student populations, who seek admission for equally diverse reasons. Some students attend immediately after completing high school before continuing to a four-year university; others have already been in the workforce, possibly for decades. Some attend full-time, while others enroll

for one or two classes a semester. Many are first-generation, and/or from a traditionally underserved population.

In an effort to serve these diverse student populations, with their equally diverse motivations, expectations and levels of preparedness, community colleges oftentimes employ multiple mission statements to guide their activities. Although specific mission statements vary among colleges, most have a basic commitment to "serve all segments of society through an open-access admissions policy that offers equal and fair treatment to all students" (American Association of Community Colleges, 2015).

No matter their core target population, open access to higher education for all is at the heart of the community college mission. As Shannon & Smith (2006) state, "The community colleges' proverbial open door, which ensures access for all who can benefit, is the foundation on which all other community college operations rest" (p. 16). Or, as Vaughan (2004) states, "Nothing is dearer to community colleges than the belief that they can and should serve all eligible people who seek admittance" (p. 52).

Impact of Open Access

Providing open access to higher education is most important for underrepresented populations. Among these are minorities, nontraditional students, those with lower incomes, and those who are underprepared for admittance to a four-year institution. Citing statistics provided by the American Association of Community Colleges, Shannon & Smith (2006) argue that the open door policies of community colleges provide an opportunity to attend college that would not exist for many students. Among the evidence they present are that community colleges enroll:

- 47% of black undergraduate students,

- 56% of Hispanic undergraduates,
- 48% of Asian/Pacific Islanders, and
- 58% of Native American students.

As Shannon and Smith (2006) say, "Because so many of these students come from low-income or educationally disadvantaged backgrounds, one can infer that without the open door, few would be able to attend an institution of higher education" (p. 16). In addition, "about 60% of public community college students today are first generation" (Vaughan, 2004, pp. 52-53). This is in large part due to the fact that community colleges actively seek those students who have historically been ignored by four-year institutions.

It is not just first generation and minority students that benefit from open access admission policies, as many students are adults who depend upon the flexibility, low cost and geographic accessibility that community colleges offer (Shannon & Smith, 2006). In fact, over 40% of undergraduates attend a community college, about 30% of which are over the age of 24 (A Test of Leadership: Charting the Future of U.S. Higher Education, 2006).

Developmental Education in Community Colleges

Just as there is no standard definition for college readiness, or a finite list of skills necessary for student success, so too is there no consensus of the best structure or organization for providing that education (Bailey, 2009). As Bailey (2009) reports, Perin (2006) "found more approaches than colleges" (p. 20) when investigating remediation practices. Oftentimes, developmental education sequences mimic those of traditional college-level courses, and consist of progressively more advanced classes designed to sequentially build upon the skills learned in previous courses. The developmental

education sequence normally ends when a student has progressed to their first gatekeeper course, or "… the first-level college course in the relevant subject area" (Bailey, Jeong, & Cho, 2010, p. 1). For some students, developmental education sequences can be as long as three semesters before they may first begin college-level work (Bailey, Jeong, & Cho, 2010).

Once in a developmental sequence, most students find themselves enrolled in courses structured similarly to a traditional college-level course (Grubb, 1999 as cited in Bailey 2009): students "gather with a professor in a classroom a given number of times over the course of a semester" (Bailey, 2009, p. 20), for example. While most class schedules are the same as college-level courses, as with all other aspects of developmental education, pedagogies and curricula employed are as varied as the institutions which employ them (Bailey, 2009).

Assessment and Placement

Despite great variety in developmental education programs, most colleges follow a similar initial pathway in determining which students need remediation: students' academic skills are assessed upon enrollment using a standardized test such as Accuplacer® or Compass® (Bailey , 2009), which are employed by 62% and 46% of community colleges respectively (Primary Research Group as cited in Scott-Clayton, 2012). Students are placed into a course corresponding to their level of need as determined by cutoff scores on these assessments (Bailey, Jeong, & Cho, 2010).

As with other aspects of developmental education, there are no universal, objective criteria for defining cutoff points for developmental education placement (Attewell, Lavin, Domina, & Levey, 2006). As such, individual institutions have great

leeway to define for themselves what college readiness means, as well as how to assess that readiness (Attewell, Lavin, Domina, & Levey, 2006; Bailey, 2009). These differing standards and cutoff points have led some researchers to conclude that assessment scores are meaningless; as Phipps (1998) states, "(M)ost students who are classified as remedial students are simply those who have the lowest scores on an assessment exam, and the line that separates those who need remediation from those who do not is fairly arbitrary" (p. vi). As stated earlier, however, this leeway is necessary, as definitions of readiness are institution-specific.

National Need

The number of students in American community colleges, and in American higher education in general, requiring some form of remediation varies considerably depending on both the source of the estimate as well as what type of institution is being examined. Most studies have consistently found, however, that the number of students requiring remediation is significantly higher at community colleges than at four-year institutions. According to Complete College America (2012), for example, 51.7% of the incoming 2006 cohort of community college students required remediation, as opposed to 19.9% of incoming four-year students. These findings should be expected, of course, due to the open enrollment policies of community colleges.

As has been stated, rates of referral to developmental education vary based on the type of institution being examined. So, too, do rates vary among demographic groups by characteristics such as race/ethnicity, age and income level, as can be seen in Table 3.

Table 3

Percentage of Students Needing Remediation

Variable	Percentage
African American	67.7%
Hispanic	58.3%
White	46.8%
Other	48.9%
Ages 17-19	54.7%
Ages 20-24	51.6%
Ages 25+	42.5%
Low-income	64.7%

Note. Table adapted from Complete College America (2012, p. 6) using Fall 2006 cohort data

Rates of referral also differ based on the subject area being examined. For colleges participating in the Achieving the Dream initiative, for example, Bailey (2009) found significant differences between math and reading placements, as outlined in Table 4.

Table 4

Math and Reading Placements in the Achieving the Dream Initiative Colleges

Math	Placement Percentages
Two levels below entry-level	~33%
Three levels below entry-level	28%
Reading	
Any developmental course	34%
Lowest elementary course (two or three levels below entry-level)	~11%

Note. Table adapted from Bailey (2009)

Enrollment

In examining the impact of developmental education, many researchers have found that a surprisingly high percentage of students who are referred to developmental education sequences never actually enroll. In their analysis of data from the Achieving the Dream initiative, Bailey, Jeong and Cho (2010), found that just over half of students

referred to developmental education followed referral recommendations. They also found that 27% of students referred to developmental math, and 39% of students referred to developmental reading, never enrolled in any developmental education courses. Jenkins, Jaggars and Roksa (2009) found similar results when analyzing the enrollment of 24,140 first-time college students attending a Virginia Community College System college during the summer or fall of 2004: of those students who were recommended to take a developmental course, over one-third did not.

Despite high rates of students testing into and enrolling in developmental education courses, the number of students who are academically unprepared for college-level work is certainly higher than the numbers presented above suggest. Many states, colleges and/or programs do not mandate placement in developmental education courses, even if students' test scores warrant it (Bailey, 2009). Even in states where developmental education courses are mandated, many students are granted exemptions and are permitted to bypass remediation and enroll in college-level courses (Bailey, 2009). Due to these factors, Bailey (2009) states that, "…it is reasonable to conclude that two-thirds or more of community college students enter college with academic skills weak enough in at least one major subject area to threaten their ability to succeed in college-level courses" (p. 13).

Sequence Completion

Even when students do enroll in and successfully complete their initial course(s), many students who are referred to a developmental sequence drop out before completing their sequence. According to Complete College America (2012), 38% of students who enroll in developmental sequences will not complete them, and less than one in four will

ever complete a college-level course. These low rates of completion hold especially true for those recommended to the lowest levels of remediation (Bailey, 2009).

In their analysis of data from the Achieving the Dream initiative, Bailey, Jeong and Cho (2010) found that only 33% of students referred to developmental math, and 46% of students referred to developmental reading, successfully completed their developmental sequences. As Table 5 shows, rates of completion for both math and reading coursework differed depending on how many levels below the first college-level course students were assigned.

Table 5

Completion of Developmental Sequences

Developmental course level (below college-level) to which student was referred	Completed Sequence[a]
Math	45%
1 level below	
2 levels below	32%
3+ levels below	17%
Total	33%
Reading	50%
1 level below	
2 levels below	42%
3+ levels below	29%
Total	46%

[a] Sequence completion refers to the completion of Level I

Note. Table adapted from Bailey, Jeong, & Cho (2010, p. 260)

These low rates of completion can be explained in large part by the fact that many students who enroll never attend classes. Jenkins, Jaggars and Roksa (2009) found that 30% of students enrolled in a developmental course never attended, for example. Of those who did attend and successfully completed their sequence, 30% did not attempt a gatekeeper course within three years of doing so.

As should be expected from the low rates of attendance and completion, very few students referred to developmental education ultimately complete college-level courses (Complete College America, 2012). As with rates of referral to developmental education discussed previously, there are some differences with rates of completion by demographic group. As Table 6 shows, however, no group shows rates of completion higher than about 25%.

Table 6

Percentage of Two-year College Students Who Did Not Complete Remediation and Associated College-level Courses in Two Years

Variable	Percentage
African American	85.6%
Hispanic	76.2%
White	76.9%
Other	74.9%
Ages 17-19	75.4%
Ages 20-24	83.3%
Ages 25+	80.9%
Low-income	79.9%

Note. Table adapted from Complete College America (2012, p. 8) using fall 2006 cohort data

Traditional Measures of Success for Students in Developmental Education

While some studies suggest that students who do successfully complete their developmental sequences and go on to take college-level courses tend to perform just as well academically as their peers who did not enroll in developmental courses (Adelman, 1998 as cited in Bailey, 2009; Attewell, Lavin, Domina, & Levey, 2006), a preponderance of evidence demonstrates that students who take developmental education courses are significantly less likely to graduate than their peers. These lower rates of completion may be due to many factors such as increased program costs (Bailey, 2009) and length (Horn & Carroll, 1996 as cited in Bailey, 2009; Horn & Nevill, 2006 as cited

in Bailey, 2009), as well as frustration and/or discouragement (Deil-Amen & Rosenbaum, 2002 as cited in Bailey, 2009).

In his two studies, Adelman (1999 as cited in Attewell, et al., 2006; Adelman, 2004 as cited in Attewell, et al., 2006) found that both the 1982 and 1992 cohorts of graduating high school students showed vastly different rates of graduation based on whether or not students took developmental education courses. For the 1982 cohort, only 39% of those who did take developmental education courses earned bachelor's degrees, versus 69% of those who did not (Adelman C., 1999 as cited in Attewell, et al., 2006).

In their survey, Complete College America (2012) found similar graduation patterns for students in community colleges. They estimated that that only 9.5% of students taking remedial education courses would graduate within three years of first enrolling, compared to 13.9% of students who do not take remedial courses. Missouri's graduation rates exceed the national average: 23.2% of the Fall 2004 cohort of students who enrolled in remedial education graduated within three years (Complete College America, 2012).

Bailey (2009) found similar discrepancies in the NELS sample: fewer than 25% of students who took developmental education courses completed a credential within eight years of enrolling compared to almost 40% who did not take a developmental course. For both groups, 14% transferred without earning a credential. According to the National Center for Education Statistics (2015), in 2011, only 59% of first-time, full-time students at two-year institutions overall returned for the fall 2012 semester. In addition, only "…31 percent of first-time, full-time undergraduate students who began their pursuit of a certificate or associate's degree in Fall 2009 attained it within 150 percent of the

normal time required to do so." In public two-year institutions, this rate drops to twenty percent.

Interventions and Recommendations from the Literature

Educators, researchers, institutes of higher education, and for-profit companies have long recognized that rates of success in developmental education courses are lower than desired, and have developed many alternative curricular designs and interventions to improve student success. Among these, which will be detailed below, are: greater collaboration, multiple pathways, co-requisite models of developmental education, and integrated instruction.

Collaboration

One of the most widely discussed recommendations for improving underprepared students' chances of success is increasing the amount of collaboration between community colleges and secondary education institutions. As students are arriving unprepared for college-level, i.e. postsecondary, work, it is only natural to conclude that the primary intervention strategy would be to increase their preparedness at the source: secondary education.

Early Assessment Programs

Early assessment programs are designed to identify those students who are not on track to be college-ready upon high school graduation while the students are still one or more years away from graduating high school, and provide interventions and services to remedy any deficiencies (Radford, et al., 2012). This oftentimes takes the form of college entrance exams given during the junior or senior year (Kerrigan & Slater, 2010 as cited in Radford et al., 2012), but can also refer to the inclusion of supplemental questions added

to preexisting statewide tests (Howell, Kurlaender, & Grodsky, 2010 as cited in Radford et al., 2012)

Dual Enrollment

Collaboration between colleges and high schools can also take the form of dual enrollment programs, in which high school students take college-level courses, and earn college credit, while still enrolled in high school (Bailey, 2008 as cited in Radford, et al. 2012). While dual enrollment has long been an enrollment strategy aimed at high-achieving students, this approach is now being advocated for use with underprepared students in an effort to expose them to both the materials and experiences they should expect to find in college (Bailey, 2008 as cited in Radford, et al. 2012)

Multiple Pathways, Co-Requisites, and Integrated Instruction

As can be seen by the success rates previously discussed, for many students the traditional academic pathway will not lead to a meaningful credential or directly-applicable work experience. Rather than continue placing these students into a traditional developmental education curricular pathway where they have little chance of success, many advocate for creating alternate pathways based on students' academic deficiencies (Complete College America, 2012), as well as providing embedded support through co-requisites and integrated instruction (Bailey T. , 2009; Bailey, Jeong, & Cho, 2010; Complete College America, 2012).

Complete College America (2012) recommends enrolling all students, including those with academic deficiencies, into credit-bearing courses as soon as possible. Rather than placing most students with lingering academic needs into standalone traditional developmental education courses, they recommend default placement into redesigned

pathways based on the student's level of deficiency, with built-in co-requisite support for those with few to moderate academic deficiencies. For those students with severe deficiencies, they recommend providing alternative pathways, including career certificates and adult skills development.

Conclusion

Typical outcomes found in the literature demonstrate that many first-year community college students are placed in developmental education sequences, with some taking multiple courses over several semesters, expending significant time, money and opportunity costs, including a significant percentage of their available Federal Student Aid, without achieving a traditional measure of student success: earning a credential and/or transferring to a four-year institution. Many interventions for addressing these issues are also found.

Next, I will describe the methodology used in this study to identify characteristics of developmental education students at Crowder College associated with a lack of second semester reenrollment. These study results were used to create the recommendations found in Chapter 5: Discussion.

Chapter 3: Methodology

To assist Crowder College in their efforts to improve first to second semester retention, this study employed chi-square and logistic regression analyses on data collected during Crowder College's current application and enrollment processes, as well as developmental education students' first semester course performance, to create several nested models of characteristics correlated with a lack of reenrollment the following semester. These models sought to identify the greatest number of students who did not reenroll as early in the students' post-secondary education as possible. The following section will describe this study's methodology in detail.

Purpose of Project

The purpose of this project is to develop recommendations for improving first to second semester retention of developmental education students at Crowder College informed by an analysis of institutional data collected during first-year, first-semester developmental education students' application and enrollment process.

Clearance from IRB

Exempt status clearance from UMSL's IRB (Institutional Review Board) was received on January 10, 2016, and the Approval Letter is included as Appendix E.

Research Question

What characteristics of first-year, first-semester developmental education students recorded by Crowder College's current admissions and enrollment process are predictive of a lack of second semester reenrollment?

Justification

Though there are numerous studies which seek to identify student characteristics associated with academic success, few specifically seek to identify characteristics of students who are not successful. As Crowder College seeks to increase its retention numbers, it will be helpful to identify students who will not reenroll as early in students' postsecondary career as possible. Doing so will not only save both students and Crowder College money (students will not expend out-of-pocket and FSA; universities will not expend on recruitment), it will save time, frustration and the opportunity costs associated with not passing individual courses and/or non-completion of a meaningful credential.

Research Design

The three most recent years of Crowder College's institutional data were analyzed using chi-square tests for association and binary logistic regression to identify characteristics correlated with, and predictive of, a lack of second semester reenrollment. The results of these analyses were used to create nested models of the characteristics associated with the greatest number of students who did not reenroll as early in students' post-secondary education as possible.

Rationale

Both chi-square and logistic regression were used to identify characteristics associated with a lack of second semester reenrollment. Chi-square was used to determine frequencies and percentages of cases associated with characteristics, while logistic regression was used to determine odds ratios while controlling for other variables. According to Peng and So (2002), logistic regression is becoming an increasingly popular analytical technique in the social sciences, including higher

education. This is in large part due to the fact that it is more flexible than other techniques and does not require normal distribution of data (Peng & So, 2002).

Population Sample

The participants in this study were first-year, first-semester students who first attended Crowder College during the fall 2012, fall 2013, and fall 2014 semesters. All participants completed Crowder College's New Freshman Application (Appendix F), were required to take the COMPASS assessment and/or provide ACT scores during the application process, and were required to provide transcripts of the high school from which they graduated, if available (Crowder College, 2015a).

Instrumentation

Students new to Crowder College completed the New Freshman Application (Appendix F) for admission. Among the variables required during this application were demographic information (age; gender; socio-economic indicators such as Pell eligibility), previous academic experiences (high school attended; high school GPA), and intentions for attending Crowder College (degree-seeking; non-degree-seeking; program of study). In addition, students were also required to provide transcripts from the high school from which they graduated, as well as ACT scores, if available. Students who either did not provide ACT scores, or who scored below 18 on the ACT, were also required to take the COMPASS assessment to gauge academic preparedness (Crowder College, 2015a). These data, as well as grades earned at Crowder College, were recorded in Jenzabar, Crowder College's system of record.

Procedures

Participant data as collected during Crowder College's current application and enrollment processes and as described in Instrumentation above were requested and received from Crowder College as an Excel file. These data were reviewed for accuracy and standardized for analysis, with missing values and outliers identified as described below. They were then imported into IBM SPSS 22 for statistical analysis.

Data Collection

Data was provided by Crowder College in an Excel file, with one row per study participant and one column per variable, with all values as originally recorded in Jenzabar. This original file was examined for completeness, including confirming that the data fields which were received matched the data fields requested, and that values for each field were appropriate. Several additional variables were calculated from the variables provided, which are highlighted in the codebook provided in Appendix G: SPSS Codebook.

Errors

Two main errors were found in the dataset: data entry errors, such as incorrectly recorded values, and values outside the range of possibility. Due to the fact that this project utilized secondary data, there was limited opportunity to correct errors. Therefore, the majority of cases with data errors were eliminated from the analysis. The total number of cases eliminated from the full dataset of 2,228 cases was 20. To identify errors, basic descriptive statistics were run which revealed values outside the range of possible values. All changes were recorded in the log file (Appendix H), and are described below.

Two cases were removed because they were not enrolled in any developmental education courses. Two cases were removed because they had errors recorded for their math course grade. Three cases were removed because they had grades recorded but no entry for hours attempted. One case was removed because it had grades recorded but no entry for hours earned. Twelve cases were removed because their credit hours earned exceeded credit hours attempted. One case was manually edited because of a data entry error in the ACT Math variable. Because ACT Math was not used as a variable in the study results, this change had no effect on results presented. The remaining 2,208 cases constitute the study population, and are described below as Model 0: All Cases.

Coding

To better facilitate logistic regression and provide Crowder College with more actionable results, all interval variables received from Crowder College were converted into categorical variables. These categorical values were then coded prior to statistical analysis, which resulted in a codebook of variables (Appendix G).

Log File

As suggested by Pallant (2013), a log file was kept to record errors detected and changes made to the original data file. This log file contains fields for the record number, the variable identified, the original and changed value if the variable value was changed, and whether the record was deleted from the file. This helped to ensure that data corruption did not occur, or, if corruptions did occur, that they were identified and corrected. The log file can be found in Appendix H.

Variables

There was one dependent variable in this study (student reenrolled: yes/no) and twenty-nine independent variables grouped chronologically into five categories: (1) Demographic; (2) Pre-collegiate academics; (3) Enrollment; (4) First Four Weeks Performance; and (5) First Semester Performance. To ensure that results from this study are as actionable as possible for Crowder College leadership, all variables were converted into categorical variables. The variables included in this study are described below.

Demographic Variables

Cohort Year: The academic year in which the student first enrolled. All students first enrolled during the fall semester of the 2012, 2013, or 2014 academic year.

Age: The student's age rounded down to the nearest whole number. Age was provided as a continuous variable, but to ensure that the model developed for Crowder College is as actionable as possible, it was recoded as a categorical variable based on IPEDS grouping: Under 18; 18-19; 20-21; 22-24; 25-29; 30-34; 35-39; 40-49; and 50-64.

Gender: The student's gender as recorded during the student's application to Crowder College. At the time of application, students could select female, male, no gender given, or trans-gender as their gender. All students in the study selected either male or female.

Race/ethnicity: The student's race and/or ethnicity as recorded during the student's application to Crowder College. Race/ethnicity was provided with values aligned with IPEDS: American Indian or Alaska Native; Asian; Black or African American; Hispanic of any race; Native Hawaiian or Other Pacific Islander; Nonresident Alien; Race and Ethnicity unknown; Two or more races; White.

First Generation Student: The student selected first generation during their application to Crowder College. First generation is defined by Crowder College as: "Parents did not complete a 4-year college degree; or an individual who resided primarily with only one parent and that parent did not have a 4-year degree."

Pell Recipient: The student received a PELL Grant, a grant for students who meet low-income criteria.

Veteran: The student identified as a veteran during the application process.

Single Parent: The student selected single parent during their application to Crowder College. Single parent is defined by Crowder College as: "A person parenting at least one child, without a spouse or significant other."

Displaced Homemaker: The student selected displaced homemaker during their application to Crowder College. Displaced homemaker is defined by Crowder College as: "has primarily been a homemaker without outside income, or has lost eligibility for public assistance."

Migrant Student: The student selected migrant student during their application to Crowder College. Migrant student is defined by Crowder College as: "student or parents have worked in agriculture/farming for 75 days within the past two years."

Pre-collegiate Academics Variables

High School Grad Type: Students were asked to provide information about their high school from which they graduated GED/HiSet Possible data points for high school grad type are: missing / unknown; GED; HiSET; homeschool diploma; high school diploma (without a transcript); and high school diploma (with a transcript).

High School GPA: Students' GPA scores were recorded as an interval variable, but were recoded as categorical, with groupings roughly equivalent to letter grade. The possible data points for high school GPA are: missing / unknown; higher than 4.0; 3.5-4.000; 2.5-3.499; 1.5-2.499; 0.5-1.499; 0.0-0.499.

Enrollment Variables

Full-time Status: The student either enrolled full-time (12 or more hours) or part-time (11 or fewer hours).

Major Declared: At the time of application, students were asked to select the degree they were interested in pursuing. Students could select a program of study, non-degree seeking, or leave the question blank. Students who selected a program were labeled as having a major declared. Students who selected non-degree seeking were labeled as non-degree seeking. Students who did not select a degree were labeled as undeclared.

Degree Type: At the time of application, students were asked to select the degree they were interested in pursuing. These degrees could be any of the following: AA; AAS; AAT; Non-degree seeking; Certificate; Undeclared. Several degrees could have been an associates or a certificate. These were coded as Unknown.

Declared Major was Cancelled: At the time of application, students were asked to select the degree they were interested in pursuing. Several of these were later cancelled, and were coded as Yes. If a student did not select a major, then the variable was coded as Undeclared. All others were coded as No.

Enrolled in Developmental Math Course: The student enrolled in a developmental math course: No; Yes.

Developmental Math Course Number Enrolled: The developmental math course for which a student enrolled: Did not enroll in a developmental math course; MATH 040; MATH 050; MATH 060; MATH 070; MATH 090; MATH 100.

Enrolled in Developmental English Course (ENGL 100): The only developmental English course offered during this study was ENGL 100. The student enrolled in this developmental English course: No; Yes.

Enrolled in Developmental Reading Course: The student enrolled in a developmental reading course: No; Yes.

Developmental Reading Course Number Enrolled: The developmental reading course for which a student enrolled: Did not enroll in a developmental reading course; LOC 040; LOC 050; LOC 090; LOC 100.

Enrolled in Developmental Communication Course (COMM 040): The only developmental communications course offered during this study was COMM 040. The student enrolled in this developmental communications course: No; Yes.

Total Number of Developmental Courses Enrolled: The total number of developmental courses a student enrolled. Enrolled includes courses that were later dropped or withdrawn. Students could enroll in 1; 2; 3; or 4 courses.

First Four Weeks Performance Variables

Total Credit Hours Attempted: Credit hours attempted are for those courses where a student was still actively enrolled after the fourth week of the semester. The credit hours for which a student attempted were recorded as an interval variable, but were recoded as categorical, with groupings roughly equivalent to a single course: 0; 1-3; 4-6; 7-9; 10-12; 13-15; 16-18; 19+.

Total Credit Hours Attempted 2: Total credit hours attempted were recorded as 7 or more; 6 or fewer.

Majority of Credit Hours Attempted were Developmental: Credit hours attempted were compared with developmental credit hours attempted to determine whether a student attempted a majority of college-level or developmental courses, coded as follows: No credit hours attempted; Only college-level credit hours were attempted; Majority of credit hours attempted were college-level; Equal number of developmental and college-level credit hours were attempted; Majority of credit hours attempted were developmental; Only developmental credit hours were attempted.

First Semester Performance Variables

Total Credits Earned: The credits a student earned were recorded as an interval variable, but were recoded as categorical, with groupings roughly equivalent to a single course: 0; 1-3; 4-6; 7-9; 10-12; 13-15; 16-18; 19+.

Total Credits Earned 2: Total credits earned were recorded as 7 or more; 6 or fewer.4 or more; 3 or fewer.

Majority of Credits Earned were Developmental: Credits earned were compared with developmental credits earned to determine whether a student earned a majority of college-level or developmental credit, coded as follows: No credits were earned; Only college-level credits were earned; Majority of credits earned were college-level; Equal number of developmental and college-level credits were earned; Majority of credits earned were developmental; Only developmental credits were earned.

Nested Model Development and Data Analysis

This study sought to develop a nested model of the characteristics associated with early non-persisters at Crowder College by examining institutional data collected during first-year, first-semester students' application and enrollment process. To do so, multiple analyses were performed, which included descriptive statistics, tests for association, and logistic regression to examine the relationships that exist between multiple independent variables and indicators of student success as measured by the dependent variable: second semester enrollment.

Nested Model Development

Development of a nested model followed the steps outlined below. The results of these models were used to identify target populations for intervention, which are described in detail in Chapter Five.

Step 1: Descriptive Statistics

Descriptive statistics were calculated to identify and describe characteristics of the study population, including numbers and percentages, means, standard deviations, and range of scores of dependent and independent variables. These statistics were used to test underlying assumptions for future statistical analyses, determine data normality, and identify the numbers and percentages of missing values and outliers.

Step 2: Tests for Association

Chi-square tests were run for binary and categorical independent variables to identify which independent variables are most strongly associated with a lack of second semester reenrollment. Variables were considered appropriate for further analysis if they satisfied the following criteria:

1. Chi-square tests showed statistical significance;
2. The percentage of students who did not reenroll were equal to or exceeded the percentage that did reenroll; and
3. The percentage of students who did not reenroll were equal to or exceeded ten percent of the total population under examination who did not reenroll.

Step 3: Multiple Logistic Regression

A multiple logistic regression analysis was conducted to test for individual variable predictability, which controlling for all other variables that occurred chronologically in line with or earlier than the variable under examination. Individual variables were considered appropriate for further analysis if they showed statistical significance and a high odds ratio.

Step 4: Select Variables

The results of the tests for association and multiple logistic regression model were used to select variables that would serve as branches in the nested models. The basis for selecting these variables were that they fulfilled the following criteria:

1. The variable occurred chronologically in-line with or after the current variable;
2. The variable showed statistical significance in both Chi-square and multiple logistic regression;
3. The percentage of students who did not reenroll equaled or exceeded the percentage that did;
4. The percentage of students who did not reenroll equaled or exceeded ten percent of the total population who did not reenroll; and

5. The multiple logistic regression model showed statistical significance and a high odds ratio while controlling for the other variables in the model.

Step 5: Create Nested Model

New models for the selected variables were created using steps one through four outlined above. This process continued so long as at least one variable met the criteria outlined in Step four.

Conclusion

At present, many first-year, first-semester students at Crowder College are placed into and take multiple developmental education courses, expending significant time, money and opportunity costs, without achieving near-term (passing grades; reenrollment) and/or long-term (earning a credential and/or transferring to a four-year institution) measures of success. In an effort to address one of these issues, this project seeks to develop recommendations for improving first to second semester retention of developmental education students at Crowder College informed by an analysis of institutional data collected during first-year, first-semester developmental education students' application and enrollment process.

As described above, this study will employ chi-square and logistic regression analyses on data collected during Crowder College's application and enrollment processes to determine if correlations exist between student characteristics and reenrollment the following semester. It is hoped that the results of this study will be useful in placing students more accurately, thereby reducing the number of students who struggle and/or withdraw during their first semester of college, and saving all stakeholders valuable time, money, and lost opportunity costs.

Chapter 4: Results

Purpose of Project

The purpose of this project is to develop recommendations for improving first to second semester retention of developmental education students at Crowder College informed by an analysis of institutional data collected during first-year, first-semester developmental education students' application and enrollment process.

Research Question

What characteristics of first-year, first-semester developmental education students recorded by Crowder College's current admissions and enrollment process are predictive of a lack of second semester reenrollment?

Study Population

The participants in this study were first-year, first-semester developmental education students who first attended Crowder College during the fall 2012, fall 2013, and fall 2014 semesters. The original study population received from Crowder College originally contained 2,228 cases, but twenty cases were removed from the study due to errors. The remaining 2,208 cases constitute the full study population, and are described below as Model 0: All Cases.

Models Developed

Four models were developed using the methods described in the Nested Model Development and Data Analysis section of Chapter 3: Methodology:

- *Model 0: All Cases* reports the results for all 2,208 cases included in the study population. Based on the results of these analyses, three other models were developed.

- *Model 1: Known High School Grad Type* excludes students with a missing / unknown high school grad type, and reports results for the 1,986 students who had a known high school graduate type.
- *Model 2: Degree-seeking Students* excludes students who either selected non-degree seeking at the time of application, or did not select any program at the time of application, and reports results for the 1,872 students who did select a program at time of application.
- *Model 3: Degree-seeking Students with a Known High School Grad Type* excludes students with a missing / unknown high school grad type, students who either selected non-degree seeking or did not select any program at the time of application, and students who attempted six or fewer credit hours. Model 3 reports results for the 1,691students who had a known high school grad type, did select a program other than non-degree seeking at time of application, and attempted seven or more credit hours.

These four models identified three characteristics predictive of students who are unlikely to re-enroll for a second semester:

- Students who had a missing / unknown high school grad type
- Students with an undeclared major at the time of application
- Students who attempted six or fewer credit hours.

Students who had one or more of these characteristics were unlikely to reenroll for a second semester, and make up potential target populations for intervention. The following pages describe the results of the nested models in detail, with detailed descriptions of the three predictive characteristics following.

Model 0: All Cases

Model 0 creates the baseline model from which Models 1-3 branch. Since all study participants either did or did not reenroll the following spring semester, all 2,208 cases were included.

Tests for Association

Although several variables were found to be associated with a lack of second semester reenrollment, only three variables met the inclusion criteria described in Methodology above: Missing / Unknown Grad Type; Undeclared Degree Type; Six or Fewer Credit Hours Attempted. The chi-square results for these variables are presented in Table 7 below; and are described in detail following the logistic regression results.

Table 7

Model 0 Tests for Association – Selected Results

Variable	n	χ^2	df	*p*	% did not re-enroll	% of total non-persisters
High School Grad Type	2,208	330.562	5	.000*	28.5	100.0
Missing / Unknown	**222**				**79.7**	**28.1**
GED	228				27.6	10.0
HiSET	9				66.7	1.0
Homeschool Diploma	20				15.0	0.5
High School Diploma	56				19.6	1.7
High School Transcript	1,673				22.1	58.7
Degree Type	2,208	377.654	7	.000	28.5	100.0
Major Declared	1,872				26.7	79.3
Non-degree seeking	201				1.0	0.3
Undeclared	**135**				**94.8**	**20.3**
Total Credit Hours Attempted 2	2,208	169.045	1	.000	28.5	100.0
7 or more	2,042				24.9	80.9
6 or fewer	**166**				**72.3**	**19.1**

* One cell (8.3%) has expected count less than five.

Logistic Regression

To test for significance of the three selected variables while controlling for other variables, a multiple logistic regression analysis was conducted using reenrollment (0 =

yes / 1 = no) as the dependent variable, and the following as independent variables: Cohort Year; Age Group; Gender; Race / Ethnicity; First Generation; Pell Recipient; Veteran; Single Parent; Displaced Homemaker; Migrant Student; High School Grad Type; High School GPA; Full-time status; Major Declared; Total Developmental Courses Enrolled; Total Credit Hours Attempted 2; and Majority of Credit Hours Attempted were Developmental.

The following variables created redundancy errors when included in the model, and were therefore excluded from the analysis: Degree Type; Declared Major was Cancelled; Enrolled in Developmental Math Course; Developmental Math Course Number Enrolled; Enrolled in Developmental English Course; Enrolled in Developmental Reading Course; Developmental Reading Course Number Enrolled; Enrolled in Developmental Communications Course; Total Credit Hours Attempted.

Even though they were highly predictive of whether or not a student would reenroll, First Semester Performance variables were not included in this model. Full logistic regression results for Model o are presented in Appendix K, and for the three selected variables in Table 8 below.

Table 8

Model 0 Logistic Regression – Selected Results

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95% C.I. Lower	95% C.I. Upper
High School Grad Type								
High School Diploma with Transcript			26.223	5	.000			
Missing / Unknown	**1.104**	**.273**	**16.294**	**1**	**.000**	**3.016**	**1.765**	**5.155**
GED	.071	.223	.101	1	.751	1.073	.693	1.662
HiSET	1.465	.805	3.313	1	.069	4.329	.894	20.974
Homeschool diploma	-.830	.700	1.406	1	.236	.436	.111	1.720
High school diploma no transcript	-.732	.388	3.566	1	.059	.481	.225	1.028
Major Declared								
Declared			48.695	2	.000			
Non-degree Seeking	-3.372	.720	21.937	1	.000	.034	.008	.141
Undeclared	**2.985**	**.581**	**26.414**	**1**	**.000**	**19.785**	**6.338**	**61.760**
Credit Hours Attempted 2 (6 or fewer)	**1.252**	**.273**	**21.077**	**1**	**.000**	**3.499**	**2.050**	**5.972**
Constant	-2.456	.649	14.306	1	.000	.086		

The logistic regression analysis confirmed the results of the chi-square analyses that the association between the three selected variables and a lack of second semester reenrollment was statistically significant while controlling for other variables.

Characteristics Associated with a Lack of Reenrollment

The results of the Model 0 chi-square and logistic regression analyses identified three student populations at high risk of not reenrolling the following semester: Students with a Missing / Unknown High School Grad Type; Students with an Undeclared Major; Students who Attempted Six or fewer credit hours their first semester.

Missing / Unknown High School Grad Type

In *Model 0: All Cases*, students without a high school grad type were 3.016 times less likely to reenroll than their peers with a high school diploma and transcript. As Figure 1 shows, almost 80% (n = 177) of the 222 total cases with a missing / unknown high school grad type did not reenroll for a second semester, which accounted for just over 28% of the 629 total students who did not reenroll.

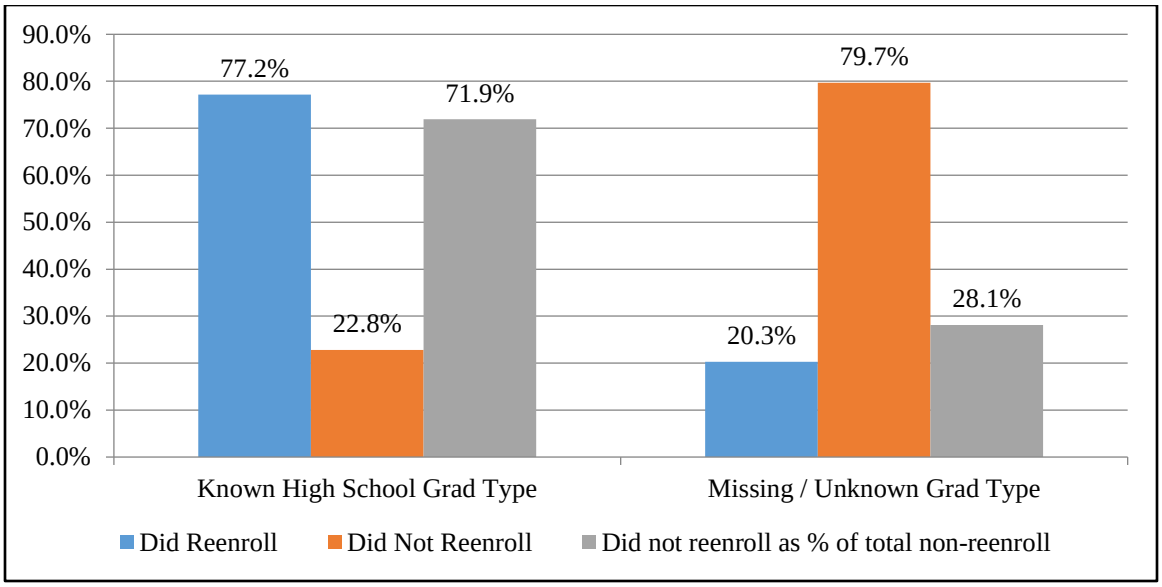

Figure 1. Reenrollment by High School Grad Type for All Cases

Undeclared Major

In *Model 0: All Cases*, students without a declared major were 19.786 times less likely to reenroll than their peers who did have a declared major. As Figure 2 shows, almost 95% (n = 128) of the 135 total cases with an undeclared major did not reenroll for a second semester, which accounted for just over 20% of the 629 total students who did not reenroll. Conversely, almost all of the non-degree seeking students did reenroll.

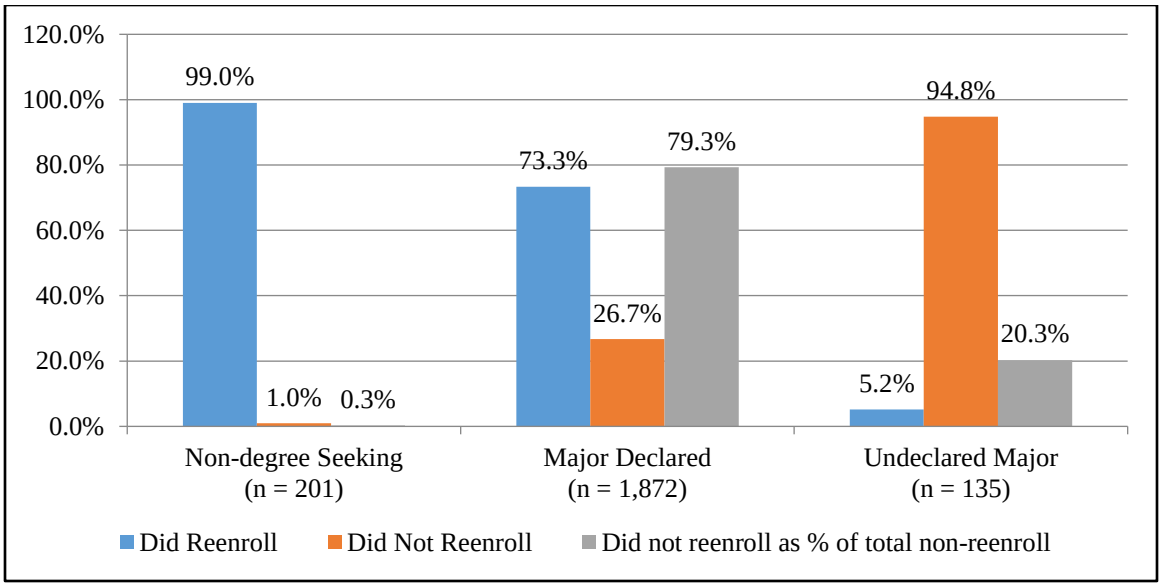

Figure 2. Reenrollment by Major Declared for All Cases

Attempted Six or Fewer Credit Hours

In *Model 0: All Cases*, students who attempted six or fewer credit hours were 3.499 times less likely to reenroll than their peers who attempted seven or more credit hours. As Figure 3 shows, almost 70% (n = 120) of the 166 total cases who attempted six or fewer credit hours did not reenroll for a second semester, which accounted for just under 20% of the 629 total students who did not reenroll.

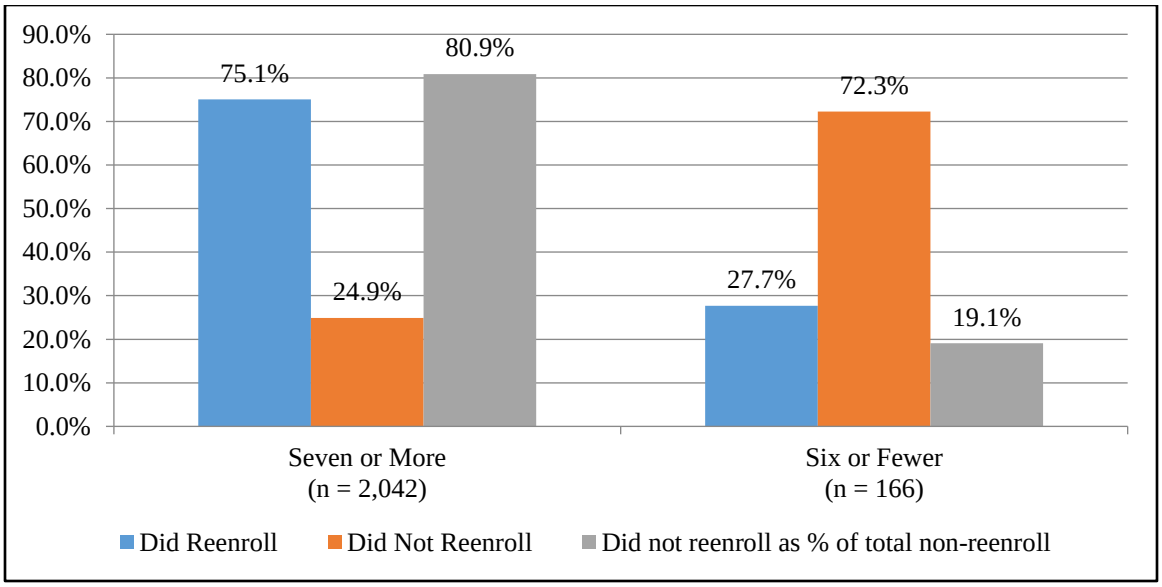

Figure 3. Reenrollment by Credit Hours Attempted for All Cases

Branches

Tests for association and the logistic regression model found three variables that fit the selection criteria described under Methods: (1) High school grad type, (2) Major declared, and (3) Total credit hours attempted. Because they occur during the enrollment process or earlier, only high school grad type and major declared were used as branches to create nested models.

Branch 1: High School Grad Type

There was one pre-collegiate academic variable that satisfied the four selection criteria above: High School Grad Type. Almost 80% (n = 177) of the 222 students who had a missing / unknown high school grad type did not reenroll for a second semester, which accounted for just over 28% of the 629 total students who did not reenroll. These cases were removed from the 2,208 total cases in the dataset, as illustrated in Figure 4, and the remaining 1,986 cases were examined using the steps described under Methodology. The results of these analyses are described below in Model 1: Known High School Grad Type.

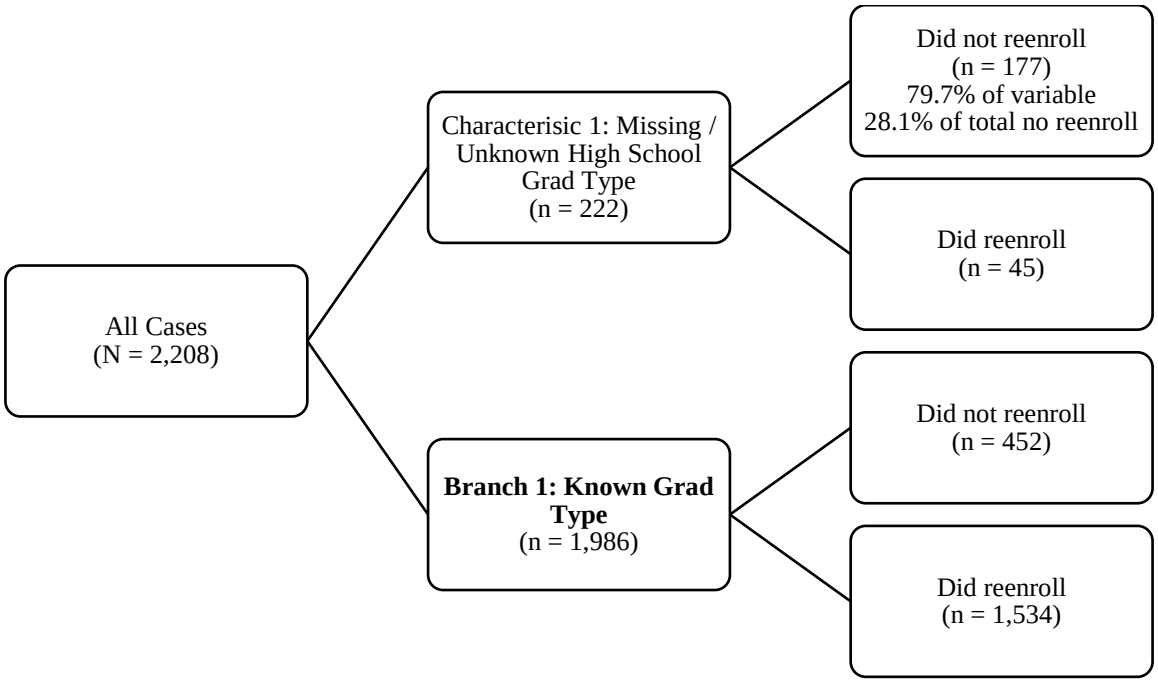

Figure 4. Model 0, Branch 1

Branch 2: Major Declared

There was one enrollment variable fitting the selection criteria above: Major Declared. Almost 95% (n = 128) of the 135 students who did not have a major declared at time of enrollment did not reenroll for a second semester, which accounted for just over 20% of the 629 total students who did not reenroll. Conversely, 95% (n = 199) of the 201 students who selected non-degree seeking at the time of enrollment did reenroll the following semester. The two students who did not reenroll accounted for less than 1% of the 629 total students who did not reenroll. These cases were removed from the 2,208 total cases in the dataset, as illustrated in Figure 5, and the remaining 1,872 cases were examined using the steps described under Methodology. The results of these analyses are described below in Model 2: Degree-seeking Students.

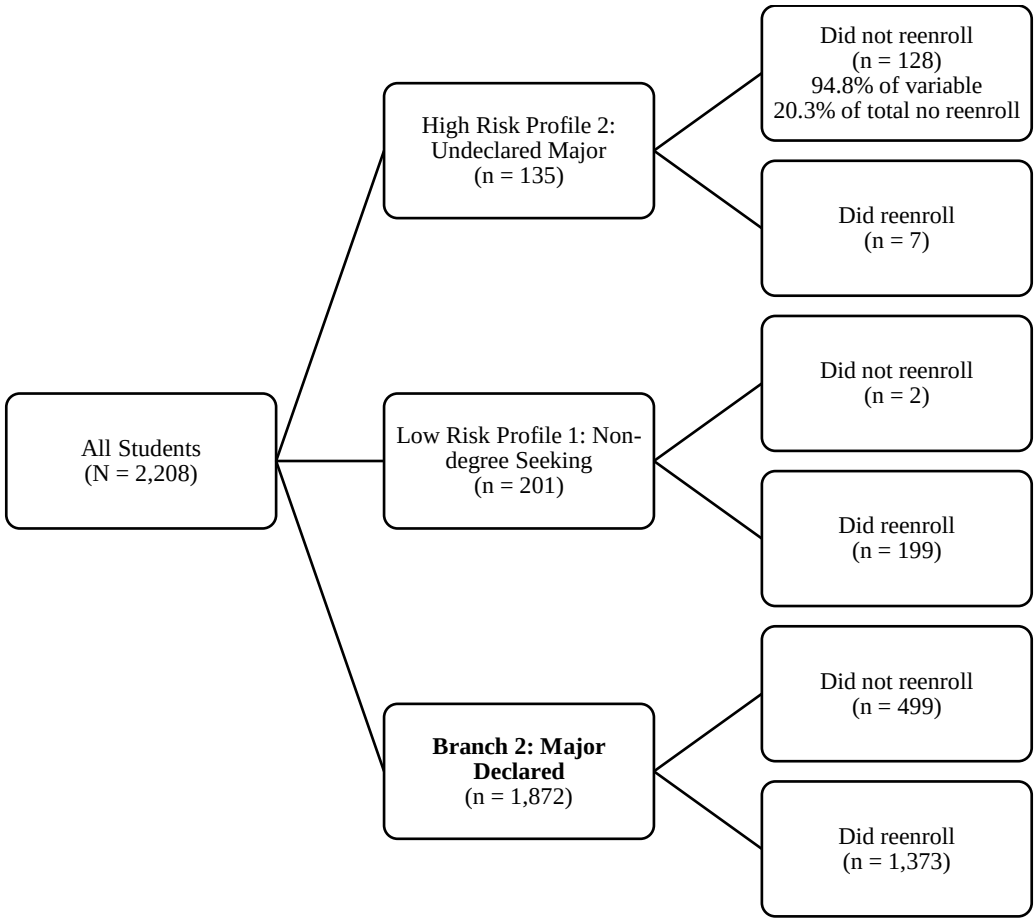

Figure 5. Model 0, Branch 2

Model 1: Known High School Grad Type

Model 1 is the first branch from Model 0, and consists of the 1,986 participants who had a known high school grad type at the time they first applied to Crowder College. These cases were examined using the methods described under Nested Model Development and Data Analysis in Chapter Three, and confirm most of the conclusions drawn from Model 0.

Tests for Association

As with Model 0, several variables were found to be associated with a lack of second semester reenrollment; but only one variable met the inclusion criteria described in Methodology above: Six or Fewer Credit Hours Attempted. The chi-square results for

this variable are presented in Table 9 below; and are described in detail following the logistic regression results.

Table 9

Model 1 Tests for Association – Selected Results

Variable	n	χ^2	df	*p*	% did not re-enroll	% of total non-persisters
Total Credit Hours Attempted 2	1,986	98.005	6	.000	22.8	100.0
7 or more	1,886				20.8	86.9
6 or fewer	**100**				**59.0**	**13.1**

Logistic Regression

To test for significance of the selected variable while controlling for other variables, a multiple logistic regression analysis was conducted using reenrollment (0 = yes / 1 = no) as the dependent variable, and the following as independent variables: Cohort Year; Age Group; Gender; Race / Ethnicity; First Generation; Pell Recipient; Veteran; Single Parent; Displaced Homemaker; Migrant Student; High School Grad Type; High School GPA; Full-time status; Major Declared; Total Developmental Courses Enrolled; Total Credit Hours Attempted 2; and Majority of Credit Hours Attempted were Developmental.

The following variables created redundancy errors when included in the model, and were therefore excluded from the analysis: Degree Type; Declared Major was Cancelled; Enrolled in Developmental Math Course; Developmental Math Course Number Enrolled; Enrolled in Developmental English Course; Enrolled in Developmental Reading Course; Developmental Reading Course Number Enrolled; Enrolled in Developmental Communications Course; Total Credit Hours Attempted.

Even though they were highly predictive of whether or not a student would reenroll, First Semester Performance variables were not included in this model. Full

logistic regression results for Model 1 are presented in Appendix N, and for the selected variable *Credit Hours Attempted 2* in Table 10 below.

Table 10

Model 1 Logistic Regression – Selected Results

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95% C.I. Lower	95% C.I. Upper
Credit Hours Attempted 2 (6 or fewer)	**1.343**	**.283**	**22.521**	**1**	**.000**	**3.831**	**2.200**	**6.671**
Constant	-6.134	1.063	33.276	1	.000	.002		

The logistic regression analysis confirmed the results of the chi-square analysis that the association between credit hours attempted and a lack of second semester reenrollment was statistically significant while controlling for other variables.

Characteristics Associated with a Lack of Reenrollment

Attempted Six or Fewer Credit Hours

In *Model 1: Known High School Grad Type*, students who attempted six or fewer credit hours were 3.831 times less likely to reenroll than their peers who attempted seven or more credit hours. As Figure 6 shows, 59% (n = 59) of the 100 total cases who attempted six or fewer credit hours did not reenroll for a second semester, which accounted for just over 13% of the 452 total students with a known high school grad type who did not reenroll.

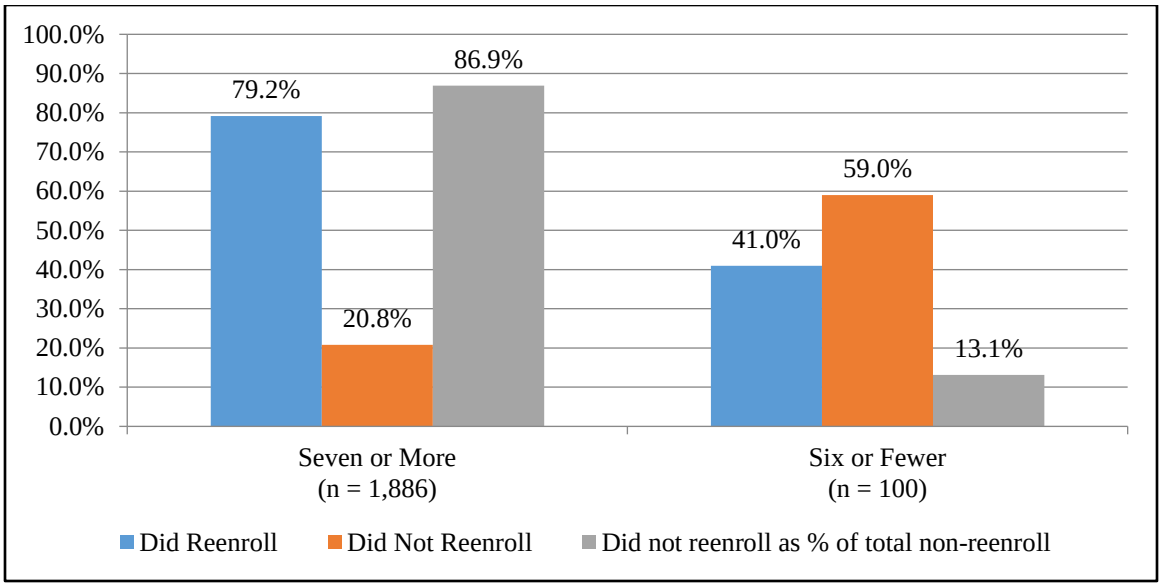

Figure 6. Reenrollment by Credit Hours Attempted for Students with a Known High School Grad Type

Branches

Tests for association and the logistic regression model found one variable that fit the selection criteria described under Methods: Total credit hours attempted. Because credit hours attempted is a variable that cannot be used to identify at risk students during the application and enrollment process, however, a new branched model was not created. Credit hours attempted was, however, used in conjunction with the other two variables selected to create Model 3.

Model 2: Degree-Seeking Students

Model 2 is the second branch from Model 0, and consists of the 1,872 participants who had a major declared (other than non-degree seeking) at the time they first applied to Crowder College. These cases were examined using the methods described under Nested Model Development and Data Analysis in Chapter Three, and confirm most of the conclusions drawn from Models 0 and 1.

Tests for Association

As with Models 0 and 1, several variables were found to be associated with a lack of second semester reenrollment for degree-seeking students; but only one variable met the inclusion criteria described in Methodology: Six or Fewer Credit Hours Attempted. While a Missing / Unknown High School Grad Type did not meet the full requirements for selection as described in Methodology, it is included in the results that follow because it was previously identified as a selection variable in a previous model and has results close enough to warrant further discussion here. The chi-square results for these variables are presented in Table 11 below; and are described in detail following the logistic regression results.

Table 11

Model 2 Tests for Association – Selected Results

Variable	n	χ^2	df	*p*	% did not re-enroll	% of total non-persisters
High School Grad Type	1,872	57.443	5	.000*	26.7	100.0
Missing / Unknown	**83**				**59.0**	**9.8**
GED	217				29.0	12.6
HiSET	9				66.7	1.2
Homeschool Diploma	18				16.7	0.6
High School Diploma	51				21.6	2.2
High School Transcript	1,494				24.6	73.5
Total Credit Hours Attempted 2	1,872	79.998	1	.000	26.7	100.0
7 or more	1,761				24.4	86.0
6 or fewer	**111**				**63.1**	**14.0**

* Two cells (16.7%) had expected count less than five.

Logistic Regression

To test for significance of the selected variables while controlling for other variables, a multiple logistic regression analysis was conducted using reenrollment (0 = yes / 1 = no) as the dependent variable, and the following as independent variables: Cohort Year; Age Group; Gender; Race / Ethnicity; First Generation; Pell Recipient; Veteran; Single Parent; Displaced Homemaker; Migrant Student; High School Grad

Type; High School GPA; Full-time status; Major Declared; Total Developmental Courses Enrolled; Total Credit Hours Attempted 2; and Majority of Credit Hours Attempted were Developmental.

The following variables created redundancy errors when included in the model, and were therefore excluded from the analysis: Degree Type; Declared Major was Cancelled; Enrolled in Developmental Math Course; Developmental Math Course Number Enrolled; Enrolled in Developmental English Course; Enrolled in Developmental Reading Course; Developmental Reading Course Number Enrolled; Enrolled in Developmental Communications Course; Total Credit Hours Attempted.

Even though they were highly predictive of whether or not a student would reenroll, First Semester Performance variables were not included in this model. Full logistic regression results for Model 2 are presented in Appendix Q, and for the two selected variables in Table 12 below.

Table 12

Model 2 Logistic Regression – Selected Results

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95% C.I. Lower	95% C.I. Upper
High School Grad Type								
High School Diploma with Transcript			25.625	5	.000			
Missing / Unknown	1.095	.275	15.829	1	.000	2.989	1.743	5.127
GED	.088	.225	.153	1	.695	1.092	.702	1.699
HiSET	1.490	.809	3.394	1	.065	4.437	.909	21.652
Homeschool diploma	-.801	.701	1.305	1	.253	.449	.114	1.774
High school diploma no transcript	-.731	.389	3.520	1	.061	.482	.225	1.033
Credit Hours Attempted 2 (6 or fewer)	**1.260**	**.275**	**20.986**	**1**	**.000**	**3.527**	**2.057**	**6.048**
Constant	-2.212	.652	11.507	1	.001	.109		

The logistic regression analysis confirmed the results of the chi-square analysis that the associations between both selected variables and a lack of second semester reenrollment were statistically significant while controlling for other variables.

Characteristics Associated with a Lack of Reenrollment

Missing / Unknown High School Grad Type

In *Model 2: Degree-seeking Students*, students without a high school grad type were 2.989 times less likely to reenroll than their peers with a high school diploma and transcript. As Figure 7 shows, 59% (n = 49) of the 83 cases with a missing / unknown high school grad type did not reenroll for a second semester, which accounted for just under 10% of the 499 total degree-seeking students who did not reenroll.

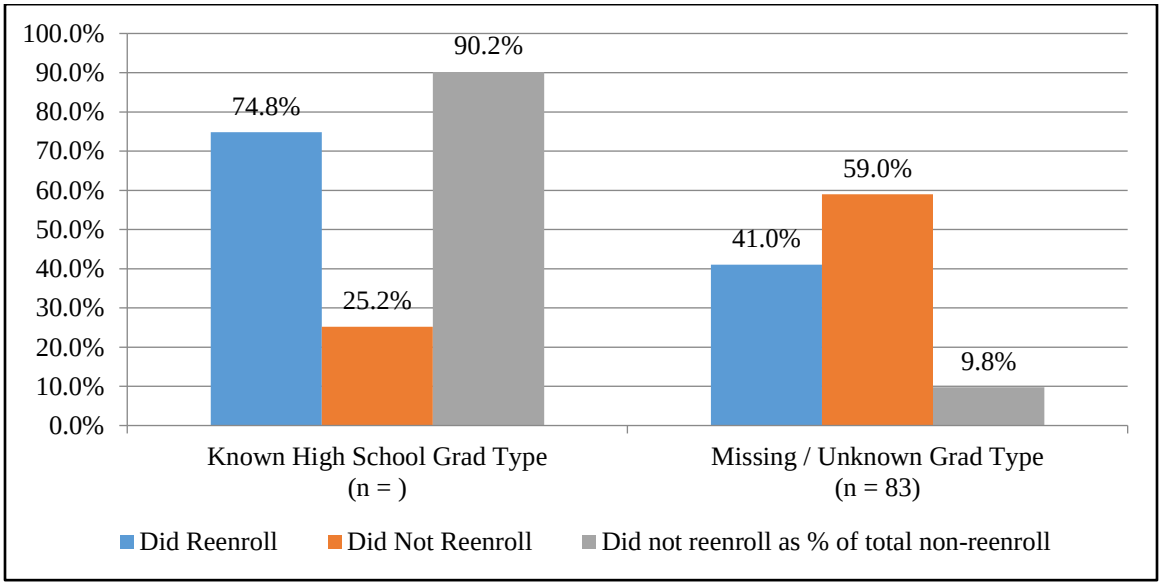

Figure 7. Reenrollment by High School Grad Type for Degree-seeking Students

Attempted Six or Fewer Credit Hours

In *Model 2: Degree-seeking Students*, students who attempted six or fewer credit hours were 3.527 times less likely to reenroll than their peers who attempted seven or more credit hours. As Figure 8 shows, just over 63% (n = 70) of the 111 degree-seeking students who attempted six or fewer credit hours did not reenroll for a second semester, which accounted for just over 14% of the 499 total degree-seeking students who did not reenroll.

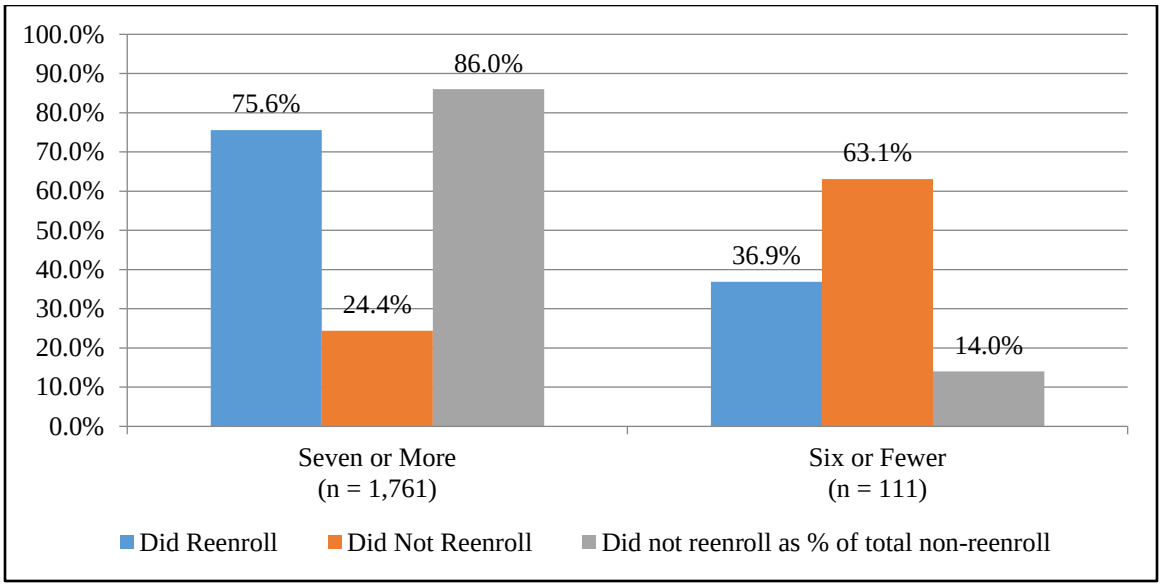

Figure 8. Reenrollment by Credit Hours Attempted for Degree-seeking Students

Branches

Tests for association and the logistic regression model found one variable that fit the selection criteria described under Methods: Total credit hours attempted. Because credit hours attempted is a variable that cannot be used to identify at risk students during the application and enrollment process, a new branched model was not created. Credit hours attempted was, however, used in conjunction with the other two variables previously selected to create Model 3.

Model 3: Degree-seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours

In developing the nested models described above, significant overlap was found between the three characteristics associated with a lack of reenrollment: Missing / Unknown High School Grad Type; Undeclared Major; Attempted Six or Fewer Credit Hours. In addition, almost all students who chose non-degree seeking as their major reenrolled. To test whether any other variables fit the selection criteria to account for the

392 cases not identified by one or more of the variables identified, a third nested model was created which eliminated these populations.

Tests for Association

As with the previous models, several variables were found to be associated with a lack of second semester reenrollment for degree-seeking students with a known high school grad type who attempted six or more credit hours; but only one variable met the inclusion criteria described in Methodology: Credit Hours Earned. Unlike credit hours attempted in the previous models, however, there was a clear linear association between credit hours earned; therefore, chi-square results for hours earned by groups of three are presented in addition to the new variable Three or Fewer Hours Earned in Table 13 below.

Table 13

Model 3 Tests for Association – Selected Results

Variable	n	χ^2	df	*p*	% did not re-enroll	% of total non-persisters
Credit Hours Earned	1,691	600.162	7	.000*	23.2	100.0
0	**151**				**85.8**	**38.5**
1-3	**119**				**55.5**	**16.8**
4-6	136				33.8	11.7
7-9	308				18.2	14.3
10-12	485				8.9	11.0
13-15	417				7.0	7.4
16-18	48				2.1	0.3
19+	2				0.0	0.0
Total Credit Hours Earned 2	1,691	509.272	1	.000	23.2	100.0
4 or more	1,396				12.5	44.6
3 or fewer	**295**				**73.6**	**55.4**

* Two cells (12.5%) had expected count less than five.

Logistic Regression

To test for significance of hours earned while controlling for other variables, a multiple logistic regression analysis was conducted using reenrollment (0 = yes / 1 = no) as the dependent variable, and the following as independent variables: Cohort Year; Age

Group; Gender; Race / Ethnicity; First Generation; Pell Recipient; Veteran; Single Parent; Displaced Homemaker; Migrant Student; High School Grad Type; High School GPA; Full-time status; Major Declared; Total Developmental Courses Enrolled; Total Credit Hours Attempted 2; and Majority of Credit Hours Attempted were Developmental.

The following variables created redundancy errors when included in the model, and were therefore excluded from the analysis: Degree Type; Declared Major was Cancelled; Enrolled in Developmental Math Course; Developmental Math Course Number Enrolled; Enrolled in Developmental English Course; Enrolled in Developmental Reading Course; Developmental Reading Course Number Enrolled; Enrolled in Developmental Communications Course; Total Credit Hours Attempted.

Even though they were highly predictive of whether or not a student would reenroll, First Semester Performance variables were not included in the model. Full logistic regression results for Model 3 are presented in Appendix T, and for the two selected variables in Table 14 below.

Table 14

Model 3 Logistic Regression – Selected Results

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95% C.I. Lower	95% C.I. Upper
Credit Hours Earned (3 or fewer)	**3.028**	**.171**	**313.713**	**1**	**.000**	**20.664**	**14.780**	**28.891**
Constant	-2.390	.921	6.730	1	.009	.092		

The logistic regression analysis confirmed the results of the chi-square analysis that the associations between both selected variables and a lack of second semester reenrollment were statistically significant while controlling for other variables.

Characteristics Associated with a Lack of Reenrollment

Earned Three or Fewer Credit Hours

In *Model 3: Degree-seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours*, students who earned three or fewer credits were 20.664 times less likely to reenroll than their peers who earned four or more credits. As Figure 9 shows, over 73% (n = 217) of the 295 degree-seeking students with a known high school grad type who attempted seven or more credit hours did not reenroll for a second semester, which accounted for over 55% of the 392 total degree-seeking students with a known high school grad type who attempted seven or more credit hours who did not reenroll.

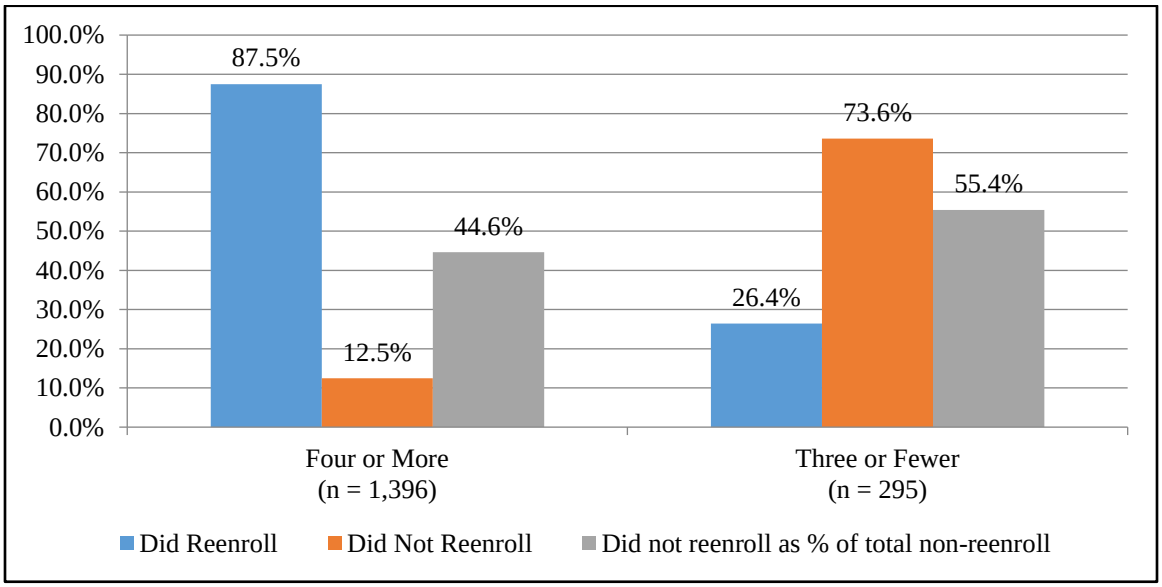

Figure 9. Reenrollment by Credit Hours Earned 2 for Degree-seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours

While three credits or fewer creates the easiest selection criteria for Crowder College, it should be noted that there is a linear relationship between credit hours earned (by three credits, or roughly for every course completed) and reenrollment, as can be seen in Figure 10.

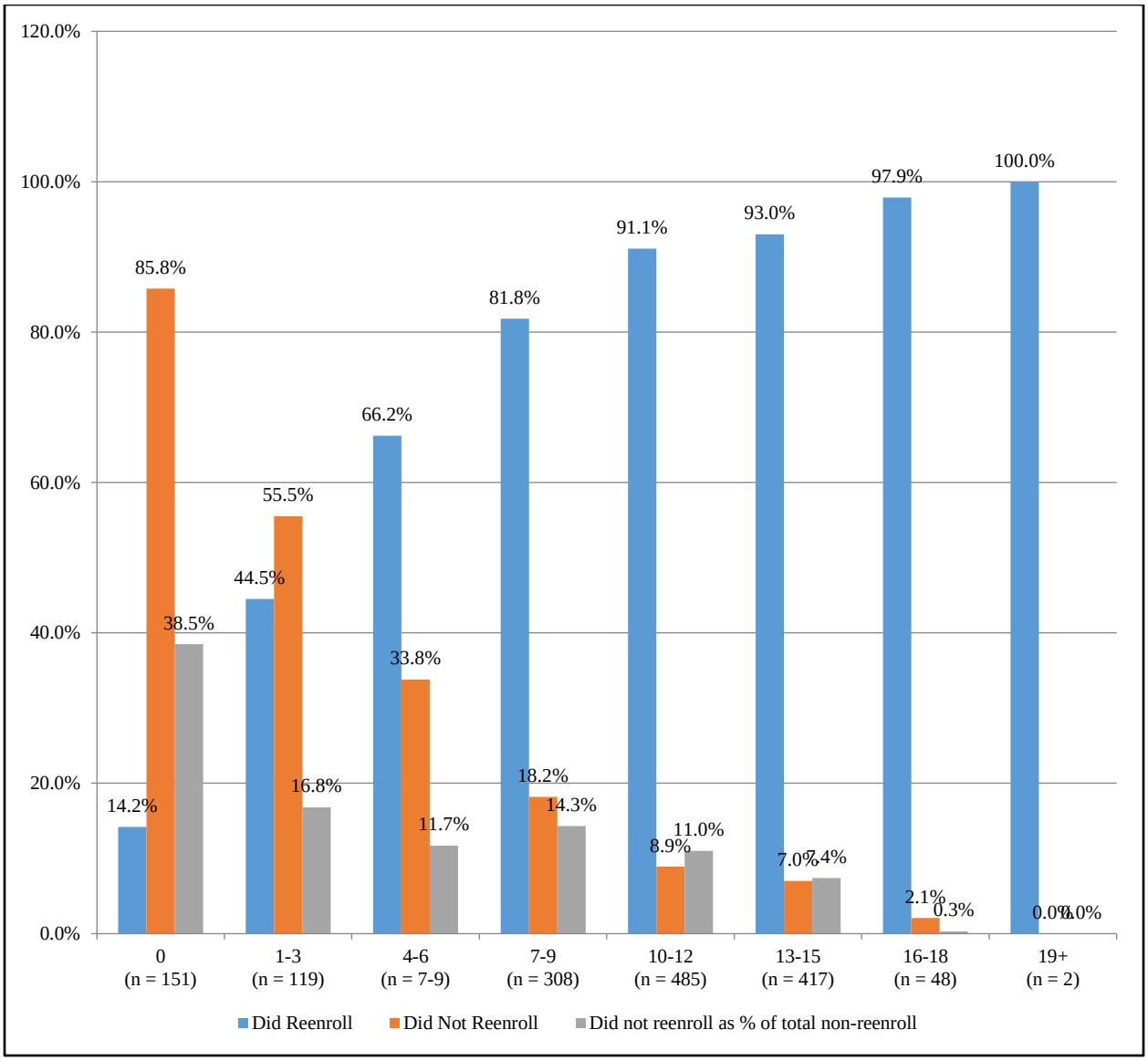

Figure 10. Reenrollment by Credit Hours Earned for Degree-seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours

Branches

Tests for association and the logistic regression model found one student characteristic that fit the selection criteria described under Methods: Total credit hours earned. Because credit hours earned is a variable that cannot be used to identify at risk students during the application and enrollment process, a new branched model was not created.

Characteristics of Early Non-persisting Developmental Education Students

This study identified three student characteristics that were both highly associated with a lack of student reenrollment, and could individually account for large numbers of students who did not reenroll. Profiles were created for each of these variables, which are described below.

Characteristic 1: Missing / Unknown High School Grad Type

Students who did not have a high school grad type (i.e., most likely did not graduate from high school) made up a sizable percentage of the total students who did not reenroll, and were significantly less likely to graduate than their peers who did have a high school diploma or equivalency. This held true in both models that included students with a missing / unknown high school grad type, even after controlling for other variables.

In *Model 0: All Cases*, students without a high school grad type were three times less likely to reenroll than their peers with a high school diploma and transcript. Almost 80% (n = 177) of the 222 total cases with a missing / unknown high school grad type did not reenroll for a second semester, which accounted for just over 28% of the 629 total students who did not reenroll.

In *Model 2: Degree-seeking Students*, a greater percentage of these students re-enrolled than non-degree seeking students (41.0% vs. 20.3%), but they were still almost three times less likely to reenroll than their peers with a high school diploma and transcript. Of the 1,872 degree-seeking students in the model, 26.7% (n = 499) did not reenroll; 9.8% (n = 49) of these did not have a grad type.

These students were also highly unlikely to pass their developmental education courses. As table 15 shows, fewer than twenty percent of students who attempted a developmental education course passed, and over half either dropped or withdrew.

Table 15

Characteristic 1 Course Outcomes for All Cases

Course Outcome	Math		English		Reading		Communications	
	f	%	f	%	f	%	f	%
Passed	31	16.4	9	18.4	13	15.7	11	19.0
D or F	39	20.6	8	16.3	15	18.1	14	24.1
Withdraw	63	33.3	15	30.6	26	31.3	13	22.4
Dropped	56	29.6	17	34.7	29	34.9	20	34.5
Subtotal	189	100.0	49	100.0	83	100.0	58	100.0
Did not take	33		173		139		164	
Total	222		222		222		222	

Characteristic 2: Undeclared Major

Almost no students who did not declare a major reenrolled for a second semester. These students made up the second highest percentage of total students who did not reenroll. There was significant overlap between students who did not declare a major and students who had a missing / unknown high school grad type; therefore, the only model that included undeclared major is Model 0: All Cases.

In *Model 0: All Cases*, students who did not declare a major were almost twenty times less likely to reenroll than their peers with a high school diploma and transcript. Almost 95% (n = 128) of the 135 total cases without a major declared did not reenroll for a second semester, which accounted for just over 20% of the 629 total students who did not reenroll.

No students in this study with an undeclared major passed a developmental education course. As table 16 shows, almost no students completed a developmental education course, as over ninety percent of students dropped or withdrew.

Table 16

Characteristic 2 Course Outcomes for All Cases

Course Outcome	Math		English		Reading		Communications	
	f	%	F	%	f	%	f	%
Passed	0	0.0	0	0.0	0	0.0	0	0.0
D or F	8	6.7	0	0.0	1	2.0	1	3.2
Withdraw	61	51.3	14	58.3	25	50.0	12	38.7
Dropped	50	42.0	10	41.7	24	48.0	18	58.1
Subtotal	119	100.0	24	100.0	50	100.0	31	100.0
Did not take	16		111		85		104	
Total	135		135		135		135	

Characteristic 3: Attempted Six or Fewer Credit Hours

Students who attempted six or fewer credit hours made up a sizable percentage of the total students who did not reenroll, and were significantly less likely to graduate than their peers who did have a high school diploma or equivalency. This held true in both models that included students who attempted six or fewer credit hours, even after controlling for other variables.

In *Model 0: All Cases*, students who attempted six or fewer credit hours were about three and a half times less likely to reenroll than their peers who attempted seven or more credit hours. Over 70% (n = 120) of the 166 total cases who attempted six or fewer credit hours did not reenroll for a second semester, which accounted for just over 19% of the 629 total students who did not reenroll.

In *Model 1: Known High School Grad Type*, students who attempted six or fewer credit hours were 3.831 times less likely to reenroll than their peers who attempted seven

or more credit hours. 59% (n = 59) of the 100 cases with a known high school grad type who attempted six or fewer credit hours did not reenroll for a second semester, which accounted for just over 13% percent of the 452 total students with a known high school grad type who did not reenroll.

In *Model 2: Degree-seeking Students*, students who attempted six or fewer credit hours were 3.831 times less likely to reenroll than their peers who attempted seven or more credit hours. Just over 63% (n = 70) of the 111 degree-seeking cases who attempted six or fewer credit hours did not reenroll for a second semester, which accounted for 14% of the 499 degree-seeking students who did not reenroll.

As with the other characteristics identified, students who attempted six or fewer credit hours were highly unlikely to pass their courses. As table 17 shows, fewer than twenty percent of students who attempted a developmental education course passed. As should be expected for students who attempted few credit hours, the majority of students dropped prior to the fourth week of the semester.

Table 17

Characteristic 3 Course Outcomes for All Cases

Course Outcome	Math		English		Reading		Communications	
	f	%	f	%	f	%	f	%
Passed	21	16.4	6	21.4	13	20.6	11	20.4
D or F	28	21.9	5	17.9	20	31.7	14	25.9
Withdraw	7	5.5	2	7.1	1	1.6	1	1.9
Dropped	72	56.3	15	53.6	29	46.0	28	51.9
Subtotal	128	100.0	28	100.0	63	100.0	54	100.0
Did not take	38		138		103		112	
Total	166		166		166		166	

Conclusion

This study identified three characteristics which were strongly associated with a lack of second semester reenrollment for students assigned to developmental education courses at Crowder College: (1) Missing/Unknown High School Grad Type; (2) Undeclared Major; and (3) Attempted Six or Fewer Credit Hours. High percentages of students possessing one or more of these characteristics did not reenroll, which accounted for 38% of the total students who did not reenroll. The implications of these characteristics and recommendations for Crowder College to improve rates of student success will be discussed in the next chapter.

Chapter 5: Discussion

Students who do not persist past their first semester are significantly less likely to ever return to post-secondary education than early persisters (Crosta, 2013). It is, therefore, critical to identify and intervene with these students as early in their postsecondary career as possible. This study identified several characteristics associated with students assigned to developmental education courses at Crowder College who do not persist past their first semester, and the following section will discuss the implications of these characteristics and provide recommendations for Crowder College to improve rates of student success.

Purpose of Project

The purpose of this project was to develop recommendations for improving first to second semester retention of developmental education students at Crowder College informed by an analysis of institutional data collected during first-year, first-semester developmental education students' application and enrollment process.

Research Question

What characteristics of first-year, first-semester developmental education students recorded by Crowder College's current admissions and enrollment process are predictive of a lack of second semester reenrollment?

Characteristics of Early Non-persisting Developmental Education Students

A large number of first-time, first semester developmental education students arrive at Crowder College underprepared for college-level work (no high school diploma or equivalency), are potentially unclear about their intentions for pursuing post-secondary education (no major declared), and appear to have limited resources available for

attending college (six or fewer credit hours attempted). The most likely outcome for students fitting these characteristics was to drop or withdrawal from their courses. These results imply that many developmental education students at Crowder College are not yet committed to pursuing a traditional postsecondary credential, are otherwise unable to work towards that goal at this time, and/or would be better served by pursuing an alternate goal.

Students in this study who were academically underprepared, did not have a major declared at the time of enrollment, attempted six or fewer credit hours their first semester, or any combination of the above were significantly less likely than their peers to reenroll, and collectively made up almost 38% (n = 237) of the 629 students in the study who did not reenroll. These results indicate that a significant opportunity exists for Crowder College to increase first to second semester retention during students' application and enrollment process. By focusing attention and resources on students with these three characteristics, Crowder College has the potential to help a significant percentage of their students who would otherwise not persist before they set foot in a classroom.

Recommendations

To assist Crowder College with improving first to second semester rates of retention for developmental education students, several recommendations are presented below. These include short-term recommendations, which could be implemented as early as the next academic semester, and long-term recommendations, which could be implemented over the next several years.

Short Term Recommendation 1: Mandatory Comprehensive Advising

It is recommended that Crowder College not allow students with one or more of the three characteristics identified in this study to attend classes without first completing a comprehensive advising session. This session should cover, at a minimum: the student's academic goals and plans for accomplishing them; how the student will finance their education, including financial aid availability; and career opportunities, including alternative and/or non-credit offerings which may better suit the student's immediate needs and abilities.

Students who follow a structured program that aligns with their career and/or academic goals are much more likely to successfully earn a degree (CCRC, 2015). Most community college students, however, are free to enroll in any course for which they are academically qualified, whether or not that course aligns with their goals for attending college. For the most underprepared students, this freedom oftentimes results in a student's dropping out. Crowder College advisors should seek to ensure that students have a clear understanding of their goals for attending college, as well as the path to get them there.

In meeting with students, Crowder College advisors may find some who are primarily interested in acquiring skills to further their careers, whether or not these ever lead to a degree. These students should be presented with skill development experiences in addition to credit-bearing courses, especially those directly tied to industry and/or jobs (Scherer & Anson, 2014).

Many students are financially unprepared for college, and issues with finance is one of the main reasons that students withdraw from classes (Nelson, 2012). While financial aid is available to assist students, many are not aware that it exists and do not complete the FAFSA (ACE, 2004). It is imperative that all students are aware of financial aid options, and should be incorporated into any advising discussion.

In meeting with an advisor, some students may find that they are not academically, financially or otherwise prepared to attend college at this time. While it seems counterintuitive to recommend that these students wait to attend college, doing so will allow them the time to become more academically and financially prepared to succeed. Equally importantly, it would allow those students who do wish to attend college at this time, and who do possess the college-readiness and other resources necessary for success, to receive better guidance and placement, thereby increasing their chances of finding success.

Short-term Recommendation 2: Exit Interviews

As mentioned earlier, most students do not withdraw due to academic reasons. They leave, rather, for finance and family issues (Nelson, 2012). While the college may not be in a position to address family issues, as mentioned in recommendation 1, there is a possibility of assisting with financial troubles. Exit interviews could serve as an opportunity to inform students of the additional resources at their disposal.

In addition to a lack of knowledge concerning financial aid, many community college students are unaware of the non-credit, continuing education and career readiness resources offered. Providing students with these as they leave their first attempt at postsecondary education should increase the likelihood that they will return at some point

in the future. Even if they do not return as a degree-seeking student, these additional resources may prove to be invaluable to the most vulnerable students (Scherer & Anson, 2014).

One suggestion for improving student outcomes made in an Education Advisory Board (EAB, 2012) report is emphasizing exit counseling during the withdrawal process. This involves students being required to meet with a counselor prior to being allowed to withdraw to discuss "…the reasons for withdrawal, available resources, and final steps…" (p. 6). While this recommendation was made for research universities, it would be worthwhile to explore the possibility of adapting it to a community college.

While the results of this study seem to be in line with contemporary theories of retention and persistence, much is left to speculation. By attempting to follow up with all students who drop or withdraw from courses, Crowder College should be able to glean new information that will be useful in serving the needs of all of their students. Follow-up surveys could be conducted electronically at time of withdrawal via email or Qualtrics survey, and/or via an in-person interview at the registration office.

Long-term Recommendation 1: Increased Collaboration with Feeder Institutions

One of the most widely discussed recommendations in the literature for improving underprepared students' chances of success is increasing the amount of collaboration between community colleges and secondary education institutions. One of the most effective strategies for such collaboration is dual enrollment, where high school students are allowed to take college-level courses and earn college credit.

While dual enrollment has long been used with high-achieving students, it is now also being advocated for use with underprepared students in an effort to expose them to both the materials and experiences they should expect to find in college (Bailey, 2008 as cited in Radford, et al. 2012). This strategy helped two of Atlanta's high schools increase their graduation rate from fifty to ninety percent (EAB, 2016); if a similar result could be had with Crowder College's feeder institutions, first to second semester attrition rates should drop dramatically.

It is also recommended that Crowder College begin collaborating with feeder institutions as early in students' secondary education as possible. One of the less resource-intensive strategies for doing so is to include early assessments into middle or high school programs (Radford et al., 2012). As with dual enrollment, early college assessments would provide students with an opportunity to be exposed to college-level materials and expectations. They would also provide educators an opportunity to remedy any deficiencies long before attending college courses.

Long-term Recommendation 2: Alternate Curricular Pathways

The results of this study support the use of alternate curricular pathways for Crowder College's most underprepared students, which could take several forms. Crowder College could expand, for example, noncredit offerings so that students would have an opportunity to gain immediately applicable workplace skills without the financial, time or opportunity costs associated with a traditional, degree-seeking developmental education pathway (Scherer & Anson, 2014). Crowder College could also increase the use of experiential learning credits in place of developmental education

courses. This would be especially useful for students seeking vocational education and training certifications, rather than the traditional two- or four-year degree.

It is expected that the redesign or creation of alternate curricular pathways would require significant resources. Therefore, it is recommended that Crowder College first determine student need and desire for such pathways, and then create a one or two semester pilot program. While the design of such a program is outside the scope of this project, the first step in determining need could be addressed through the mandatory advising and exit interview described above and in further research below. It would also be worthwhile for Crowder College to continue partnering with doctoral candidates to investigate the creation of such a program.

Further Research

While the results of this study support existing theory and research, it was limited to developmental education students in a single rural community college, which only captures a fraction of the total community college population. This study was also limited to a single definition of student success: reenrollment for a second semester. While this is a meaningful metric, it is far from exhaustive and ignores other measures of student success such as grades and credentials earned.

It would be worthwhile, therefore, for this study to be expanded to other community colleges and community college populations. It would also be worthwhile to investigate whether a similar model would work for other traditional measures of success (grades earned; course withdrawals), as well as non-traditional measures of success such as job placement.

If Crowder College does implement any of the recommendations above, it would be worthwhile for both them and other community colleges to track and report their results. This could be accomplished by using a standardized survey instrument during the mandatory advising sessions which captures students' goals for attending, as well as their resources available and plan for achieving those goals. A similar study to the one presented in this paper could be conducted for any alternate curricular pathways. As mentioned above, it would be worthwhile to include other measures of student success in any future study.

References

A Test of Leadership: Charting the Future of U.S. Higher Education. (2006). Washington, DC.

ACE. (2004). *Missed Opportunities: Students Who Do Not Apply for Financial Aid*. Washington, DC: American Council on Education.

ACT. (2013). 2012 Retention/Completion Summary Tables. Retrieved from ACT website: http://www.act.org/research/policymakers/pdf/12retain_trends.pdf

Adelman, C. (1998). The kiss of death? An alternative view of college remediation. *National CrossTalk, 6*(3), 11.

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education.

Adelman, C. (2004). *Principal indicators of student academic histories in post-secondary education*. Washington, DC: U.S. Department of Education, Institute of Education Sciences.

Alliance for Excellent Education. (2011, May). *Saving now and saving later: How high school reform can reduce the nation's wasted remediation dollars* (Issue Brief). Washington, DC: Alliance for Excellent Education. Retrieved from Alliance for Excellent Education website: http://all4ed.org/wp-content/uploads/2013/06/SavingNowSavingLater Remediation.pdf

American Association of Community Colleges. (2006). *Fast Facts.* Washington DC: American Association of Community Colleges. Retrieved from

http://www.aacc.nche.edu/Content/NavigationMenu/AboutCommunityColleges/Fast_Facts1/Fast_Facts.htm

Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *Journal of Higher Education, 77*(5), 886-924

Aud, S., Hussar, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K. (2011). *The condition of education 2011* (NCES 2011-033). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Bahr, P. R. (2013). The aftermath of remedial math: Investigating the low rate of certificate completion among remedial math students. *Research in Higher Education, 54*(2), 171-200. doi:10.1007/s11162-012-9281-4

Bailey, T. (2008). Bridging the High School-College Divide. In H. F. Ladd, & E. B. Fiske (Eds.), *Handbook of Research in Education Finance and Policy* (pp. 724-737). New York: Routledge.

Bailey, T. (2009). Challenge and opportunity: Rethinking the role and function of developmental education in community college. *New Directions for Community Colleges, 145*, 11-30. doi:10.1002/cc.352

Bailey, T., Jeong, D. W., & Cho, S. W. (2010). Referral, enrollment, and completion in developmental education sequences in community colleges. *Economics of Education Review, 29*(2), 255-270. doi:10.1016/j.econedurev.2009.09.002

Bers, T., & Schuetz, P. (2014). Nearbies: A missing piece of the college completion conundrum. *Community College Review, 42*(3), 167-183. doi:10.1177/0091552114525834

Complete College America. (2012). Remediation: Higher Education's Bridge to Nowhere. Complete College America. Retrieved from Complete College America website: http://www.completecollege.org/docs/CCA-Remediation-final.pdf

CCRC. (2015). *What We Know About Guided Pathways*. Community College Research Center, Teachers College, Columbia University.

Coordinating Board for Higher Education. (2005, October 13). *Credit Transfer Guidelines for Student Transfer and Articulation Among MO Colleges and Universities*. Retrieved from Missouri Department of Higher Education Web Site: http://dhe.mo.gov/policies/credit-transfer.php

Crosta, Peter. (2013). *Characteristics of Early Community College Dropouts*. Community College Research Center, Teachers College, Columbia University.

Crowder College. (2013a). *Course Catalog 2014-2015*. Retrieved from Crowder College website: http://www.crowder.edu/wp-content/uploads/2013/01/2014-2015-Catalog2.pdf

Crowder College. (2013b). *Course Catalog 2015-2016*. Retrieved from Crowder College website: http://www.crowder.edu/wp-content/uploads/2013/01/2015-2016-Catalog.pdf

Crowder College. (2015a). *Admissions Application*. Retrieved from Crowder College website: https://my.crowder.edu/ICS/Admissions/Apply_Online.jnz?portlet=Apply_Online

Crowder College. (2015b). *Net Price Calculator*. Retrieved from Crowder College website: http://www.crowder.edu/custom-hooks/net-price-calc/npcalc.htm

Crowder College. (2015c). *Tuition Rates*. Retrieved from Crowder College website: http://www.crowder.edu/financial-aid/tuition-residency

Deil-Amen, R., & Rosenbaum, J. (2002). The unintended consequences of stigma-free remediation. *Sociology of Education, 75*(3), 249-268.

EAB. (2012). Strategies to Identify, Understand, and Prevent Student Withdrawal. Washington DC: Education Advisory Board.

EAB. (2016). Four ways to redesign remedial courses and set students up for success. Washington DC: Education Advisory Board. Retrieved from: http://www.eab.com/daily-briefing/2016/03/22/four-ways-to-redesign-remedial-courses-and-set-students-up-for-success

Gates, M. F. (2010, April 20). Melinda French Gates: Raising the Bar on College Completion. An excerpt from her keynote address to the American Association of Community Colleges. *Bill & Melinda Gates Foundation Press Room*. Retrieved from http://www.gatesfoundation.org/media-center/speeches/2010/04/raising-the-bar-on-college-completion

Grubb, N. (1999). *Honored But Invisible: An Inside Look at Teaching in Community Colleges*. New York: Rutledge.

Horn, L., & Carroll, C. D. (1996). *Nontraditional undergraduates: Trends in enrollment from 1986 to 1992 and persistence and attainment among 1989-90 beginning postsecondary students*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Horn, L., & Nevill, S. (2006). *Profile of undergraduates in U.S. postsecondary education institutions, 2003-04: With a special analysis of community college students*. U.S.

Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Howell, J. S., Kurlaender, M., & Grodsky, E. (2010). Postsecondary preparation and remediation: Examining the effect of the early assessment program at California State University. *Journal of Policy Analysis and Management, 29*(4), 726-748.

Jenkins, D., Jaggars, S. S., & Roksa, J. (2009). *Promoting gatekeeper course success among community college students needing remediation. Findings and recommendations from a Virginia study (summary report)*. Community College Research Center, Teachers College, Columbia University.

Kerrigan, M. R., & Slater, D. (2010). *Collaborating to Create Change: How El Paso Community College Improved the Readiness of Its Incoming Students Through Achieving the Dream*. Report No. 4 in the Achieving the Dream Culture of Evidence Series. Community College Research Center and MDRC.

National Center for Education Statistics. (2015, May). Institutional retention and graduation rates for undergraduate students. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Retrieved from National Center for Education Statistics website: https://nces.ed.gov/programs/coe/indicator_cva.asp

Nelson, J., & Thomas, A. (2012). *Strategies to Identify, Understand, and Prevent Student Withdrawal*. Washington, DC: Education Advisory Board.

Pallant, J. (2013). *SPSS Survival Manual*. New York: Open University Press.

Parsad, B., & Lewis, L. (2003). *Remedial education at degree-granting postsecondary institutions in fall 2000* (NCES 2004-010). U.S. Department of Education,

National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Peng, C.J., & So, T.H. (2002). Logistic regression analysis and reporting: A primer. *Understanding Statistics, 1*(1), 31-70.

Perin, D. (2006). Can community colleges protect both access and standards? The problem of remediation. *Teachers College Record, 108*(3), 339-373.

Phipps, R. (1998, December). *College remediation: What it is, what it costs, what's at stake*. Washington, DC: The Institute for Higher Education Policy. Retrieved from The Institute for Higher Education Policy website: http://www.ihep.org/sites/default/files/uploads/docs/pubs/collegeremediation.pdf

Primary Research Group, Inc. (2008). *Survey of assessment practices in higher education*. New York: Primary Research Group, Inc.

Radford, A. W., Pearson, J., Ho, P., Chambers, E., & Ferlazzo, D. (2012, April). Remedial coursework in postsecondary education: The students, their outcomes, and strategies for improvement. MPR Associates, Inc. Retrieved from Missouri Department of Higher Education website: http://www.ihep.org/sites/default/files/uploads/docs/pubs/collegeremediation.pdf

Scherer, J., & Anson, M. (2014). *Community Colleges and the Access Effect: Why Open Admission s Suppresses Achievement*. New York: Palgrave Macmillan.

Shannon, H., & Smith, R. (2006). A Case for the Community College's Open Access Mission. *New Directions for Community Colleges, 136*, 15-21. doi:10.1002/cc.255

Tinto, V. (2012). *Completing College: Rethinking Institutional Action*. Chicago, IL: University of Chicago Press.

Vaughan, G. (2004). How to Keep Open Access in Community Colleges. *Education Digest: Essential Readings Condensed for Quick Review, 69*(6), 52-55.

The White House. (2011, June). Summit report. *The White House Summit on Community Colleges* conducted October 5, 2010. Retrieved from The White House website: https://www.whitehouse.gov/sites/default/files/uploads/community_college_summit_report.pdf

Appendix A: HESS Learning Community Request for Problem in Practice

UMSL COE
COLLEGE OF EDUCATION

Request for Problem in Practice

HIGHER EDUCATION STUDENT SERVICES LEARNING COMMUNITY SPECIALISTS 2013

COLLEGE OF EDUCATION
UNIVERSITY OF MISSOURI – ST. LOUIS
ONE UNIVERSITY BOULEVARD
ST. LOUIS, MO 63121

Request for Problem in Practice

SUMMARY AND BACKGROUND

The University of Missouri-St. Louis College of Education is a member of the Carnegie Project on the Education Doctorate, a national group of over fifty universities re-designing and re-orienting the Doctor of Education (Ed.D.) degree as a program distinct from Doctor of Philosophy in Education degree programs. Our program reflects our commitment to the work of the Carnegie Project and its working principles which "prepares educators for the application of appropriate and specific practices, the generation of new knowledge, and for the stewardship of the profession" (http://cpedinititive.org/definition-and-working-principles-edd-program-design).

The Ed.D. degree prepares practitioners to be leaders who use practical wisdom, professional skills, and knowledge of educational literature to address high-level problems of practice facing their area of education. The program applies an *Inquiry as Practice* model of scholarship. Graduates gain the ability to use data to inform decision-making and enhance their practice by gathering, organizing, judging, aggregating, and analyzing situations, literature, and data. More specifically, the program will re-emphasize critical competencies as outlined in the Council for the Advancement of Standards in Higher Education (CAS). Such critical competencies include, but are not limited to highlighting student learning and engagement, student development theory and practice, leadership and management, cultural pluralism, collaboration and program development. The intention is to prepare scholarly practitioners in their professional work. The program is unique in that it emphasizes collaboration with other professionals throughout the curriculum as well as with the Dissertation in Practice

The curriculum of the Ed.D. is intended to prepare practicing professionals to transform both their practice and the field by working *in the community*, just as practitioners collaborate with key stakeholders to address complex problems of practice. Students are admitted to the degree program and are simultaneously enrolled into a learning community of practice formed around a theme such as educational policy, student services or character education. The learning community and appointed mentor team of faculty and practitioners work collaboratively throughout the program by meeting in a learning community seminar each semester. The *community* is encouraged to work in unison to construct, assess, and advance innovative solutions to high-leverage problems of practice that are fostered throughout the program.

In addition to the thematic learning community of practice format, the curriculum features Laboratories of Practice and a Dissertation in Practice as culminating activities. The Laboratories of Practice take the doctoral studies away from the University campus to a context where theory, inquiry, and practice can intersect and the implementation of practice can be measured. The Dissertation in Practice allows the learning community to address a high leverage problem of practice through collaborative and connected work beyond independent work. Individuals contribute work that impacts overall group work. The Dissertation of Practice is characterized by generative impact.

PURPOSE AND BENEFITS OF THE REQUEST FOR PROBLEM IN PRACTICE

The purpose of this Request for Problem in Practice (RPP) is to solicit proposals from various higher education institutions that would benefit from the collaborative efforts of practitioners currently completing the Ed.D. with demonstrated skill sets to solve a problem specific to a student services unit. The Higher Education and Student Services learning community members (HESS-LC) are specialists with a wide array of expertise in student services including but not limited to academic advising, scheduling, counseling, course instruction, qualitative and quantitative research methodology. Professional bios of each HESS-LC member are included in the addendum. The HESS-LC specialists are seeking requests for proposals from higher education professionals whom envision bold, innovative and systemic solutions to high-leverage problems in practice that have emerged from within your organization and practices across professional and academic fields.

OBJECTIVE:
We will use our diverse professional experiences and scholarly expertise to conduct a multifaceted, objective analysis of your high leverage problem of practice to: identify feasible solutions, facilitate preliminary implementation, administer initial assessment of expected outcomes, and prepare a comprehensive dissertation in practice.

BENEFITS TO PARTNER:
As UMSL Ed.D students, we propose to create a collaborative relationship with a student services unit that is seeking innovative solutions to an identified high-leverage problem of practice for the purposes of contribution to best practices with in the profession and in partial fulfillment of degree requirements. Our partner student services unit may benefit from the following to address a problem in practice specific to the unit:

1. Shared professional competence and experience
2. Increased resource availability
3. Engaged interprofessional communication
4. Collective responsibility
5. Improved student outcomes

SCOPE OF SERVICES:

In order to understand the campus environment, clarify the problem of practice in context, and identify feasible solution(s), we will:

1. Assess existing data (e.g. annual reports, institutional data, agency records, etc.)
2. Conduct a targeted literature review on best practices, benchmarks and trends
3. Gather stakeholder perspectives
4. Evaluate current program assumption and effectiveness
5. Develop a strategic plan with proposed solution(s)
6. Pilot elements of proposed solution(s), evaluating feasibility and effectiveness, identifying and reporting outcomes.
7. Maintain on-going communication with liaison throughout the process.

PROPOSAL GUIDELINES AND TIMELINE:

Guidelines:
In order for HESS-LC Specialists to begin to understand your program and evaluate the suitability of your problem for engagement, all RPP's should include the following elements in order:

1. Provide Department Mission Statement, Program/Project Purpose Statement, and Statement of Problem
2. Narrative – Provide details of problem in practice
    a. Outline of current status which will encompass a projection of the desired outcomes
    b. Detailed summary of the current resources, activities, outputs, outcomes, stakeholder participation
    c. How does the problem demonstrate the potential for high leverage impact?
    d. How is the problem suitable for engagement within a 12-18 month timeline?
3. Copies of existing research or assessments findings that have already been acquired by your unit
4. Description of any limitations or challenges that you are aware of that might hinder progress towards solution
5. List of key resources which can be provided to HESS-LC Specialists
6. A statement of understanding that the selected partner will provide access to any applicable sensitive information (e.g. files, student records, financial aid info, etc.) as well as an Liaison (name and position)
7. Any additional information you would like HESS-LC Specialists to consider

We will consider all timely applications from two and four year institutions, as well as agencies working with post-secondary students.

Each prospective partner must submit 1 electronic copy of proposal to allenkr@umsl.edu by **June 11, 2014 at 5pm CST.**

Comprehensive Timeline:

June 11, 2014	5:00pm	RPPs submitted
June 12-18, 2014		Evaluation of proposals by the HESS-LC Specialists
June 20, 2014	5:00pm	Selected RPPs notified
July 16 or 23, 2014	5:30-6:30pm, 6:45-7:45pm, or 8:00-9:00pm	Presentation of selected presentations followed by HESS-LC Question/Answer
July 31, 2014	5:00pm	Selected partner notified and project pre-planning timeline will be developed
August 6, 2014	5:00pm	Notification to applicants not selected

Selected Requests for Problem in Practice

A maximum of **six** RPPs will be selected. Representatives from each RPP will be invited to facilitate a 30 minute presentation of proposed problem followed by 30 minute Questions & Answers with the HESS-LC specialists. Presentations will be facilitated on July 16 or 23 between 5:30 p.m. and 9:00 p.m. Each presentation will be recorded; once a finalist has been selected all recordings will be destroyed.

EVALUATION CRITERIA:

Proposal and Presentation Evaluation Criteria

As UMSL Ed.D students, we propose to create a collaborative relationship with an institution that is seeking innovative solutions to an identified high-leverage problem of practice for the purposes of contribution to best practices within the profession and in partial fulfillment of degree requirements.

This will necessitate that the scope of the problem of practice is suitable for engagement within a **12-18 month timeline**, including inquiry and initial implementation, and that the institution chosen will be able to provide a liaison who will disseminate communications and be available for regularly scheduled update meetings.

HESS-LC Specialists will evaluate all proposals based on the following criteria. To ensure consideration, your proposal should include all elements as previously described as well as meet the following criteria:

A. Statement of High-Leverage Problem of Practice

High-leverage problems can be defined as those issues that will both challenge the status quo and serve to influence effectiveness in multiple areas throughout the institution/department/unit. They are deemed significant and solvable by all members of the organization; our expectation is that key stakeholders will be involved in the evaluation process and advocate for systemic change once the problem of practice has been assessed and solutions rendered.

B. Suitability for engagement by HESS-LC Specialists

HESS-LC Specialists are student services professionals with diverse interests and experiences. We are most interested in problems related, but not limited to: student access; first-year experiences and student integration; at-risk students and student retention; faculty and student services staff collaboration. We are less interested in problems related to laws and regulations mandated by outside agencies, including but not limited to problems in the areas of athletic programs, fraternity/sorority life, and residential life.

C. Clear Stakeholder Buy-In

Key stakeholders (through the liaison) must be involved in the iterative process of evaluation and collaborative inquiry to ensure that clearly identified concerns are being met. Concerns and agreements must be clearly communicated throughout the evaluation process.

D. Previous work experience
Understanding the history of solutions previously attempted will be an important step in our recommendations. It is expected that any data or information (if applicable) of previous work in attempting to solve the problem of practice will be provided.

E. Prior Partnership with Consulting Organizations
Group dynamics are an important component in the assessment and evaluation process. As such, it is important that we are made aware of previous partnerships that may have existed concerning the problem of practice under consideration, including outcomes and recommendations. This information will assist us in designing new strategies for data collection and analysis of current conditions.

F. Value and Cost
The benefits derived from the solution options provided should outweigh the investment of time, effort, and resources needed to produce the desired outcomes.

G. Reasonable Expectation of Success
Consideration of allotted resources should be taken into account for a feasibility analysis of whether the problem of practice can be reasonably addressed.

Evaluation Rubric

Scoring Guide and Descriptions	
Quality Indicator	**Description**
Very Good 4 points	The response is specific and comprehensive. There is complete, detailed, and clearly articulated information as to how the criteria are met. The ideas presented are innovative, well-conceived and thoroughly developed.
Good 3 points	The response is reasonably comprehensive and includes sufficient detail. It contains many of the characteristics of a response that is very good even though it may require additional specificity, support or elaboration in places.
Fair 2 points	The response is non-specific and lacks focus and detail. The response addresses some of the selection criteria, but not all. Some ideas presented are sound, but others are not responsive to the purpose of the RFP. Additional information is needed in order to be reasonably comprehensive and meet the criteria of a response that is good.
Poor 1 points	The response does not meet many criteria; provides inaccurate information or provides information that requires substantial clarification as to how the criteria are met; lacks meaningful detail; demonstrates lack of preparation; or otherwise raises substantial concerns about the applicant's understanding of the issue in concept and/or ability to meet the requirement in practice.
No Evidence 0 points	The response does not address the criteria or simply re-states the criteria.

Proposal Component	Evaluation Factor	Score	Evaluator Comments
Organizational Information	Proposer provides background information about the institution and its current program(s), uniqueness, etc.		
	The institution has the capacity to undertake the partnership.		
Problem Description	The problem has potential for high leverage impact.		
	The problem is suitable for engagement within a 12-18 month timeline.		
Collective Stakeholder Buy-in	Stakeholders are defined.		
	Change will be supported by the collective stakeholders.		
	There is a clear understanding of allotted resources.		
Collaborative Inquiry	The proposer provides collaborative opportunities within the institution in order to increase effectiveness and efficiencies.		
	Collaborators are identified and roles are clearly delineated.		
Inputs and Outcomes	Both the number of activities and the number of students served are identified.		
	Outcomes are quantified in both percentages and real numbers.		
	Outcomes identify how students will benefit from the solution.		
Evaluation	There are prospective analysis strategies.		
	There are clear opportunities for data collection.		

Proposal Component	Evaluation Factor	Score	Evaluator Comments
Previous Solution Attempts	Previous attempted solutions are clearly stated.		
	Outcome data is used to provide details of success or lack of success.		
Sustainability	Strategies are identified to ensure the program is sustainable when the partnership ends.		
	Feasible solutions have been identified.		
Value and Cost	The benefits derived from the solution outweigh the utilization of time and resources needed to solve the problem.		
	The value of the proposed solution is able to be related back to the resources needed to solve the problem (inputs, outcomes, and proposed services).		
Organizational Viability	Relevant institution materials provide evidence of a viable institution.		
	The proposed staffing plan provides evidence to support the proposed services.		
Total Score:			

Additional Comments:

ADDENDUM: HESS-LC Specialist Bio Sketches

Ed.D. Students

Sean Chism is currently the Academic/Recruitment Advisor at DeVry University and Keller Graduate School of Management. Within this role, Sean facilitates the operation of a comprehensive Academic Advising Program providing a broad range of services including; program planning and course selection, enrollment trends and shifting campus demographics, interpretation of assessment test scores, course transferability, and recruitment. In addition, Sean maintains an effective informational and collaborative relationship within college departments and instructional divisions; conferring with deans and other faculty on degree program requirements, college policies and program changes. Sean brings solid experience with at risk populations, recruitment, program implementation, placement evaluation, and academic support from UMSL and Washington University. Sean also is an adjunct faculty member at St. Louis Community College, instructing courses aimed at acclimating first time college students to higher education standards/policy, best practices, and professional development. Sean welcomes the opportunity to collaborate with professionals who share his passion for student excellence.

Joseph Grailer is the librarian for the Missouri Institute of Mental Health, where his duties include seeking new grant, partnership and alternative revenue generating opportunities, authoring research reports, and managing the library's holdings. Recent projects have provided the clinical and fiscal rationale to create and fund major initiatives that are helping Missouri remain at the forefront of behavioral health treatment, improve the health and wellbeing of those receiving services, and create estimated savings of millions of dollars for the state. His entrepreneurial efforts include developing the business plan and funding models to transform an in-home business into a St. Louis Development Corporation Neighborhood Business of the Year storefront. He holds an MFA in creative writing, is a consultant and former managing editor for the journal *Natural Bridge*, and is currently pursuing a doctor of education. He lives in south city with his wife, infant daughter, and too many pets.

Tyson Holder joined the Office of Multicultural Student Services (MSS department) at the University of Missouri-St Louis in 2013 and serves as a Counselor, providing academic coaching to Liberal Arts Majors. In addition to academic coaching, Tyson serves as the coordinator of the MSS tutoring component. He received his Bachelors of Arts in Psychology (2007), Specialists degree in School Psychology (2010), and Masters of Science in Counseling and Student Development (2012) from Eastern Illinois University. He has previously worked as a TRiO (Student Support Services) Advisor at Lewis and Clark Community College and Eastern Illinois University. Tyson has experience in academic advising, cultural enrichment programming, counseling, academic coaching, quantitative and qualitative research methodology, and diversity training.

Theresa Keuss is an Assistant Registrar at the University of Missouri-St Louis. Theresa received her bachelor's degree from UMSL in Business Administration and has worked in several facets within the University system including Financial Services at Missouri S&T, and Accounting, Purchasing, Cashiers, and Registration at UMSL. Theresa also spent time in the corporate world where she worked as a cost accountant and financial analyst at a manufacturing firm, but after several years, realized she missed the academic environment and returned to UMSL where she completed her Master's Degree in Higher Education. Theresa is currently enrolled in the Ed.D Higher Education/Student Services learning community at UMSL. As Assistant Registrar, Theresa oversees customer service concerning

enrollment, registration, grade submission and transcript issues, and is also responsible for coordinating the course schedule. She was the recipient of the 2011 Chancellor's award for staff excellence and works closely with every department on campus giving her a broad perspective on institutional practices.

Earl Macam has 18 years of experience in education, 15 years spent in college admission, financial aid, and enrollment management, most recently serving as Director of Admission at DePauw University (IN). He managed a sizable staff of admission recruitment professionals and support staff. As Director, Earl implemented online application review processes, oversaw CRM execution, developed admission publications, managed a variety of recruitment communication plans, directed admission technology efforts, and created social media recruitment strategies. He currently serves as a College Counselor at Mary Institute and St. Louis Country Day School (MICDS), after two years serving as Director of College Counseling at Chatham Hall, Chatham, VA. Earl graduated from DePauw University with a B.A. degree in Music and holds a M.S. degree in Education with a School Counseling concentration from Indiana University. He has served in executive committee roles for the Indiana Association for College Admission Counseling, as well as being an active member at the national association level.

Felicita Myers is an Academic Advisor for the College of Education (COE), University of Missouri-St. Louis. She advises students on course scheduling and COE policies and procedures, tracks and monitors progress, update academic records, evaluate transfer credit and assist with registration, withdrawing, and related scheduling. She assists with commencement activities and participates on Recruitment, Admissions, Retention and Student Financial Aid and International Student and Scholar Services committees. Felicita monitor program requirement changes and incorporate them into degree plans. She also created a policy and procedures manual for use within OASIS; present at numerous UMSL activities, i.e. New Student Orientations, Transfer Tuesdays and UMSL Day. A large portion of her experience has been providing educational access to both traditional and non-traditional students, managing and marketing distance education programs, recruiting both students and faculty. She has taught grades 7 – 12 plus community college level. My strengths include attention to detail and organization and enthusiastic presenter.

Brittany Neunuebel is an Academic Advisor for the College of Education at UMSL. She helps guide students on their path to graduation. She also serves on many committees for the campus and College. Her background experience is in graphic design, library science, Student Life, and Multiculturalism. She has worked at a Community College, a HBCU, and a Research Institution. She also has been a facilitator for a national organization and traveled around the country and spoke to large groups of Middle school and High School students about violence prevention. With her interest in helping institutions rise to full potential she brings new ideas to the table that today's students are looking for.

Natissia Small is an Assistant Dean of Students and provides direct oversight and leadership for Precollegiate Student Services (Bridge Program) and Multicultural Student Services. Natissia joined the University in 1995 and currently works directly with diverse student populations, first-generation students, middle and high school students, parents, and school administrators within the St. Louis community. She has led the Bridge Program to state and national recognition, Bridge continues to serve more than 4,000 students and families in the St. Louis community annually. Natissia's responsibilities include oversight for college access initiatives and programming, retention services, academic support,

parental engagement, leadership development and cultural enrichment programming. She earned her undergraduate degree in Mass Communication from Southeast Missouri State University, and dual Master degrees in Secondary Education with an emphasis in Adult Education; and Counseling from the University of Missouri – St. Louis. She is currently pursuing her doctoral degree in Educational Policy and Leadership at UMSL.

Antoinette Sterling is currently a Student Retention Specialist in the Student Retention Services Office at UMSL. She has well over 19 years of advising and academic coaching and teaching experience. She holds an undergraduate degree in French with a master's degree in Communications. As a Student Retention Specialist, she provides individual coaching to help foster student success and academic development conducting workshops and presentations for students or organizations pertaining to goal setting, time management, study skills, communication skills and value clarification. Moreover, she is knowledgeable about issues in higher education and has acquired well over 19 years of advising and classroom experience. Currently, she is pursuing a doctorate in higher education and is enrolled in Program Evaluation and an Interviewing process. Thank you.

Brian Tiemeier has held successive positions in higher education administration over the past eight years. Brian is currently the Senior Director of Enrollment Services at Covenant Theological Seminary. In this role Brian provides leadership and oversight in the areas of: academic advising (to a student body of over 200 full-time, 300 part-time, and 70 on-line students); student "One-Stop" services; the Registrar's Office; the Financial Aid Department; course planning; and various student appeal/grievance processes. Brian also serves on the Curriculum Committee (having had a key role in a recent development and implementation of revised degree curriculums) and is a member of the President's Cabinet (working collaboratively in the formulation of short and long-range goals consistent with the mission of the Seminary and corresponding process creation, implementation, and evaluation). Brian is a strong critical thinker who particularly enjoys creative, ethical, systemic, systematic problem-solving.

Faculty Mentors

Kathleen M. Haywood, Associate Dean and Professor in the College of Education at the University of Missouri-St. Louis, is an internationally recognized author in the field of life span motor development. Dr. Haywood has led the Carnegie Project on the Education Doctorate (CPED) initiative and instrumental in the development of the current curriculum.

Shawn Woodhouse is the Director of the OASIS Center and an Assistant Professor of Higher Education Administration in the Division of Educational Leadership & Policy Studies for the College of Education at the University of Missouri-St. Louis. Dr. Woodhouse teaches a variety of courses, including Legal Aspects of Higher Education, Current Issues in Community Colleges, Governance in Higher Education, Legal Aspects of Postsecondary Teaching, and Curriculum in Higher Education. Her research focuses on legal issues involving higher education administrators, college faculty, students and staff members.

Kimberly R. Allen is the Assistant Dean for Student and Faculty Affairs and Associate Teaching Professor in the College of Nursing at UMSL. She provides formal leadership for the Office of Student Services which includes academic support programs, academic advising, recruitment, enrollment and retention. In addition, she is responsible for faculty development and academic program

evaluation. She currently teaches evaluation strategies in nursing education and the learning communities of practice courses for the Ed.D. program in the College of Education.

Appendix B: Crowder College Highest D/F/W Courses

Fall 2011 to Fall 2013 Crs Code	Aggregated Fall Grades	Aggregated DFWs	% of DFWs	Spring 2012 to 2014 Crs Code	Aggregated Grades	Aggregated DFWs	% DFW
MATH 060	331	206	62%	MATH 060	259	177	68%
MATH 070	203	119	59%	MATH 070	261	135	52%
MATH 040	926	399	43%	BIOL 152	581	255	44%
MATH 050	1206	503	42%	MATH 050	967	415	43%
BIOL 152	814	334	41%	MATH 040	541	212	39%
LOC 040	207	81	39%	COMM 080	241	92	38%
AGRN 113	89	33	37%	PHYS 190	90	34	38%
ADN 280	88	32	36%	ENGL 101	1596	588	37%
MUSC 101	705	254	36%	MATH 100	1128	404	36%
BIOL 110	92	33	36%	MUSC 101	624	220	35%
COMM 080	550	191	35%	LOC 103	434	153	35%
MATH 100	1322	459	35%	LOC 050	158	55	35%
LOC 100	528	182	34%	COLL 101	1421	482	34%
LOC 050	267	91	34%	LOC 100	242	79	33%
ENGL 102	1038	352	34%	LOC 090	290	94	32%
LOC 103	434	143	33%	ENGL 100	573	183	32%
LOC 090	379	118	31%	BSAD 150	389	122	31%
BSAD 150	470	144	31%	ECON 201	395	123	31%
PLSC 103	990	298	30%	MATH 111	1509	455	30%
TA 205	654	193	30%	BMGT 175	136	41	30%

Note: Sorted to pull courses that had at least 75 students over the 3 semesters.

Appendix C: Crowder College Course Classifications Methodology

In order to perform certain analyses described in this proposal, it will be necessary to categorize and code each of the courses participants in this study have taken. To identify developmental, general education, and other courses, searches were made of the digital editions of Crowder College's (2013a; 2013b) 2014-2015 and 2015-2016 course catalogs for the keywords "general education", "does not", "cannot be", "transfer", and "orientation". In addition, a manual review of the catalogs was conducted and the Vice President of Academic Affairs at Crowder College provided confirmation of definitions and classification methods employed.

Courses offered at Crowder College can be classified according to one of four categories:

1. Developmental – Courses listed in Crowder College's Course Catalogs as 100-level or lower that do not satisfy a general education or degree requirement.
2. General education – Courses listed in Crowder College's Course Catalogs as 101-level or higher that do satisfy a Crowder College general education requirement and/or are transferable according to the CBHE's (2005) *Credit Transfer Guidelines for Student Transfer and Articulation Among MO Colleges and Universities*.
3. College-level – Courses listed in Crowder College's Course Catalogs as 101-level or higher that do not satisfy a general education requirement, but do count as credits to degree completion.

4. Other – Courses listed in Crowder College's Course Catalogs that do not satisfy a general education or program requirement, such as those designated for non-native English speakers or students on academic probation.

These processes identified the 44 unique General Education courses listed in Table 12, the 13 Developmental Courses listed in Table 13, and the 7 Other Courses listed in Table 14. Any courses not listed in these tables is classified as college-level.

Table 18

Crowder College General Education Courses, by Course Number

Course Code and Title	General Education for
AGRI 111: Agriculture Career Orientation	Orientation (program-specific)
ART 101: Art & Design	Humanities
ASL 101: Beginning American Sign Language I	Foreign Language Humanities
ASL 102: Beginning American Sign Language II	Foreign Language Humanities
BIOL 101: General Biology	Life Science
BIOL 152: Human Anatomy & Physiology	Life Science
CHEM 101: Survey of Chemistry	Science
CHEM 104: Chemistry for Health Sciences	Science
COLL 101: College Orientation	Orientation
ECON 201: Principles of Economics I	Social and Behavioral Sciences
ECON 202: Principles of Economics II	Social and Behavioral Sciences
ENGL 101: English Composition	Communications
ENGL 102: Advanced English Composition	Communications
ENGL 104: Honors English Composition	Communications
ENGL 109: Introduction to Literature	Humanities
ENGL 120: Masterpieces of World Literature I	Humanities
ENGL 125: Masterpieces of World Literature II	Humanities
ENGL 203: Technical Report Writing	Communications
FREN 101: Beginning French*	Humanities Foreign Language
GEOG 101: Principles of Geography	Social and Behavioral Sciences
HIST 101: Western Civilization I	Social and Behavioral Sciences Humanities
HIST 106: U.S. History I	Social and Behavioral Sciences Constitutional Study
HIST 107: U.S. History II	Social and Behavioral Sciences
MATH 111: College Algebra	Mathematics
PHIL 101: Introduction to Western Philosophy	Humanities

Course Code and Title	General Education for
PHIL 110: Critical Thinking	Humanities
	Social and Behavioral Sciences
PHIL 121: World Religions	Humanities
	Social and Behavioral Sciences
PHIL 201: Logic	Humanities
PHIL 202: Ethics	Humanities
PHYS 101: Survey of Physical Science	Science
PLSC 102: Missouri Constitution	Constitutional Study
PLSC 103: National, State, Local Government	Constitutional Study
	Social and Behavioral Sciences
PLSC 205: Introduction to Political Science	Social and Behavioral Sciences
PSYC 101: General Psychology	Social and Behavioral Sciences
PSYC 110: Psychology of Personal Adjustment	Social and Behavioral Sciences
PSYC 210: Child Psychology	Social and Behavioral Sciences
PSYC 215: Adolescent Psychology	Social and Behavioral Sciences
SOC 101: General Sociology	Social and Behavioral Sciences
SOC 103: Marriage and the Family	Social and Behavioral Sciences
SPAN 101: Beginning Spanish	Foreign Language
	Humanities
SPAN 102: Beginning Spanish II	Foreign Language
	Humanities
SPAN 201: Intermediate Spanish	Foreign Language
	Humanities
SPAN 202: Intermediate Spanish II	Foreign Language
	Humanities
TA 205: Introduction to Theatre	Humanities

*2014-2015 Course Catalog only
Note: "General Education for" follows Crowder College's naming conventions, not those of CBHE

Table 19

Crowder College Developmental Education Courses, by Course Number

Course Code and Title	Developmental Education for
COMM 080: Introduction to Communications	Communications
COMM 090 (91, 92, 93) : Developmental Communication Arts	Communications
ENGL 100: Mechanics of Composition	Communications
LOC 040: Reading Enhance I	Communications
LOC 050: Reading Enhancement II	Communications
LOC 090: Reading Across the Curriculum	Communications
LOC 100: College Success	Student Success
MATH 040: Arithmetic	Mathematics
MATH 050: Basic Algebra	Mathematics

Course Code and Title	General Education for
MATH 060: Pre-Collegiate Math I	Mathematics
MATH 070: Pre-Collegiate Math II	Mathematics
MATH 090 (91, 92, 93, 94): Developmental Mathematics	Mathematics
MATH 100: Intermediate Algebra	Mathematics

Table 20

Crowder College Other Courses, by Course Number

Course Code and Title	Other Education for
ELI 030: ELI Basic I	ESOL
ELI 032: ELI Basic 2	ESOL
ELI 033: English For Non-Native Speakers	ESOL
ELI 035: English For Non-Native Speakers	ESOL
ELI 037: ELI: Special Topics	ESOL
ELI 038: ELI Special Topics	ESOL
LOC 103: College Connections	Student Success / Academic Probation

Appendix D: Crowder College D/F/W Summary with Tuition and Fees

Course Code & Title	Credits*	Aggregated Grades	Aggregated D/F/Ws	Cost of Attempted Credits**	Cost of D/F/W Credits**
Developmental Education Courses					
MATH 050: Basic Algebra	3	2,173	918	$684,495	$289,170
MATH 100: Intermediate Algebra	3	2,450	863	$771,750	$271,845
MATH 040: Arithmetic	2	1,467	611	$308,070	$128,310
LOC 050: Reading Enhancement II	2	1,364	558	$286,440	$117,180
MATH 060: Pre-Collegiate Math I	3	590	383	$185,850	$120,645
COMM 080: Introduction to Communications	2	791	283	$166,110	$59,430
LOC 100: College Success	3	770	261	$242,550	$82,215
MATH 070: Pre-Collegiate Math II	3	464	254	$146,160	$80,010
LOC 090: Reading Across the Curriculum	3	669	212	$210,735	$66,780
ENGL 100: Mechanics of Composition	3	573	183	$180,495	$57,645
LOC 040: Reading Enhancement I	2	207	81	$43,470	$17,010
Total Developmental Education		11,518	4,607	$3,226,125	$1,290,240
General Education Courses					
BIOL 152: Human Anatomy & Physiology I	5	1,395	589	$732,375	$309,225
ENGL 101: English Composition	3	1,596	588	$502,740	$185,220
COLL 101: College Orientation	1	1,421	482	$149,205	$50,610
MATH 111: College Algebra	3	1,509	455	$475,335	$143,325
ENGL 102: Advanced English Composition	3	1,038	352	$326,970	$110,880
PLSC 103: National, State, Local Government	3	990	298	$311,850	$93,870
TA 205: Introduction to Theatre	3	654	193	$206,010	$60,795
ECON 201: Principles of Economics I	3	395	123	$124,425	$38,745
Total General Education		8,998	3,080	$2,828,910	$992,670
College-level Courses					
MUSC 101: Music Appreciation	3	1,329	474	$418,635	$149,310
BSAD 150: Introduction to Business	3	859	266	$270,585	$83,790
BMGT 175: Management	3	136	41	$42,840	$12,915
PHYS 190: General Physics	5	90	34	$47,250	$17,850
AGRN 113: Crop Science	3	89	33	$28,035	$10,395
BIOL 110: General Zoology	5	92	33	$48,300	$17,325
ADN 280: Advanced Pharmacology	3	88	32	$27,720	$10,080
Total College-level		2,683	913	$883,365	$301,665
Other Courses					
LOC 103: College Connections	3	868	296	$273,420	$93,240
Total for All Courses		24,067	8,896	$7,211,820	$2,677,815

*Credit hours are based on Crowder College's (2013b) Course Catalog

**Costs are calculated using Crowder College's (2015c) fall 2015 in-district tuition of $82/credit hour and facilities fee of $16/credit hour

Appendix E: IRB Approval Letter

Office of Research Administration

One University Boulevard
St. Louis, Missouri 63121-4499
Telephone: 314-516-5899
Fax: 314-516-6759
E-mail: ora@umsl.edu

DATE:	January 10, 2016
TO:	Joseph Grailer, MFA
FROM:	University of Missouri-St. Louis IRB
PROJECT TITLE:	[841048-1] Improving Assessment and Placement Models for Developmental Education in Community Colleges
REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	January 9, 2016
REVIEW CATEGORY:	Exemption category # *4*

The chairperson of the University of Missouri-St. Louis IRB has APPROVED the above mentioned protocol for research involving human subjects and determined that the project qualifies for exemption from full committee review under Title 45 Code of Federal Regulations Part 46.101b. The time period for this approval expires one year from the date listed above. You must notify the University of Missouri-St. Louis IRB in advance of any proposed major changes in your approved protocol, e.g., addition of research sites or research instruments.

You must file an annual report with the committee. This report must indicate the starting date of the project and the number of subjects to date from start of project, or since last annual report, whichever is more recent.

Any consent or assent forms must be signed in duplicate and a copy provided to the subject. The principal investigator must retain the other copy of the signed consent form for at least three years following the completion of the research activity and they must be available for inspection if there is an official review of the UM-St. Louis human subjects research proceedings by the U.S. Department of Health and Human Services Office for Protection from Research Risks.

This action is officially recorded in the minutes of the committee.

If you have any questions, please contact Carl Bassi at 314-516-6029 or bassi@umsl.edu. Please include your project title and reference number in all correspondence with this committee.

Appendix F: Crowder College New Freshman Application

Adapted from Crowder College (2015a) online New Freshman Application

Section 1: Candidate Information

NAME

1. Last Name (Name should ne as it appears on your Social Security Card)

2. First Name (Name should ne as it appears on your Social Security Card)

3. Middle Name (Name should ne as it appears on your Social Security Card)

4. What is your birth/maiden name?

5. What is your preferred name?

ADDRESS

6. Mailing Address

7. City

8. State

9. Zip Code

10. County

11. How long at above address?

    Greater than or Equal to one year

    Less than one year

12. Email address

13. Phone Number

14. Cell Phone Number

Previous Address

15. Address

16. City

17. State

18. Zip Code

19. County

20. How long did you live at the above address?

21. If you have lived at additional addresses in the last year, please provide the address, city, state, and length of stay in the space provided.

BIOGRAPH

22. Date of Birth

23. Social Security Number

24. Citizenship

25. Citizen Status

US Citizen

Nonresident Alien

Resident Alien

26. Gender (M/F)

Female

Male

No Gender Given

Trans-Gender

27. Marital Status

Divorced

Legally Separated

Married

Single

Widowed

28. Ethnic Heritage

American Indian or Alaskan Native

Asian

Black, Non-Hispanic

Hispanic

Native Hawaiian or Other Pacific Islander

Non-Resident Alien

Race/Ethnicity Unknown

Two or more races

White, Non-Hispanic

29. Ethnicity

Hispanic/Latino

Not Hispanic/Latino

30. Race (Please select all that apply)

American Indian or Alaska Native

Asian

Black or African American

Native Hawaiian or Other Pacific Islander

White

31. High School Where Graduated

32. High School Graduation Date

33. City where the High School graduated from is located

34. State where the High School graduated from is located

35. Do you have a GED/HISET?

36. GED/HISET test date (please use this same date for high school graduation date above.)

37. GED/HISET testing center state

38. United States Veteran?

39. For what branch of the military are you a veteran?

40. Are you receiving veteran's benefits?

41. If you on active duty, what branch of the military are you in?

42. Will your employment status while in college be full-time or pat-time? Leave blank if not employed while in College.

43. Please select if the following applies to you: First generation – Parents did not complete a 4-year college degree; or an individual who resided primarily with only one parent and that parent did not have a 4-year degree.

44. Please select if the following applies to you: Single Parent Home – A person parenting at least one child, without a spouse or significant other.

45. Please select if the following applies to you: Displaced Homemaker – Has primarily been a homemaker without outside income, or has lost eligibility for public assistance.

46. Please select if the following applies to you: Migrant – student or parents have worked in agriculture/farming for 75 days within the past two years.

47. How did you hear about Crowder College?

48. Have you ever attended a college or university?

49. If Yes, please list all colleges and/or universities you have attended.

Section 2: Academic Information for Candidacy

1. Anticipated Academic Enroll Year

2. Anticipated Academic Enroll Term

3. Degree Interested in Pursuing

4. Enrollment Status

5. Have you completed the requirements for the Missouri High School A+ program?

6. Which campus do you plan to attend?

7. If you have previously attended another college, are you now or were you ever the subject of any disciplinary proceedings or findings that would prevent your unrestricted enrollment at that institution?

8. If you responded yes to the question above, provide an explanation.

9. Have you ever been convicted of, entered a plea of "guilty", "no contest", or "nolo contender" to any crime other than a minor traffic offense?

10. If you answered yes to the question above, provide the following information for each crime: 1) the crime for which you were convicted, 2) the year the act was committed, 3) the penalty imposed, and 4) the terms and conditions of any current sentence, probation, or parole.

11. Is there a language other than English commonly spoken in your home or by you regularly?

12. Have you ever had close contact with anyone who was sick with Tuberculosis (TB)?

13. Have you ever had a positive result on a tuberculin test?

14. Have you resided, worked, or volunteered in a prison, homeless shelter, hospital, nursing home, or other long-term treatment facility that serves a population that is at increased risk for active TB?

15. Within the past 5 years, have you travelled or resided outside the United States of America for a period of 3 months or longer?

16. If yes, please list the countries you have visited.

Appendix G: SPSS Codebook

Name	Label	Values
CohortYear	Cohort Year	1 = 2012 2 = 2013 3 = 2014
AgeGroup	Age by IPEDS Group	0 = 18-19 1 = Under 18 3 = 20-21 4 = 22-24 5 = 25-29 6 = 30-34 7 = 35-39 8 = 40-49 9 = 50-64
Gender	Gender	1 = Female 2 = Male
IPEDS	IPEDS Value	1 = American Indian or Alaska Native 2 = Asian 3 = Black or African American 4 = Hispanics of any race 5 = Native Hawaiian or Other Pacific Islander 6 = Nonresident Alien 7 = Race and Ethnicity Unknown 8 = Two or more races 9 = White
FirstGen	First Generation	0 = No 1 = Yes
PELL	Pell Recipient	0 = No 1 = Yes
Veteran	Veteran Student	0 = No 1 = Yes
SingPar	Single Parent Household	0 = No 1 = Yes
Displaced	Displaced Homemaker	0 = No 1 = Yes
Migrant	Migrant Student	0 = No 1 = Yes
HSGradType	High School Grad Type	0 = Missing / Unknown 1 = GED 2 = HiSET 3 = Homeschool Diploma 4 = High School Diploma 5 = High School Transcript
HSGradTypeYN	Did not earn HS diploma	0 = Did graduate high school 1 = Did not graduate high school
HSgpaGroup	High School GPA Group	0 = Missing / Unknown 1 = >4 2 = 3.5-4.000 3 = 2.5-3.499 4 = 1.5-2.499 5 = 0.5-1.499 6 = 0.0-0.499

Name	Label	Values
PTFT	Full Time or Part Time	1 = Full-time 2 = Part-time
MajorDeclared	Major Declared	0 = Declared 1 = Non-degree 2 = Undeclared
MajorDeclaredYN	Did not declare a major	0 = Declared major or non-degree seeking 1 = Did not declare major
DegType	Degree Type	0 = Unknown 1 = AA 2 = AS 3 = AAS 4 = AAT 5 = Non-degree 6 = Certificate 7 = Undeclared
MajorCancel	Declared Major was Cancelled	1 = No 2 = Yes 3 = Undeclared
DevMathEnroll	Developmental Math Course Enrolled	0 = No 1 = Yes
DevMathNumber	Developmental Math Course Number Enrolled	0 = No Math Course 1 = MATH 040 2 = MATH 050 3 = MATH 060 4 = MATH 070 5 = MATH 090 (91+92) 6 = MATH 092 7 = MATH 100
DevEnglEnroll	Developmental English Course Enrolled	0 = No 1 = Yes
DevReadEnroll	Developmental Reading Course Enrolled	0 = No 1 = Yes
DevReadNumber	Developmental Reading Course Number Enrolled	0 = No Reading Course 1 = LOC 040 2 = LOC 050 3 = LOC 090 4 = LOC 100
DevCommEnroll	Developmental Communications Course Enrolled	0 = No 1 = Yes
TotalDevCoursesEnroll	Total Number of Developmental Courses Enrolled	Numeric input scale: 0-4
HrsAttGroup	Hours Attempted First Semester by Group 2	1 = 0 2 = 1-3 3 = 4-6 4 = 7-9 5 = 10-12 6 = 13-15 7 = 16-18 8 = 19+
HrsAttGroupXX	Hours Attempted GroupXX	0 = 7 or more 1 = 6 or less
Attempt7YN	Did not attempt more than 6 hours	0 = Attempted 7 or more hours 1 = Attempted 6 or fewer hours

Name	Label	Values
MajorityDevAtt	Majority of Courses Attempted were Developmental Education	0 = No Hours Attempted 1 = Only Non-Dev 2 = Majority Non-Dev 4 = Majority Dev 5 = Only Dev 6 = Equal
HoursEarnedGroup	Hours Earned First Semester by Group 2	1 = 0 2 = 1-3 3 = 4-6 4 = 7-9 5 = 10-12 6 = 13-15 7 = 16-18 8 = 19+
HoursEarnedGroup3	Hours Earned Group 3	0 = 4 or more 1 = 3 or fewer
HoursEarnedGroupXX	Hours Earned Group XX	0 = 7 or more 1 = 6 or less
MajorityDevEarn	Majority of Credits Earned were Developmental Education	0 = No Credits Earned 1 = Only Non-Dev 2 = Majority Non-Dev 4 = Majority Dev 5 = Only Dev 6 = Equal
ReEnroll	Student Reenrolled the Following Spring Semester	0 = Yes 1 = No

Appendix H: Log File

Identifier	Variable Changed	Original Value	New Value	Reason
2012-78	ACTMT	47	17	Believed to be a data entry error. ACT Comp=17; ACTEN=18; ACTRD=16
2012-179	Deleted from dataset			Hours earned exceeds hours attempted.
2012-305	Deleted from dataset			Did not enroll in any Developmental Education Courses
2013-106	Deleted from dataset			Hours earned exceeds hours attempted.
2013-11	Deleted from dataset			Hours earned exceeds hours attempted.
2013-229	Deleted from dataset			Hours earned exceeds hours attempted.
2013-322	Deleted from dataset			Hours earned exceeds hours attempted.
2013-333	Deleted from dataset			Grades are recorded, but no hours attempted
2013-347	Deleted from dataset			Grades are recorded, but no hours attempted
2013-425	Deleted from dataset			Grades are recorded, but no hours earned
2013-583	Deleted from dataset			Hours earned exceeds hours attempted.
2013-637	Deleted from dataset			Grades are recorded, but no hours attempted
2014-189	Deleted from dataset			Hours earned exceeds hours attempted.
2014-248	Deleted from dataset			Hours earned exceeds hours attempted.
2014-342	Deleted from dataset			Hours earned exceeds hours attempted.
2014-385	Deleted from dataset			Did not enroll in any Developmental Education Courses DevMathGrade = DN (unknown datapoint prevents calculating other IVs)
2014-481	Deleted from dataset			DevMathGrade = DN (unknown datapoint prevents calculating other IVs)
2014-618	Deleted from dataset			Hours earned exceeds hours attempted.
2014-626	Deleted from dataset			Hours earned exceeds hours attempted.
2014-659	Deleted from dataset			DevMathGrade = DN (unknown datapoint prevents calculating other IVs)
2014-81	Deleted from dataset			Hours earned exceeds hours attempted.

Appendix I: Model 0 Descriptive Statistics – Frequencies and Percentages for All Cases

Variable	f	%
Demographic		
Cohort Year	2,208	100.0
2012	658	29.8
2013	774	35.1
2014	776	35.1
Age Group	2,208	100.0
Under 18	77	3.5
18-19	1,531	69.3
20-21	144	6.5
22-24	98	4.4
25-29	142	6.4
30-34	69	3.1
35-39	53	2.4
40-49	67	3.0
50-64	27	1.2
Gender	2,208	100.0
Female	1,315	59.6
Male	893	40.4
Race/ethnicity	2,208	100.0
American Indian or Alaska Native	58	2.6
Asian	35	1.6
Black or African American	46	2.1
Hispanic of any race	258	11.7
Native Hawaiian or Other Pacific Islander	15	0.7
Nonresident Alien	4	0.2
Race and Ethnicity unknown	26	1.2
Two or more races	77	3.5
White	1,689	76.5
First Generation Student	2,208	100.0
No	799	36.2
Yes	1,409	63.8
PELL recipient	2,208	100.0
No	755	34.2
Yes	1,453	65.8
Veteran	2,208	100.0
No	2,155	97.6
Yes	53	2.4
Single Parent	2,208	100.0
No	1,743	78.9
Yes	465	21.1

Variable	f	%
Displaced homemaker	2,208	100.0
No	2,176	98.6
Yes	32	1.4
Migrant Student	2,208	100.0
No	2,095	94.9
Yes	113	5.1
Pre-collegiate Academics		
High School Grad Type	2,208	100.0
Missing / Unknown	222	10.1
GED	228	10.3
Highset	9	0.4
Homeschool Diploma	20	0.9
High School Diploma	56	2.5
High School Transcript	1,673	75.8
High School GPA	2,208	100.0
Missing / Unknown	681	30.8
>4	189	8.6
3.5-4.000	211	9.6
2.5-3.499	821	37.2
1.5-2.499	292	13.2
0.5-1.499	14	0.6
0.0-0.499	0	0.0
Enrollment		
Full-time Status	2,208	100.0
Full-time	1,746	79.1
Part-time	462	20.9
Major Declared	2,208	100.0
Declared	1,872	84.8
Non-degree Seeking	201	9.1
Undeclared	135	6.1
Degree Type	2,208	100.0
Unknown	6	0.3
AA (incl. general studies)	1,037	47.0
AS	312	14.1
AAS	334	15.1
AAT	124	5.6
Non-degree seeking	201	9.1
Certificate	59	2.7
Undeclared	135	6.1
Declared Major was Cancelled	2,208	100.0
No	1,977	89.5
Yes	96	4.3
Undeclared	135	6.1
Enrolled in Developmental Math Course	2,208	100.0
No	245	11.1

Variable	f	%
Yes	1,963	88.9
Developmental Math Course Number Enrolled	2,208	100.0
Did not enroll in a developmental math course	245	11.1
MATH 040	453	20.5
MATH 050	410	18.6
MATH 060	271	12.3
MATH 070	189	8.6
MATH 090	200	9.1
MATH 100	440	19.9
Enrolled in Developmental English Course (ENGL 100)	2,208	100.0
No	1,716	77.7
Yes	492	22.3
Enrolled in Developmental Reading Course	2,208	100.0
No	1,548	70.1
Yes	660	29.9
Developmental Reading Course Number Enrolled	2,208	100.0
Did not enroll in a developmental reading course	1,548	70.1
LOC 040	107	4.8
LOC 050	135	6.1
LOC 090	215	9.7
LOC100	203	9.2
Enrolled in Developmental Communications Course (COMM 040)	2,208	100.0
No	1,733	78.5
Yes	475	21.5
Number of Developmental Courses Enrolled	2,208	100.0
1	1,244	56.3
2	564	25.5
3	382	17.3
4	18	0.8
First Four Weeks Performance		
Total Credit Hours Attempted	2,208	100.0
0	43	1.9
1-3	19	0.9
4-6	104	4.7
7-9	190	8.6
10-12	694	31.4
13-15	998	45.2
16-18	155	7.0
19+	5	0.2
Total Credit Hours Attempted 2	2,208	100.0
7 or more	2,042	92.5
6 or fewer	166	7.5
Majority of credit hours attempted were developmental	2,208	100.0
No credit hours were attempted	43	1.9
Only college-level credit hours were attempted	123	5.6

Variable	f	%
Majority of credit hours attempted were college-level	1,595	72.2
Equal number of developmental and college-level credit hours were attempted	127	5.8
Majority of credit hours attempted were developmental	309	14.0
Only developmental credit hours were attempted	11	0.5
First Semester Performance		
Total credits earned first semester	2,208	100.0
0	384	17.4
1-3	144	6.5
4-6	187	8.5
7-9	325	14.7
10-12	567	25.7
13-15	534	24.2
16-18	65	2.9
19+	2	0.1
Total credits earned 2	2,208	100.0
7 or more	1,493	67.6
6 or fewer	715	32.4
Majority of Credits Earned were Developmental	2,208	100.0
No credits were earned	384	17.4
Only college-level credits were earned	415	18.8
Majority of credits earned were college-level	1,057	47.9
Equal number of developmental and college-level credits were earned	93	4.2
Majority of credits earned were developmental	219	9.9
Only developmental credits were earned	40	1.8
Student reenrolled	2,208	100.0
Yes	1,579	71.5
No	629	28.5

Appendix J: Model 0 Tests for Association – Students Who Did and Did Not Reenroll for All Cases

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
Demographics							
Cohort Year	2,208	1,579	71.5	629	28.5	100.0	.224
2012	658	462	70.2	196	29.8	31.2	
2013	774	571	73.8	203	26.2	32.3	
2014	776	546	70.4	230	29.6	36.6	
Age	2,208	1,579	71.5	629	28.5	100.0	.000
Under 18	77	49	63.6	28	36.4	4.5	
18-19	1,531	1,114	72.8	417	27.2	66.3	
20-21	144	81	56.3	63	43.8	10.0	
22-24	98	69	70.4	29	29.6	4.6	
25-29	142	107	75.4	35	24.6	5.6	
30-34	69	54	78.3	15	21.7	2.4	
35-39	53	43	81.1	10	18.9	1.6	
40-49	67	48	71.6	19	28.4	3.0	
50-64	27	14	51.9	13	48.1	2.1	
Gender	2,208	1,579	71.5	629	28.5	100.0	.001
Female	1,315	974	74.1	341	25.9	54.2	
Male	893	605	67.7	288	32.3	45.8	
Race/Ethnicity	2,208	1,579	71.5	629	28.5	100.0	.116*
American Indian or Alaska Native	58	42	72.4	16	27.6	2.5	
Asian	35	30	85.7	5	14.3	0.8	
Black or African American	46	32	69.6	14	30.4	2.2	
Hispanic of any race	258	200	77.5	58	22.5	9.2	
Native Hawaiian or Other Pacific Islander	15	9	60.0	6	40.0	1.0	
Nonresident Alien	4	4	100	0	0.0	0.0	
Race and Ethnicity unknown	26	16	61.5	10	38.5	1.6	
Two or more races	77	53	68.8	24	31.2	3.8	
White	1,689	1,193	70.6	496	29.4	78.9	
First Generation Student	2,208	1,579	71.5	629	28.5	100.00	.182
No	799	585	73.2	214	26.8	34.0	
Yes	1,409	994	70.5	415	29.5	66.0	
Pell Recipient	2,208	1,579	71.5	629	28.5	100.0	.000
No	755	452	59.9	303	40.1	48.2	
Yes	1,453	1,127	77.6	326	22.4	51.8	
Veteran	2,208	1,579	71.5	629	28.5	100.0	.976
No	2,155	1,541	71.5	614	28.5	97.6	
Yes	53	38	71.7	15	28.3	2.4	
Single Parent	2,208	1,579	71.5	629	28.5	100.0	.683
No	1,743	1,250	71.7	493	28.3	78.4	
Yes	465	329	70.8	136	29.2	21.6	
Displaced Homemaker	2,208	1,579	71.5	629	28.5	100.0	.125
No	2,176	1,560	71.7	616	28.3	97.9	
Yes	32	19	59.4	13	40.6	2.1	
Migrant Student	2,208	1,579	71.5	629	28.5	100.0	.639
No	2,095	1,496	71.4	599	28.6	95.2	
Yes	113	83	73.5	30	26.5	4.8	
Pre-collegiate Academics							
High School Grad Type	2,208	1,579	71.5	629	28.5	100.00	.000†
Missing / Unknown	**222**	**45**	**20.3**	**177**	**79.7**	**28.1**	

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
GED	228	165	72.4	63	27.6	10.0	
HiSET	9	3	33.3	6	66.7	1.0	
Homeschool Diploma	20	17	85.0	3	15.0	0.5	
High School Diploma	56	45	80.4	11	19.6	1.7	
High School Transcript	1,673	1,304	77.9	369	22.1	58.7	
High School GPA	2,208	1,579	71.5	629	28.5	100.0	.000†
Missing / Unknown	681	423	62.1	258	37.9	41.0	
>4	189	153	81.0	36	19.0	5.7	
3.5-4.000	211	185	87.7	26	12.3	4.1	
2.5-3.499	821	623	75.9	198	24.1	31.5	
1.5-2.499	292	183	62.7	109	37.3	17.3	
0.5-1.499	14	12	85.7	2	14.3	0.3	
Full-time Status	2,208	1,579	71.5	629	28.5	100.0	.000
Full-time	1,746	1,339	76.7	407	23.3	64.7	
Part-time	462	240	51.9	222	48.1	35.3	
Major Declared	2,208	1,579	71.5	629	28.5	100.0	.000
Major Declared	1,872	1,373	73.3	499	26.7	79.3	
Non-degree	201	199	99.0	2	1.0	0.3	
Undeclared	**135**	**7**	**5.2**	**128**	**94.8**	**20.3**	
Degree Type	2,208	1,579	71.5	629	28.5	100.0	.000‡
Unknown	6	3	50.0	3	50.0	0.5	
AA	1,037	775	74.7	262	25.3	41.7	
AS	312	226	72.4	86	27.6	13.7	
AAS	334	243	72.8	91	27.2	14.5	
AAT	124	91	73.4	33	26.6	5.2	
Non-degree seeking	201	199	99.0	2	1.0	0.3	
Certificate	59	35	59.3	24	40.7	3.8	
Undeclared	**135**	**7**	**5.2**	**128**	**94.8**	**20.3**	
Declared Major was Cancelled	2,208	1,579	71.5	629	28.5	100.0	.000
Major was not cancelled	1,977	1,514	76.6	463	23.4	73.6	
Major was cancelled	96	58	60.4	38	39.6	6.0	
Undeclared	135	7	5.2	128	94.8	20.3	
Enrolled in Dev. Math Course	2,208	1,579	71.5	629	28.5	100.0	.279
No	245	168	68.6	77	31.4	12.2	
Yes	1,963	1,411	71.9	552	28.1	87.8	
Dev. Math Course Number enrolled	2,208	1,579	71.5	629	28.5	100.0	.000
Did not enroll in a dev. math course	245	168	68.6	77	31.4	12.2	
MATH 040	453	312	68.9	141	31.1	22.4	
MATH 050	410	302	73.7	108	26.3	17.2	
MATH 060	271	174	64.2	97	35.8	15.4	
MATH 070	189	130	68.8	59	31.2	9.4	
MATH 090 (91+92)	200	135	67.5	65	32.5	10.3	
MATH 100	440	358	81.4	82	18.6	13.0	
Enrolled in Dev. English Course (ENGL 100)	2,208	1,579	71.5	629	28.5	100.0	.721
No	1,716	1,224	71.3	492	28.7	78.2	
Yes	492	355	72.2	137	27.8	21.8	
Enrolled in Dev. Reading Course	2,208	1,579	71.5	629	28.5	100.0	.004
No	1,548	1,135	73.3	413	26.7	65.7	
Yes	660	444	67.3	216	32.7	34.3	
Dev. Reading Course Number enrolled	2,208	1,579	71.5	629	28.5	100.0	.005
Did not enroll in dev. reading course	1,548	1,135	73.3	413	26.7	65.7	
LOC 040	107	62	57.9	45	42.1	7.2	
LOC 050	135	96	71.1	39	28.9	6.2	
LOC 090	215	143	66.5	72	33.5	11.4	
LOC 100	203	143	70.4	60	29.6	9.5	

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
Enrolled in Dev. Comm. Course (COMM 040)	2,208	1,579	71.5	629	28.5	100.0	.007
No	1,733	1,263	72.9	470	27.1	74.7	
Yes	475	316	66.5	159	33.5	25.3	
Number of Dev. Courses Enrolled	2,208	1,579	71.5	629	28.5	100.0	.077
1	1,244	916	73.6	328	26.4	52.1	
2	564	390	69.1	174	30.9	27.7	
3	382	262	68.6	120	31.4	19.1	
4	18	11	61.1	7	38.9	1.1	
First Four Weeks Performance							
Total Credit Hours Attempted	2,208	1,579	71.5	629	28.5	100.0	.000‡
0	43	3	30.8	40	93.0	6.4	
1-3	19	5	26.3	14	73.7	2.2	
4-6	**104**	**38**	**36.5**	**66**	**63.5**	**10.5**	
7-9	190	117	61.6	73	38.4	11.6	
10-12	694	504	72.6	190	27.4	30.2	
13-15	998	777	77.9	221	22.1	35.1	
16-18	155	131	84.5	24	15.5	3.8	
19+	5	4	80.0	1	20.0	0.2	
Total Credit Hours Attempted 2	2,208	1,579	71.5	629	28.5	100.0	.000
7 or more	2,042	1,533	75.1	509	24.9	80.9	
6 or fewer	**166**	**46**	**27.7**	**120**	**72.3**	**19.1**	
Majority of credit hours attempted were dev.	2,208	1,579	71.5	629	28.5	100.0	.000†
No credit hours were attempted	43	3	7.0	40	93.0	6.4	
Only college-level credit hours attempted	123	71	57.7	52	42.3	8.3	
Majority of credit hours attempted were college-level	1,595	1,210	75.9	385	24.1	61.2	
Equal number of developmental and college-level credit hours were attempted	127	86	67.7	41	32.3	6.5	
Majority of credit hours attempted were developmental	309	206	66.7	103	33.3	16.4	
Only developmental credit hours attempted	11	3	27.3	8	72.7	1.3	
First Semester Performance							
Total credits earned	2,208	1,579	71.5	629	28.5	100.0	.000‡
0	**384**	**32**	**8.3**	**352**	**91.7**	**56.0**	
1-3	**144**	**63**	**43.8**	**81**	**56.3**	**12.9**	
4-6	187	126	67.4	61	32.6	9.7	
7-9	325	267	82.2	58	17.8	9.2	
10-12	567	523	92.2	44	7.8	7.0	
13-15	534	502	94.0	32	6.0	5.1	
16-18	65	64	98.5	1	1.5	0.2	
19+	2	2	100.0	0	0.0	0.0	
Total credits earned 2	2,208	1,579	71.5	629	28.5	100.0	.000
7 or more	1,493	1,358	91.0	135	9.0	21.5	
6 or fewer	**715**	**221**	**30.9**	**494**	**69.1**	**78.5**	
Majority of credits earned were developmental	2,208	1,579	71.5	629	28.5	100.0	.000
No credits were earned	384	32	8.3	352	91.7	56.0	
Only college-level credits were earned	415	298	71.8	117	28.2	18.6	
Majority of credits earned were college-level	1,057	968	91.6	89	8.4	14.1	
Equal number of developmental and college-level credits were earned	93	77	82.8	16	17.2	2.5	
Majority of credits earned were developmental	219	187	85.4	32	14.6	5.1	
Only developmental credits were earned	40	17	42.5	23	57.5	3.7	

*Three cells (16.7%) have expected counts less than five.
†One cell (8.3%) has expected count less than five.
‡Two cells (12.5%) have expected counts less than five.

Appendix K: Model 0 Logistic Regression for All Cases

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95% C.I. Lower	95% C.I. Upper
Cohort Year								
2012			4.254	2	.119			
2013	-.248	.145	2.898	1	.089	.781	.587	1.038
2014	-.271	.141	3.673	1	.055	.763	.578	1.006
Age Group								
18-19			21.469	8	.006			
Under 18	.077	.314	.060	1	.806	1.080	.584	1.998
20-21	.237	.220	1.160	1	.281	1.268	.823	1.952
22-24	-.441	.294	2.249	1	.134	.643	.361	1.145
25-29	-.493	.254	3.763	1	.052	.611	.371	1.005
30-34	-.964	.376	6.578	1	.010	.381	.183	.797
35-39	-1.087	.442	6.039	1	.014	.337	.142	.802
40-49	-.880	.353	6.213	1	.013	.415	.208	.829
50-64	-.155	.511	.092	1	.761	.856	.314	2.332
Gender (male)	.195	.117	2.778	1	.096	1.215	.966	1.529
Race / Ethnicity								
White			13.020	8	.111			
American Indian or Alaska Native	.086	.348	.061	1	.806	1.089	.551	2.155
Asian	-.895	.580	2.383	1	.123	.409	.131	1.273
Black or African American	-.322	.384	.700	1	.403	.725	.341	1.540
Hispanics of any race	-.552	.208	7.046	1	.008	.576	.383	.865
Native Hawaiian or Other Pacific Islander	.705	.588	1.436	1	.231	2.023	.639	6.407
Nonresident Alien	-20.415	17465.201	.000	1	.999	.000	.000	.
Race and Ethnicity unknown	.450	.469	.920	1	.337	1.568	.626	3.929
Two or more races	.037	.287	.016	1	.898	1.037	.591	1.821
First Generation (yes)	.305	.122	6.266	1	.012	1.356	1.068	1.722
Pell Recipient (no)	.670	.124	29.435	1	.000	1.955	1.534	2.490
Veteran (no)	.908	.465	3.806	1	.051	2.478	.996	6.167
Single Parent (no)	.130	.145	.809	1	.368	1.139	.858	1.512
Displaced Homemaker (yes)	.283	.451	.394	1	.530	1.328	.548	3.216
Migrant Student (no)	.419	.301	1.941	1	.164	1.521	.843	2.744
<u>Pre-collegiate Academics</u>								
High School Grad Type								
High School Diploma with Transcript			26.223	5	.000			
Missing / Unknown	1.104	.273	16.294	1	.000	3.016	1.765	5.155
GED	.071	.223	.101	1	.751	1.073	.693	1.662
HiSET	1.465	.805	3.313	1	.069	4.329	.894	20.974
Homeschool diploma	-.830	.700	1.406	1	.236	.436	.111	1.720
High school diploma no transcript	-.732	.388	3.566	1	.059	.481	.225	1.028
High School GPA								
Missing / Unknown			23.947	5	.000			
Greater than 4.0	-.807	.249	10.491	1	.001	.446	.274	.727
3.5-4.000	-1.056	.274	14.909	1	.000	.348	.203	.594
2.5-2.499	-.541	.167	10.424	1	.001	.582	.419	.809
1.5-2.499	-.196	.200	.961	1	.327	.822	.555	1.217
0.5-1.499	-1.186	.957	1.533	1	.216	.306	.047	1.996
<u>Enrollment</u>								
Full-time Status (part-time)	.530	.162	10.722	1	.001	1.700	1.237	2.335
Major Declared								

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95% C.I. Lower	95% C.I. Upper
Declared			48.695	2	.000			
Non-degree Seeking	-3.372	.720	21.937	1	.000	.034	.008	.141
Undeclared	2.985	.581	26.414	1	.000	19.785	6.338	61.760
Number of Developmental Courses Enrolled								
1			1.831	3	.608			
2	.073	.141	.270	1	.603	1.076	.816	1.420
3	.120	.210	.326	1	.568	1.128	.747	1.703
4	.787	.602	1.711	1	.191	2.197	.675	7.149
First Four Weeks Performance								
Credit Hours Attempted 2 (6 or fewer)	1.252	.273	21.077	1	.000	3.499	2.050	5.972
Majority of credit hours attempted were developmental								
Equal number attempted			8.837	5	.116			
No credit hours were attempted	-2.249	.863	6.791	1	.009	.106	.019	.573
Only college-level attempted	.221	.343	.414	1	.520	1.247	.637	2.441
Majority were college-level	-.081	.260	.096	1	.757	.923	.554	1.537
Majority were developmental	.001	.279	.000	1	.997	1.001	.579	1.729
Only developmental attempted	-.174	.818	.045	1	.832	.841	.169	4.177
Constant	-2.456	.649	14.306	1	.000	.086		

Appendix L: Model 1 Descriptive Statistics – Frequencies and Percentages for Cases with a Known High School Grad Type

Variable	f	%
Demographic		
Cohort Year	1,986	100.0
2012	587	29.6
2013	709	35.7
2014	690	34.7
Age Group	1,986	100.0
Under 18	64	3.2
18-19	1,399	70.4
20-21	115	5.8
22-24	87	4.4
25-29	129	6.5
30-34	61	3.1
35-39	49	2.5
40-49	62	3.1
50-64	20	1.0
Gender	1,986	100.0
Female	1,210	60.9
Male	776	39.1
Race/ethnicity	1,986	100.0
American Indian or Alaska Native	52	2.6
Asian	32	1.6
Black or African American	39	2.0
Hispanic of any race	226	11.4
Native Hawaiian or Other Pacific Islander	14	0.7
Nonresident Alien	1	0.1
Race and Ethnicity unknown	22	1.1
Two or more races	70	3.5
White	1,530	77.0
First Generation Student	1,986	36.0
No	714	36.0
Yes	1,272	64.0
PELL recipient	1,986	100.0
No	611	30.8
Yes	1,375	69.2
Veteran	1,986	100.0
No	1,948	98.1
Yes	38	1.9
Single Parent	1,986	100.0
No	1,579	79.5
Yes	407	20.5

Variable	f	%
Displaced homemaker	1,986	100.0
No	1,960	98.7
Yes	26	1.3
Migrant Student	1,986	100.0
No	1,891	95.2
Yes	95	4.8
Pre-collegiate Academics		
High School Grad Type	1,986	100.0
Missing / Unknown	0	0.0
GED	228	11.5
HiSET	9	0.5
Homeschool Diploma	20	1.0
High School Diploma	56	2.8
High School Transcript	1,673	84.2
High School GPA	1,986	100.0
Missing / Unknown	559	28.1
>4	182	9.2
3.5-4.000	205	10.3
2.5-3.499	774	39.0
1.5-2.499	253	12.7
0.5-1.499	13	0.7
0.0-0.499	0	0.0
Enrollment		
Full-time Status	1,986	100.0
Full-time	1,616	81.4
Part-time	370	18.6
Major Declared	1,986	100.0
Declared	1,789	90.1
Non-degree Seeking	197	9.9
Undeclared	0	0.0
Degree Type	1,986	100.0
Unknown	6	0.3
AA (incl. general studies)	993	50.0
AS	303	15.3
AAS	306	15.9
AAT	116	5.8
Non-degree seeking	197	9.9
Certificate	55	208
Undeclared	0	0.0
Declared Major was Cancelled	1,986	100.0
No	1,892	95.3
Yes	94	4.7
Undeclared	0	0.0
Enrolled in Developmental Math Course	1,986	100.0
No	212	10.7

Variable	f	%
Yes	1,774	89.3
Developmental Math Course Number Enrolled	1,986	100.0
Did not enroll in a developmental math course	212	10.7
MATH 040	409	20.6
MATH 050	375	18.9
MATH 060	241	12.1
MATH 070	171	8.6
MATH 090 (91 + 92)	169	8.5
MATH 100	409	20.6
Enrolled in Developmental English Course (ENGL 100)	1,986	100.0
No	1,543	77.7
Yes	443	22.3
Enrolled in Developmental Reading Course	1,986	100.0
No	1,409	70.9
Yes	577	29.1
Developmental Reading Course Number Enrolled	1,986	100.0
Did not enroll in a developmental reading course	1,409	70.9
LOC 040	92	4.6
LOC 050	124	6.2
LOC 090	180	9.1
LOC100	181	9.1
Enrolled in Developmental Communications Course (COMM 040)	1,986	100.0
No	1,569	79.0
Yes	417	21.0
Number of Developmental Courses Enrolled	1,986	100.0
1	1,129	56.8
2	505	25.4
3	336	16.9
4	16	0.8
First Four Weeks Performance		
Total Credit Hours Attempted	1,986	100.0
0	0	0.0
1-3	16	0.8
4-6	84	4.2
7-9	167	8.4
10-12	632	31.8
13-15	934	47.0
16-18	148	7.5
19+	5	0.3
Total Credit Hours Attempted 2	1,986	100.0
7 or more	1,886	95.0
6 or fewer	100	5.0
Majority of credit hours attempted were developmental	1,986	100.0
No credit hours were attempted	0	0.0
Only college-level credit hours were attempted	105	5.3

Variable	f	%
Majority of credit hours attempted were college-level	1,477	74.4
Equal number of developmental and college-level credit hours were attempted	114	5.7
Majority of credit hours attempted were developmental	282	14.2
Only developmental credit hours were attempted	8	0.4
First Semester Performance		
Total credits earned	1,986	100.0
0	219	11.0
1-3	136	6.8
4-6	178	9.0
7-9	318	16.0
10-12	554	27.9
13-15	515	25.9
16-18	64	3.2
19+	2	0.1
Total credits earned 2	1,986	100.0
7 or more	1,453	73.2
6 or fewer	533	26.8
Majority of Credits Earned were Developmental	1,986	100.0
No credits were earned	219	11.0
Only college-level credits were earned	406	20.4
Majority of credits earned were college-level	1,026	51.7
Equal number of developmental and college-level credits were earned	89	4.5
Majority of credits earned were developmental	210	10.6
Only developmental credits were earned	36	1.8
Student reenrolled	1,986	100.0
Yes	1,534	77.2
No	452	22.8

Appendix M: Model 1 Tests for Association – Students Who Did and Did Not Reenroll for Cases with a Known High School Grad Type

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
Demographics							
Cohort Year	1,986	1,534	77.2	452	22.8	100.0	.503
2012	587	450	29.3	137	23.3	30.3	
2013	709	558	78.7	151	21.3	33.4	
2014	690	526	76.2	164	23.8	36.3	
Age	1,986	1,534	77.2	452	22.8	100.0	.027*
Under 18	64	46	71.9	18	28.1	4.0	
18-19	1,399	1,087	77.7	312	22.3	69.0	
20-21	115	75	65.2	40	34.8	8.8	
22-24	87	67	77.0	20	23.0	4.4	
25-29	129	105	81.4	24	18.6	5.3	
30-34	61	51	83.6	10	16.4	2.2	
35-39	49	43	87.8	6	12.2	1.3	
40-49	62	46	74.2	16	25.8	3.5	
50-64	20	14	70.0	6	30.0	1.3	
Gender	1,986	1,534	77.2	452	22.8	100.0	.091
Female	1,210	950	78.5	260	21.5	57.5	
Male	776	584	75.3	192	24.7	42.5	
Race/Ethnicity	1,986	1,534	77.2	452	22.8	100.0	.107†
American Indian or Alaska Native	52	41	78.8	11	21.2	2.4	
Asian	32	29	90.6	3	9.4	0.7	
Black or African American	39	30	76.9	9	23.1	2.0	
Hispanic of any race	226	190	84.1	36	15.9	8.0	
Native Hawaiian or Other Pacific Islander	14	9	64.3	5	35.7	1.1	
Nonresident Alien	1	1	100.0	0	0.0	0.0	
Race and Ethnicity unknown	22	15	68.2	7	31.8	1.5	
Two or more races	70	52	74.3	18	25.7	4.0	
White	1,530	1,167	76.3	363	23.7	80.3	
First Generation Student	1,986	1,534	77.2	452	22.8	100.0	.106
No	714	566	79.3	148	20.7	32.7	
Yes	1,272	968	76.1	304	23.9	67.3	
Pell Recipient	1,986	1,534	77.2	452	22.8	100.0	.000
No	611	431	70.5	180	29.5	39.8	
Yes	1,375	1,103	80.2	272	19.8	60.2	
Veteran	1,986	1,534	77.2	452	22.8	100.0	.027
No	1,948	1,499	77.0	449	23.0	99.3	
Yes	38	35	92.1	3	7.9	0.7	
Single Parent	1,986	1,534	77.2	452	22.8	100.0	.312
No	1,579	1,212	76.8	367	23.2	81.2	
Yes	407	322	79.1	85	20.9	18.8	
Displaced Homemaker	1,986	1,534	77.2	452	22.8	100.0	.327
No	1,960	1,516	77.3	444	22.7	98.2	
Yes	26	18	69.2	8	30.8	1.8	
Migrant Student	1,986	1,534	77.2	452	22.8	100.0	.364
No	1,891	1,457	77.0	434	23.0	96.0	
Yes	95	77	81.1	18	18.9	4.0	
Pre-collegiate Academics							
High School Grad Type	1,986	1,534	77.2	452	22.8	100.0	.006‡

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
Missing / Unknown	0	0	0.0	0	0.0	0.0	
GED	228	165	72.4	63	27.6	13.9	
HiSET	9	3	33.3	6	66.7	1.3	
Homeschool Diploma	20	17	85.0	3	15.0	0.7	
High School Diploma	56	45	80.4	11	19.6	2.4	
High School Transcript	1,673	1,304	77.9	369	22.1	81.6	
High School GPA	1,986	1,534	77.2	452	22.8	100.0	.000[§]
Missing / Unknown	559	399	71.4	160	28.6	35.4	
>4	182	152	83.5	30	16.5	6.6	
3.5-4.000	205	183	89.3	22	10.7	4.9	
2.5-3.499	774	611	78.9	163	21.1	36.1	
1.5-2.499	253	177	70.0	76	30.0	16.8	
0.5-1.499	13	12	92.3	1	7.7	0.2	
Full-time Status	1,986	1,534	77.2	452	22.8	100.0	.000
Full-time	1,616	1,303	80.6	313	19.4	69.2	
Part-time	370	231	62.4	139	37.6	30.8	
Major Declared	1,986	1,534	77.2	452	22.8	100.0	.000
Major Declared	1,789	1,339	74.8	450	25.2	99.6	
Non-degree	197	195	99.0	2	1.0	0.4	
Undeclared	0	0	0.0	0	0.0	0.0	
Degree Type	1,986	1,534	77.2	452	22.8	100.0	.000[‖]
Unknown	6	3	50.0	3	50.0	0.7	
AA	993	756	76.1	237	23.9	52.4	
AS	303	223	73.6	80	26.4	17.7	
AAS	316	236	74.7	80	25.3	17.7	
AAT	116	86	74.1	30	25.9	6.6	
Non-degree seeking	197	195	99.0	2	1.0	0.4	
Certificate	55	35	63.6	20	36.4	4.4	
Undeclared	0	0	0.0	0	0.0	0.0	
Declared Major was Cancelled	1,986	1,534	77.2	452	22.8	100.0	.000
Major was not cancelled	1,892	1,476	78.0	416	22.0	92.0	
Major was cancelled	94	58	61.7	36	38.3	8.0	
Undeclared	0	0	0.0	0	0.0	0.0	
Enrolled in Dev. Math Course	1,986	1,534	77.2	452	22.8	100.0	.965
No	212	164	77.4	48	22.6	10.6	
Yes	1,774	1,370	77.2	404	22.8	89.4	
Dev. Math Course Number enrolled	1,986	1,534	77.2	452	22.8	100.0	.000
Did not enroll in a dev. math course	212	164	77.4	48	22.6	10.6	
MATH 040	409	305	74.6	104	25.4	23.0	
MATH 050	375	292	77.9	83	22.1	18.4	
MATH 060	241	169	70.1	72	29.9	15.9	
MATH 070	171	127	74.3	44	25.7	9.7	
MATH 090 (91+92)	169	125	74.0	44	26.0	9.7	
MATH 100	409	352	86.1	57	13.9	12.6	
Enrolled in Dev. English Course (ENGL 100)	1,986	1,534	77.2	452	22.8	100.0	.535
No	1,543	1,187	76.9	356	23.1	78.8	
Yes	443	347	78.3	96	21.7	21.2	
Enrolled in Dev. Reading Course	1,986	1,534	77.2	452	22.8	100.0	.065
No	1,409	1,104	78.4	305	21.6	67.5	
Yes	577	430	74.5	147	25.5	32.5	
Dev. Reading Course Number enrolled	1,986	1,534	77.2	452	22.8	100.0	.101
Did not enroll in dev. reading course	1,409	1,104	78.4	305	21.6	67.5	
LOC 040	92	61	66.3	31	33.7	6.9	
LOC 050	124	93	75.0	31	25.0	6.9	
LOC 090	180	138	76.7	42	23.3	9.3	
LOC 100	181	138	76.2	43	23.8	9.5	

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
Enrolled in Dev. Comm. Course (COMM 040)	1,986	1,534	77.2	452	22.8	100.0	.025
No	1,569	1,229	78.3	340	21.7	75.2	
Yes	417	305	73.1	112	26.9	24.8	
Number of Dev. Courses Enrolled	1,986	1,534	77.2	452	22.8	100.0	.244¶
1	1,129	890	78.8	239	21.2	52.9	
2	505	381	75.4	124	24.6	27.4	
3	336	252	75.0	84	25.0	18.6	
4	16	11	68.8	5	31.3	1.1	
First Four Weeks Performance							
Total Credit Hours Attempted	1,986	1,534	77.2	452	22.8	100.0	.000#
0	0	0	0.0	0	0.0	0.0	
1-3	16	5	31.3	11	68.8	2.4	
4-6	**84**	**36**	**42.9**	**48**	**57.1**	**10.6**	
7-9	167	115	68.9	52	31.1	11.5	
10-12	632	489	77.4	143	22.6	31.6	
13-15	934	756	80.9	178	19.1	39.4	
16-18	148	129	87.2	19	12.8	4.2	
19+	5	4	80.0	1	20.0	0.2	
Total Credit Hours Attempted 2	1,986	1,534	77.2	452	22.8	100.0	.000
7 or more	1,886	1,493	79.2	393	20.8	86.9	
6 or fewer	**100**	**41**	**41.0**	**59**	**59.0**	**13.1**	
Majority of credit hours attempted were dev.	1,986	1,534	77.2	452	22.8	100.0	.000**
No credit hours were attempted	0	0	0.0	0	0.0	0.0	
Only college-level credit hours attempted	105	70	66.7	35	33.3	7.7	
Majority of credit hours attempted were college-level	1,477	1,178	79.8	399	20.2	66.2	
Equal number of developmental and college-level credit hours were attempted	114	84	73.7	30	26.3	6.6	
Majority of credit hours attempted were developmental	282	199	70.6	83	29.4	18.4	
Only developmental credit hours attempted	8	3	37.5	5	62.5	1.1	
First Semester Performance							
Total credits earned	1,986	1,534	77.2	452	22.8	100.0	.000††
0	**219**	**25**	**11.4**	**194**	**88.6**	**42.9**	
1-3	**136**	**62**	**45.6**	**74**	**54.4**	**16.4**	
4-6	179	123	69.1	55	30.9	12.2	
7-9	318	262	82.4	56	17.6	12.4	
10-12	554	511	92.2	43	7.8	9.5	
13-15	515	486	94.4	29	5.6	6.4	
16-18	64	63	98.4	1	1.6	0.2	
19+	2	2	100.0	0	0.0	0.0	
Total credits earned 2	1,986	1,534	77.2	452	22.8	100.0	.000
7 or more	1,453	1,324	91.1	129	8.9	28.5	
6 or fewer	**533**	**210**	**39.4**	**323**	**60.6**	**71.5**	
Majority of credits earned were developmental	1,986	1,534	77.2	452	22.8	100.0	.000
No credits were earned	219	25	11.4	194	88.6	42.9	
Only college-level credits were earned	406	295	72.7	111	27.3	24.6	
Majority of credits earned were college-level	1,026	941	91.7	85	8.3	18.8	
Equal number of developmental and college-level credits were earned	89	75	84.3	14	15.7	3.1	
Majority of credits earned were developmental	210	181	86.2	29	13.8	6.4	
Only developmental credits were earned	36	17	47.2	19	52.8	4.2	

*One cell (5.6%) had expected count less than five.

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
†Three cells (16.7%) had expected counts less than five.							
‡Two cells (20.0%) had expected counts less than five.							
§ One cell (8.3%) had expected count less than five.							
‖Two cells (14.3%) had expected counts less than five.							
¶One cell (12.5%) had expected count less than five.							
#Three cells (21.4%) had expected counts less than five.							
**One cell (10.0%) had expected count less than five.							
††Two cells (12.5%) had expected counts less than five.							

Appendix N: Model 1 Logistic Regression for Cases with a Known High School Grad Type

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95%C.I. Lower	95%C.I. Upper
Cohort Year								
2012			3.222	2	.200			
2013	-.196	.150	1.703	1	.192	.822	.613	1.103
2014	-.258	.147	3.070	1	.080	.772	.579	1.031
Age Group								
18-19			20.802	8	.008			
Under 18	.047	.334	.020	1	.888	1.048	.545	2.016
20-21	.172	.234	.539	1	.463	1.188	.750	1.881
22-24	-.526	.309	2.900	1	.089	.591	.323	1.083
25-29	-.694	.277	6.275	1	.012	.500	.290	.860
30-34	-.982	.398	6.088	1	.014	.375	.172	.817
35-39	-1.267	.482	6.911	1	.009	.282	.110	.724
40-49	-.744	.357	4.352	1	.037	.475	.236	.956
50-64	-.379	.563	.454	1	.500	.684	.227	2.062
Gender (male)	.188	.121	2.417	1	.120	1.207	.952	1.529
Race / Ethnicity								
White			10.023	8	.263			
American Indian or Alaska Native	.043	.365	.014	1	.907	1.043	.510	2.134
Asian	-.891	.646	1.905	1	.168	.410	.116	1.454
Black or African American	-.311	.416	.559	1	.455	.733	.325	1.655
Hispanics of any race	-.487	.217	5.056	1	.025	.614	.402	.939
Native Hawaiian or Other Pacific Islander	.653	.591	1.221	1	.269	1.922	.603	6.122
Nonresident Alien	-17.358	40192.970	.000	1	1.000	.000	.000	
Race and Ethnicity unknown	.476	.497	.917	1	.338	1.610	.608	
Two or more races	.003	.298	.000	1	.991	1.004	.559	1.800
First Generation (yes)	.283	.126	5.005	1	.025	1.327	1.036	1.700
Pell Recipient (no)	.599	.128	21.810	1	.000	1.821	1.416	2.342
Veteran (no)	1.271	.655	3.765	1	.052	3.565	.987	12.880
Single Parent (no)	.210	.152	1.907	1	.167	1.233	.916	1.660
Displaced Homemaker (yes)	.247	.484	.260	1	.610	1.280	.496	3.304
Migrant Student (no)	.351	.316	1.238	1	.266	1.421	.765	2.639
Pre-collegiate Academics								
High School Grad Type								
High School Diploma with Transcript			9.283	4	.054			
GED	.172	.231	.552	1	.457	1.187	.755	1.866
HiSET	1.540	.812	3.599	1	.058	4.666	.950	22.914
Homeschool diploma	-.812	.702	1.336	1	.248	.444	.112	1.759
High school diploma no transcript	-.685	.391	3.063	1	.080	.504	.234	1.085
High School GPA								
Missing / Unknown			22.772	5	.000			

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95%C.I. Lower	95%C.I. Upper
Greater than 4.0	-.781	.258	9.156	1	.002	.458	.276	.760
3.5-4.000	-1.057	.284	13.865	1	.000	.347	.199	.606
2.5-2.499	-.481	.177	7.384	1	.007	.618	.437	.875
1.5-2.499	-.087	.210	.172	1	.678	.917	.608	1.383
0.5-1.499	-1.211	1.077	1.265	1	.261	.298	.036	2.458
Enrollment								
Full-time Status (part-time)	.530	.169	9.833	1	.002	1.698	1.220	2.364
Major Declared (declared)								
Number of Developmental Courses Enrolled								
1			1.503	3	.682			
2	.041	.147	.079	1	.778	1.042	.781	1.390
3	.110	.218	.253	1	.615	1.116	.728	1.710
4	.751	.620	1.466	1	.226	2.119	.628	7.148
First Four Weeks Performance								
Credit Hours Attempted 2 (6 or fewer)	1.343	.283	22.521	1	.000	3.831	2.200	6.671
Majority of credit hours attempted were developmental								
Equal number attempted			1.287	4	.864			
Only college-level attempted	.193	.355	.295	1	.587	1.213	.605	2.432
Majority were college-level	-.063	.271	.054	1	.816	.939	.552	1.598
Majority were developmental	.009	.289	.001	1	.975	1.009	.573	1.777
Only developmental attempted	-.388	.856	.206	1	.650	.678	.127	3.628
Constant	-6.134	1.063	33.276	1	.000	.002		

Appendix O: Model 2 Descriptive Statistics – Frequencies and Percentages for Degree-Seeking Students

Variable	f	%
Demographic		
Cohort Year	1,872	100.0
2012	508	27.1
2013	639	34.1
2014	725	38.7
Age Group	1,872	100.0
Under 18	67	3.6
18-19	1,289	68.9
20-21	124	6.6
22-24	86	4.6
25-29	125	6.7
30-34	58	3.1
35-39	44	2.4
40-49	58	3.1
50-64	21	1.1
Gender	1,872	100.0
Female	1,138	60.8
Male	734	39.2
Race/ethnicity	1,872	100.0
American Indian or Alaska Native	50	2.7
Asian	31	1.7
Black or African American	43	2.3
Hispanic of any race	215	11.5
Native Hawaiian or Other Pacific Islander	14	0.7
Nonresident Alien	1	0.1
Race and Ethnicity unknown	23	1.2
Two or more races	68	3.6
White	1,427	76.2
First Generation Student	1,872	100.0
No	662	35.4
Yes	1,210	64.6
PELL recipient	1,872	100.0
No	586	31.3
Yes	1,286	68.7
Veteran	1,872	100.0
No	1,835	98.0
Yes	37	2.0
Single Parent	1,872	100.0
No	1,477	78.9
Yes	395	21.1

Variable	f	%
Displaced homemaker	1,872	100.0
No	1,844	98.5
Yes	28	1.5
Migrant Student	1,872	100.0
No	1,780	95.1
Yes	92	4.9
Pre-collegiate Academics		
High School Grad Type	1,872	100.0
Missing / Unknown	83	4.4
GED	217	11.6
HiSET	9	0.5
Homeschool Diploma	18	1.0
High School Diploma	51	2.7
High School Transcript	1,494	79.8
High School GPA	1,872	100.0
Missing / Unknown	584	31.2
>4	152	8.1
3.5-4.000	161	8.6
2.5-3.499	713	38.1
1.5-2.499	249	13.3
0.5-1.499	13	0.7
0.0-0.499	0	0.0
Enrollment		
Full-time Status	1,872	100.0
Full-time	1,486	79.4
Part-time	386	20.6
Major Declared	1,872	100.0
Declared	1,872	100.0
Non-degree Seeking	0	0.0
Undeclared	0	0.0
Degree Type	1,872	100.0
Unknown	6	0.3
AA (incl. general studies)	1,037	55.4
AS	312	16.7
AAS	334	17.8
AAT	124	6.6
Non-degree seeking	0	0.0
Certificate	59	3.2
Undeclared	0	0.0
Declared Major was Cancelled	1,872	100.0
No	1,776	94.9
Yes	96	5.1
Undeclared	0	0.0
Enrolled in Developmental Math Course	1,872	100.0
No	209	11.2

Variable	f	%
Yes	1,663	88.8
Developmental Math Course Number Enrolled	1,872	100.0
Did not enroll in a developmental math course	209	11.2
MATH 040	394	21.0
MATH 050	329	17.6
MATH 060	244	13.0
MATH 070	166	8.9
MATH 090 (91 + 92)	181	9.7
MATH 100	349	18.6
Enrolled in Developmental English Course (ENGL 100)	1,452	100.0
No	1,452	77.6
Yes	420	22.4
Enrolled in Developmental Reading Course	1,872	100.0
No	1,299	69.4
Yes	573	30.6
Developmental Reading Course Number Enrolled	1,872	100.0
Did not enroll in a developmental reading course	1,299	69.4
LOC 040	98	5.2
LOC 050	120	6.4
LOC 090	177	9.5
LOC100	178	9.5
Enrolled in Developmental Communications Course (COMM 040)	1,872	100.0
No	1,455	77.7
Yes	417	22.3
Number of Developmental Courses Enrolled	1,872	100.0
1	1,039	55.5
2	481	25.7
3	336	17.9
4	16	0.9
<u>First Four Weeks Performance</u>		
Total Credit Hours Attempted	1,872	100.0
0	0	0.0
1-3	18	1.0
4-6	93	5.0
7-9	176	9.4
10-12	599	32.0
13-15	854	45.6
16-18	127	6.8
19+	5	0.3
Total Credit Hours Attempted 2	1,872	100.0
7 or more	1,761	94.1
6 or fewer	111	5.9
Majority of credit hours attempted were developmental	1,872	100.0
No credit hours were attempted	0	0.0
Only college-level credit hours were attempted	98	5.2

Variable	f	%
Majority of credit hours attempted were college-level	1,370	73.2
Equal number of developmental and college-level credit hours were attempted	106	5.7
Majority of credit hours attempted were developmental	287	15.3
Only developmental credit hours were attempted	11	0.6
First Semester Performance		
Total credits earned	1,872	100.0
0	247	13.2
1-3	144	7.7
4-6	185	9.9
7-9	314	16.8
10-12	498	26.6
13-15	433	23.1
16-18	49	2.6
19+	2	0.1
Total credits earned 2	1,872	100.0
7 or more	1,296	69.2
6 or fewer	576	30.8
Majority of Credits Earned were Developmental	1,872	100.0
No credits were earned	247	13.2
Only college-level credits were earned	391	20.9
Majority of credits earned were college-level	905	48.3
Equal number of developmental and college-level credits were earned	82	4.4
Majority of credits earned were developmental	207	11.1
Only developmental credits were earned	40	2.1
Student reenrolled	1,872	100.0
Yes	1,373	73.3
No	499	26.7

Appendix P: Model 2 Tests for Association – Students Who Did and Did Not Reenroll for Degree-seeking Students

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
Demographics							
Cohort Year	1,872	1,373	73.3	499	26.7	100.0	.052
2012	508	352	69.3	156	30.7	31.3	
2013	639	480	75.1	159	24.9	31.9	
2014	725	541	74.6	184	25.4	36.9	
Age	1,872	1,373	73.3	499	26.7	100.0	.005
Under 18	67	45	67.2	22	32.8	4.4	
18-19	1,289	958	74.3	331	25.7	66.3	
20-21	124	72	58.1	52	41.9	10.4	
22-24	86	64	74.4	22	25.6	4.4	
25-29	125	94	75.2	31	24.8	6.2	
30-34	58	47	81.0	11	19.0	2.2	
35-39	44	37	84.1	7	15.9	1.4	
40-49	58	42	72.4	16	27.6	3.2	
50-64	21	14	66.7	7	33.3	1.4	
Gender	1,872	1,373	73.3	499	26.7	100.0	.009
Female	1,138	859	75.5	279	24.5	55.9	
Male	734	514	70.0	220	30.0	44.1	
Race/Ethnicity	1,872	1,373	73.3	499	26.7	100.0	.183*
American Indian or Alaska Native	50	38	76.0	12	24.0	2.4	
Asian	31	26	83.9	5	16.1	1.0	
Black or African American	43	32	74.4	11	25.6	2.2	
Hispanic of any race	215	173	80.5	42	19.5	8.4	
Native Hawaiian or Other Pacific Islander	14	9	64.3	5	35.7	1.0	
Nonresident Alien	1	1	100.0	0	0.0	0.0	
Race and Ethnicity unknown	23	14	60.9	9	39.1	1.8	
Two or more races	68	48	70.6	20	29.4	4.0	
White	1,427	1,032	72.3	395	27.7	79.2	
First Generation Student	1,872	1,373	73.3	499	26.7	100.0	.072
No	662	502	75.8	160	24.2	32.1	
Yes	1,210	871	72.0	339	28.0	67.9	
Pell Recipient	1,872	1,373	73.3	499	26.7	100.0	.000
No	586	369	63.0	217	37.0	43.5	
Yes	1,286	1,004	78.1	282	21.9	56.5	
Veteran	1,872	1,373	73.3	499	26.7	100.0	.484
No	1,835	1,344	73.2	491	26.8	98.4	
Yes	37	29	78.4	8	21.6	1.6	
Single Parent	1,872	1,373	73.3	499	26.7	100.0	.187
No	1,477	1,073	72.6	404	27.4	81.0	
Yes	395	300	75.9	95	24.1	19.0	
Displaced Homemaker	1,872	1,373	73.3	499	26.7	100.0	.508
No	1,844	1,354	73.4	490	26.6	98.2	
Yes	28	19	67.9	9	32.1	1.8	
Migrant Student	1,872	1,373	73.3	499	26.7	100.0	.274
No	1,780	1,301	73.1	479	26.9	96.0	
Yes	92	72	78.3	20	21.7	4.0	
Pre-collegiate Academics							
High School Grad Type	1,872	1,373	73.3	499	26.7	100.0	.000†

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
Missing / Unknown	83	34	41.0	49	59.0	9.8	
GED	217	154	71.0	63	29.0	12.6	
HiSET	9	3	33.3	6	66.7	1.2	
Homeschool Diploma	18	15	83.3	3	16.7	0.6	
High School Diploma	51	40	78.4	11	21.6	2.2	
High School Transcript	1,494	1,127	75.4	367	24.6	73.5	
High School GPA	1,872	1,373	73.3	499	26.7	100.0	.000‡
Missing / Unknown	584	382	65.4	202	34.6	40.5	
>4	152	121	79.6	31	20.4	6.2	
3.5-4.000	161	138	85.7	23	14.3	4.6	
2.5-3.499	713	549	77.0	164	23.0	32.9	
1.5-2.499	249	172	69.1	77	30.9	15.4	
0.5-1.499	13	11	84.6	2	15.4	0.4	
Full-time Status	1,872	1,373	73.3	499	26.7	100.0	.000
Full-time	1,486	1,147	77.2	339	22.8	67.9	
Part-time	386	226	58.5	160	41.5	32.1	
Major Declared	1,872	1,373	73.3	499	26.7	100.0	N/A
Major Declared	1,872	1,373	73.3	499	26.7	100.0	
Non-degree	0	0	0.0	0	0.0	0.0	
Undeclared	0	0	0.0	0	0.0	0.0	
Degree Type	1,872	1,373	73.3	499	26.7	100.0	.116†
Unknown	6	3	50.0	3	50.0	0.6	
AA	1,037	775	74.7	262	25.3	52.5	
AS	312	226	72.4	86	27.6	17.2	
AAS	334	243	72.8	91	27.2	18.2	
AAT	124	91	73.4	33	26.6	6.6	
Non-degree seeking	0	0	0.0	0	0.0	0.0	
Certificate	59	35	59.3	24	40.7	4.8	
Undeclared	0	0	0.0	0	0.0	0.0	
Declared Major was Cancelled	1,872	1,373	73.3	499	26.7	100.0	.003
Major was not cancelled	1,776	1,315	74.0	461	26.0	92.4	
Major was cancelled	96	58	60.4	38	39.6	7.6	
Undeclared	0	0	0.0	0	0.0	0.0	
Enrolled in Dev. Math Course	1,872	1,373	73.3	499	26.7	100.0	.380
No	209	148	70.8	61	29.2	12.2	
Yes	1,663	1,225	73.7	438	26.3	87.8	
Dev. Math Course Number enrolled	1,872	1,373	73.3	499	26.7	100.0	.005
Did not enroll in a dev. math course	209	148	70.8	61	29.2	12.2	
MATH 040	394	282	71.6	112	28.4	22.4	
MATH 050	329	242	73.6	87	26.4	17.4	
MATH 060	244	166	68.0	78	32.0	15.6	
MATH 070	166	117	70.5	49	29.5	9.8	
MATH 090 (91+92)	181	132	72.9	49	27.1	9.8	
MATH 100	349	286	81.9	63	18.1	12.6	
Enrolled in Dev. English Course (ENGL 100)	1,872	1,373	73.3	499	26.7	100.0	.798
No	1,452	1,067	73.5	385	26.5	77.2	
Yes	420	306	72.9	114	27.1	22.8	
Enrolled in Dev. Reading Course	1,872	1,373	73.3	499	26.7	100.0	.133
No	1,299	966	74.4	333	25.6	66.7	
Yes	573	407	71.0	166	29.0	33.3	
Dev. Reading Course Number enrolled	1,872	1,373	73.3	499	26.7	100.0	.137
Did not enroll in dev. reading course	1,299	966	74.4	333	25.6	66.7	
LOC 040	98	61	62.2	37	37.8	7.4	
LOC 050	120	88	73.3	32	26.7	6.4	
LOC 090	177	128	72.3	49	27.7	9.8	

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
LOC 100	178	130	73.0	48	27.0	9.6	
Enrolled in Dev. Comm. Course (COMM 040)	1,872	1,373	73.3	499	26.7	100.0	.013
No	1,455	1,087	74.7	368	25.3	73.7	
Yes	417	286	68.6	131	31.4	26.3	
Number of Dev. Courses Enrolled	1,872	1,373	73.3	499	26.7	100.0	.094[§]
1	1,039	782	75.3	257	24.7	51.5	
2	481	340	70.7	141	29.3	28.3	
3	336	242	72.0	94	28.0	18.8	
4	16	9	56.3	7	43.8	1.4	
First Four Weeks Performance							
Total Credit Hours Attempted	1,872	1,373	73.3	499	26.7	100.0	.000[‖]
0	0	0	0.0	0	0.0	0.0	
1-3	18	5	27.8	13	72.2	2.6	
4-6	93	36	38.7	57	61.3	11.4	
7-9	176	112	63.6	64	36.4	12.8	
10-12	599	443	74.0	156	26.0	31.3	
13-15	854	666	78.0	188	22.0	37.7	
16-18	127	107	84.3	20	15.7	4.0	
19+	5	4	80.0	1	20.0	0.2	
Total Credit Hours Attempted 2	1,872	1,373	73.3	499	26.7	100.0	.000
7 or more	1,761	1,332	75.6	429	24.4	86.0	
6 or fewer	111	41	36.9	70	63.1	14.0	
Majority of credit hours attempted were dev.	1,872	1,373	73.3	499	26.7	100.0	.000[¶]
No credit hours were attempted	0	0	0.0	0	0.0	0.0	
Only college-level credit hours attempted	98	60	61.2	38	38.8	7.6	
Majority of credit hours attempted were college-level	1,370	1,045	76.3	325	23.7	65.1	
Equal number of developmental and college-level credit hours were attempted	106	72	67.9	34	32.1	6.8	
Majority of credit hours attempted were developmental	287	193	67.2	94	32.8	18.8	
Only developmental credit hours attempted	11	3	27.3	8	72.7	1.6	
First Semester Performance							
Total credits earned	1,872	1,373	73.3	499	26.7	100.0	.000[#]
0	247	25	10.1	222	89.9	44.5	
1-3	144	63	43.8	81	56.3	16.2	
4-6	185	124	67.0	61	33.0	12.2	
7-9	314	256	81.5	58	18.5	11.6	
10-12	498	454	91.2	44	8.8	8.8	
13-15	433	401	92.6	32	7.4	6.4	
16-18	49	48	98.0	1	2.0	0.2	
19+	2	2	100.0	0	0.0	0.0	
Total credits earned 2	1,872	1,373	73.3	499	26.7	100.0	.000
7 or more	1,296	1,161	89.6	135	10.4	27.1	
6 or fewer	576	212	36.8	364	63.2	72.9	
Majority of credits earned were developmental	1,872	1,373	73.3	499	26.7	100.0	.000
No credits were earned	247	25	10.1	222	89.9	44.5	
Only college-level credits were earned	391	274	70.1	117	29.9	23.4	
Majority of credits earned were college-level	905	816	90.2	89	9.8	17.8	
Equal number of developmental and college-level credits were earned	82	66	80.5	16	19.5	3.2	
Majority of credits earned were developmental	207	175	84.5	32	15.5	6.4	
Only developmental credits were earned	40	17	42.5	23	57.5	4.6	

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
*One cell (5.6%) had expected count less than five.							
†Three cells (16.7%) had expected counts less than five.							
‡Two cells (20.0%) had expected counts less than five.							
§ One cell (8.3%) had expected count less than five.							
‖Two cells (14.3%) had expected counts less than five.							
¶One cell (12.5%) had expected count less than five.							
#Three cells (21.4%) had expected counts less than five.							
**One cell (10.0%) had expected count less than five.							
††Two cells (12.5%) had expected counts less than five.							

Appendix Q: Model 2 Logistic Regression for Degree-seeking Students

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95%C.I. Lower	95%C.I. Upper
Cohort Year								
2012			3.894	2	.143			
2013	-.228	.148	2.387	1	.122	.796	.596	1.063
2014	-.270	.143	3.542	1	.060	.764	.577	1.011
Age Group								
18-19			21.727	8	.005			
Under 18	.060	.318	.035	1	.851	1.062	.569	1.979
20-21	.260	.223	1.367	1	.242	1.297	.839	2.007
22-24	-.430	.299	2.061	1	.151	.651	.362	1.170
25-29	-.526	.258	4.164	1	.041	.591	.356	.979
30-34	-1.015	.389	6.803	1	.009	.362	.169	.777
35-39	-1.165	.462	6.362	1	.012	.312	.126	.771
40-49	-.837	.355	5.551	1	.018	.433	.216	.869
50-64	-.317	.534	.353	1	.552	.728	.255	2.074
Gender (male)	.207	.119	3.025	1	.082	1.230	.974	1.552
Race / Ethnicity								
White			13.208	8	.105			
American Indian or Alaska Native	.056	.356	.025	1	.875	1.058	.527	2.123
Asian	-.877	.580	2.287	1	.130	.416	.134	1.296
Black or African American	-.372	.396	.883	1	.347	.689	.317	1.498
Hispanics of any race	-.578	.213	7.347	1	.007	.561	.369	.852
Native Hawaiian or Other Pacific Islander	.690	.594	1.350	1	.245	1.993	.623	6.381
Nonresident Alien	-22.032	40192.970	.000	1	1.000	.000	.000	.
Race and Ethnicity unknown	.453	.471	.928	1	.335	1.574	.625	3.959
Two or more races	.016	.290	.003	1	.956	1.016	.575	1.795
First Generation (yes)	.343	.124	7.617	1	.006	1.409	1.104	1.797
Pell Recipient (no)	.687	.125	30.242	1	.000	1.987	1.104	1.797
Veteran (no)	.642	.467	1.886	1	.170	1.900	.760	4.747
Single Parent (no)	.173	.148	1.368	1	.242	1.189	.890	1.590
Displaced Homemaker (yes)	.253	.463	.298	1	.585	1.288	.520	3.190
Migrant Student (no)	.389	.307	1.606	1	.205	1.476	.808	2.694
Pre-collegiate Academics								
High School Grad Type								
High School Diploma with Transcript			25.625	5	.000			
Missing / Unknown	1.095	.275	15.829	1	.000	2.989	1.743	5.127
GED	.088	.225	.153	1	.695	1.092	.702	1.699
HiSET	1.490	.809	3.394	1	.065	4.437	.909	21.652
Homeschool diploma	-.801	.701	1.305	1	.253	.449	.114	1.774
High school diploma no transcript	-.731	.389	3.520	1	.061	.482	.225	1.033
High School GPA								
Missing / Unknown			24.006	5	.000			

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95%C.I. Lower	95%C.I. Upper
Greater than 4.0	-.816	.253	10.412	1	.001	.442	.269	.726
3.5-4.000	-1.058	.277	14.551	1	.000	.347	.202	.598
2.5-2.499	-.558	.170	10.730	1	.001	.573	.410	.799
1.5-2.499	-.189	.204	.861	1	.354	.827	.555	1.235
0.5-1.499	-1.173	.963	1.486	1	.223	.309	.047	2.041
Enrollment								
Full-time Status (part-time)	.534	.164	10.546	1	.001	1.705	1.236	2.353
Number of Developmental Courses Enrolled								
1			2.259	3	.520			
2	.092	.143	.409	1	.522	1.096	.828	1.452
3	.142	.214	.439	1	.508	1.152	.758	1.751
4	.876	.611	2.057	1	.152	2.401	.725	7.948
First Four Weeks Performance								
Credit Hours Attempted 2 (6 or fewer)	1.260	.275	20.986	1	.000	3.527	2.057	6.048
Majority of credit hours attempted were developmental								
Equal number attempted			1.484	4	.830			
Only college-level attempted	.188	.347	.295	1	.587	1.207	.612	2.381
Majority were college-level	-.105	.262	.161	1	.689	.900	.539	1.504
Majority were developmental	-.056	.280	.040	1	.841	.945	.546	1.637
Only developmental attempted	-.226	.820	.076	1	.783	.798	.160	3.983
Constant	-2.212	.652	11.507	1	.001	.109		

Appendix R: Model 3 Descriptive Statistics – Frequencies and Percentages for Degree-Seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours

Variable	f	%
Demographic		
Cohort Year	1,691	100.0
2012	439	26.0
2013	602	35.6
2014	650	38.4
Age Group	1,691	100.0
Under 18	56	3.3
18-19	1,211	71.6
20-21	98	5.8
22-24	74	4.4
25-29	103	6.1
30-34	46	2.7
35-39	40	2.4
40-49	45	2.7
50-64	18	1.1
Gender	1,691	100.0
Female	1,030	60.9
Male	661	39.1
Race/ethnicity	1,691	100.0
American Indian or Alaska Native	48	2.8
Asian	28	1.7
Black or African American	36	2.1
Hispanic of any race	180	11.2
Native Hawaiian or Other Pacific Islander	14	0.8
Nonresident Alien	0	0.0
Race and Ethnicity unknown	20	1.2
Two or more races	63	3.7
White	1,292	76.4
First Generation Student	1,691	100.0
No	604	35.7
Yes	1,087	64.3
PELL recipient	1,691	100.0
No	500	29.6
Yes	1,191	70.4
Veteran	1,691	100.0
No	1,662	98.3
Yes	29	1.7
Single Parent	1,691	100.0
No	1,340	79.2

Variable	f	%
Yes	351	20.8
Displaced homemaker	1,691	100.0
No	1,668	98.6
Yes	23	1.4
Migrant Student	1,691	100.0
No	1,614	95.4
Yes	77	4.6
Pre-collegiate Academics		
High School Grad Type	1,691	100.0
Missing / Unknown	0	0.0
GED	205	12.1
HiSET	6	0.4
Homeschool Diploma	17	1.0
High School Diploma	44	2.6
High School Transcript	1,419	83.9
High School GPA	1,691	100.0
Missing / Unknown	482	28.5
>4	140	8.3
3.5-4.000	156	9.2
2.5-3.499	675	39.9
1.5-2.499	227	13.4
0.5-1.499	11	0.7
0.0-0.499	0	0.0
Enrollment		
Full-time Status	1,691	100.0
Full-time	1,429	84.5
Part-time	262	15.5
Major Declared	1,691	100.0
Declared	1,691	100.0
Non-degree Seeking	0	0.0
Undeclared	0	0.0
Degree Type	1,691	100.0
Unknown	6	0.4
AA (incl. general studies)	951	56.2
AS	275	16.3
AAS	297	17.6
AAT	112	6.6
Non-degree seeking	0	0.0
Certificate	50	3.0
Undeclared	0	0.0
Declared Major was Cancelled	1,691	100.0
No	1,602	94.7
Yes	89	5.3
Undeclared	0	0.0

Variable	f	%
Enrolled in Developmental Math Course	1,691	100.0
No	171	10.1
Yes	1,520	89.9
Developmental Math Course Number Enrolled	1,691	100.0
Did not enroll in a developmental math course	171	10.1
MATH 040	352	20.8
MATH 050	303	17.9
MATH 060	226	13.4
MATH 070	153	9.0
MATH 090 (91 + 92)	158	9.3
MATH 100	328	19.4
Enrolled in Developmental English Course (ENGL 100)	1,691	100.0
No	1,310	77.5
Yes	381	22.5
Enrolled in Developmental Reading Course	1,691	100.0
No	1,184	70.0
Yes	507	30.0
Developmental Reading Course Number Enrolled	1,691	100.0
Did not enroll in a developmental reading course	1,184	70.0
LOC 040	84	5.0
LOC 050	101	6.0
LOC 090	162	9.6
LOC100	160	9.5
Enrolled in Developmental Communications Course (COMM 040)	1,691	100.0
No	1,329	78.6
Yes	362	21.4
Number of Developmental Courses Enrolled	1,691	100.0
1	947	56.0
2	423	25.0
3	307	18.2
4	14	0.8
First Four Weeks Performance		
Total Credit Hours Attempted	1,691	100.0
0	0	0.0
1-3	0	0.0
4-6	0	0.0
7-9	162	9.6
10-12	574	33.9
13-15	825	48.8
16-18	125	7.4
19+	5	0.3
Total Credit Hours Attempted 2	1,691	100.0
7 or more	1,691	100.0
6 or fewer	0	0.0
Majority of credit hours attempted were developmental	1,691	100.0

Variable	f	%
No credit hours were attempted	0	0.0
Only college-level credit hours were attempted	71	4.2
Majority of credit hours attempted were college-level	1,295	76.6
Equal number of developmental and college-level credit hours were attempted	85	5.0
Majority of credit hours attempted were developmental	240	14.2
Only developmental credit hours were attempted	0	0.0
First Semester Performance		
Total credits earned	1,691	100.0
0	176	10.4
1-3	119	7.0
4-6	136	8.0
7-9	308	18.2
10-12	485	28.7
13-15	417	24.7
16-18	48	2.8
19+	2	0.1
Total credits earned 2	1,691	100.0
4 or more	1,396	82.6
3 or fewer	295	17.4
Majority of Credits Earned were Developmental	1,691	100.0
No credits were earned	176	10.4
Only college-level credits were earned	362	21.4
Majority of credits earned were college-level	870	51.4
Equal number of developmental and college-level credits were earned	73	4.3
Majority of credits earned were developmental	181	10.7
Only developmental credits were earned	29	1.7
Student reenrolled	1,691	100.0
Yes	1,299	76.8
No	392	23.2

Appendix S: Model 3 Tests for Association – Students Who Did and Did Not Reenroll for Degree-Seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
Demographics							
Cohort Year	1,691	1,299	76.8	392	23.2	100.0	.193
2012	439	324	73.8	115	26.2	29.3	
2013	602	465	77.1	137	22.8	34.9	
2014	650	510	78.5	140	21.5	35.7	
Age	1,691	1,299	76.8	392	23.2	100.0	.296*
Under 18	56	42	75.0	14	25.0	3.6	
18-19	1,211	923	76.2	288	23.8	73.5	
20-21	98	67	68.4	31	31.6	7.9	
22-24	74	61	82.4	13	17.6	3.3	
25-29	103	85	82.5	18	17.5	4.6	
30-34	46	37	80.4	9	19.6	2.3	
35-39	40	34	85.0	6	15.0	1.5	
40-49	45	36	80.0	9	20.0	2.3	
50-64	18	14	77.8	4	22.2	1.0	
Gender	1,691	1,299	76.8	392	23.2	100.0	.063
Female	1,030	807	78.3	223	21.7	56.9	
Male	661	492	74.4	169	25.6	43.1	
Race/Ethnicity	1,691	1,299	76.8	392	23.2	100.0	.177†
American Indian or Alaska Native	48	37	77.1	11	22.9	2.8	
Asian	28	25	89.3	3	10.7	0.8	
Black or African American	36	28	77.8	8	22.2	2.0	
Hispanic of any race	190	158	83.2	32	16.8	8.2	
Native Hawaiian or Other Pacific Islander	14	9	64.3	5	35.7	1.3	
Nonresident Alien	0	0	0.0	0	0.0	0.0	
Race and Ethnicity unknown	20	13	65.0	7	35.0	1.8	
Two or more races	63	47	74.6	16	25.4	4.1	
White	1,292	982	76.0	310	24.0	79.1	
First Generation Student	1,691	1,299	76.8	392	23.2	100	.185
No	604	475	78.6	129	21.4	32.9	
Yes	1,087	824	75.8	263	24.2	67.1	
Pell Recipient	1,691	1,299	76.8	392	23.2	100.0	.000
No	500	348	69.6	152	30.4	38.8	
Yes	1,191	951	79.8	240	20.2	61.2	
Veteran	1,691	1,299	76.8	392	23.2	100.0	.098
No	1,662	1,273	76.6	389	23.4	99.2	
Yes	29	26	89.7	3	10.3	0.8	
Single Parent	1,691	1,299	76.8	392	23.2	100.0	.141
No	1,019	76.0	78.4	321	24.0	81.9	
Yes	351	280	79.8	71	20.2	18.1	
Displaced Homemaker	1,691	1,299	76.8	392	23.2	100.0	.740
No	1,668	1,282	76.9	386	23.1	98.5	
Yes	23	17	73.9	6	26.1	1.5	
Migrant Student	1,691	1,299	76.8	392	23.2	100.0	.106
No	1,614	1,234	76.5	380	23.5	96.9	
Yes	77	65	84.4	12	15.6	3.1	

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
Pre-collegiate Academics							
High School Grad Type	1,291	1,299	76.8	392	23.2	100.0	.188‡
Missing / Unknown	0	0	0.0	0	0.0	0.0	
GED	205	151	73.9	54	26.3	13.8	
HiSET	6	3	50.0	3	50.0	0.8	
Homeschool Diploma	17	15	88.2	2	11.8	0.5	
High School Diploma	44	37	84.1	7	15.9	1.8	
High School Transcript	1,419	1,093	77.0	326	23.0	83.2	
High School GPA	1,691	1,299	76.8	392	23.2	100.0	.001§
Missing / Unknown	482	350	72.6	132	27.4	33.7	
>4	140	113	80.7	27	19.3	6.9	
3.5-4.000	156	137	87.8	19	12.2	4.8	
2.5-3.499	675	526	77.9	149	22.1	38.0	
1.5-2.499	227	163	71.8	64	28.2	16.3	
0.5-1.499	11	10	90.9	1	9.1	0.3	
Full-time Status	1,691	1,299	76.8	392	23.2	100.0	.001
Full-time	1,429	1,118	78.2	311	21.8	79.3	
Part-time	262	181	69.1	81	30.9	20.7	
Major Declared	1,691	1,299	76.8	392	23.2	100.0	N/A
Major Declared	1,691	1,299	76.8	392	23.2	100.0	
Non-degree	0	0	0.0	0	0.0	0.0	
Undeclared	0	0	0.0	0	0.0	0.0	
Degree Type	1,691	1,299	76.8	392	23.2	100.0	.323‖
Unknown	6	3	50.0	3	50.0	.08	
AA	951	738	77.6	213	22.4	54.3	
AS	275	212	77.1	63	22.9	16.1	
AAS	297	230	77.4	67	22.6	17.1	
AAT	112	82	73.2	30	26.8	7.7	
Non-degree seeking	0	0	0.0	0	0.0	0.0	
Certificate	50	34	68.0	16	32.0	4.1	
Undeclared	0	0	0.0	0	0.0	0.0	
Declared Major was Cancelled	1,691	1,299	76.8	392	23.2	100.0	.007
Major was not cancelled	1,602	1,241	77.5	361	22.5	92.1	
Major was cancelled	89	58	65.2	31	34.8	7.9	
Undeclared	0	0	0.0	0	0.0	0.0	
Enrolled in Dev. Math Course	1,691	1,299	76.8	392	23.2	100.0	.375
No	171	136	79.5	35	20.5	8.9	
Yes	1,520	1,163	76.5	357	23.5	91.1	
Dev. Math Course Number enrolled	1,691	1,299	76.8	392	23.2	100.0	.010
Did not enroll in a dev. math course	171	136	79.5	35	20.5	8.9	
MATH 040	352	263	74.7	89	25.3	22.7	
MATH 050	303	229	75.6	74	24.4	18.9	
MATH 060	226	162	71.7	64	28.3	16.3	
MATH 070	153	114	74.5	39	25.5	9.9	
MATH 090 (91+92)	158	118	74.7	40	25.3	10.2	
MATH 100	328	277	84.5	51	15.5	13.0	
Enrolled in Dev. English Course (ENGL 100)	1,691	1,299	76.8	392	23.2	100.0	.749
No	1,310	1,004	76.6	306	23.4	78.1	
Yes	381	295	77.4	86	22.6	21.9	
Enrolled in Dev. Reading Course	1,691	1,299	76.8	392	23.2	100.0	.287
No	1,184	918	77.5	266	22.5	67.9	
Yes	507	381	75.1	126	24.9	32.1	
Dev. Reading Course Number enrolled	1,691	1,299	76.8	392	23.2	100.0	.325

Variable	n	Did reenroll		Did not reenroll		Did not reenroll % of total	*p*
		#	%	#	%		
Did not enroll in dev. reading course	1,184	918	77.5	266	22.5	67.9	
LOC 040	84	57	67.9	27	32.1	6.9	
LOC 050	101	80	79.2	21	20.8	6.4	
LOC 090	162	123	75.9	39	24.1	9.9	
LOC 100	160	121	75.6	39	24.1	9.9	
Enrolled in Dev. Comm. Course (COMM 040)	1,691	1,299	76.8	392	23.2	100.0	.157
No	1,329	1,031	77.6	298	22.4	76.0	
Yes	362	268	74.0	94	26.0	24.0	
Number of Dev. Courses Enrolled	1,691	1,299	76.8	392	23.2	100.0	.415[¶]
1	947	739	78.0	208	22.0	53.1	
2	423	321	75.9	102	24.1	26.0	
3	307	230	74.9	77	25.1	19.6	
4	14	9	64.3	5	35.7	1.3	
First Four Weeks Performance							
Total Credit Hours Attempted	1,691	1,299	76.8	392	23.2	100.0	.007[#]
0	0	0	0.0	0	0.0	0.0	
1-3	0	0	0.0	0	0.0	0.0	
4-6	0	0	0.0	0	0.0	0.0	
7-9	162	110	67.9	52	32.1	13.3	
10-12	574	431	75.1	143	24.9	36.5	
13-15	825	648	78.5	177	21.5	45.2	
16-18	125	106	84.8	19	15.2	4.8	
19+	5	4	80.0	1	20.0	0.3	
Total Credit Hours Attempted 2	1,691	1,299	76.8	392	23.2	100.0	N/A
7 or more	1,691	1,299	76.8	392	23.2	100.0	
6 or fewer	0	0	0.0	0	0.0	0.0	
Majority of credit hours attempted were dev.	1,691	1,299	76.8	392	23.2	100.0	.166
No credit hours were attempted	0	0	0.0	0	0.0	0.0	
Only college-level credit hours attempted	71	54	76.1	17	23.9	4.3	
Majority of credit hours attempted were college-level	1,295	1,009	77.9	286	22.1	73.0	
Equal number of developmental and college-level credit hours were attempted	85	65	76.5	20	23.5	5.1	
Majority of credit hours attempted were developmental	240	171	71.3	69	28.7	17.6	
Only developmental credit hours attempted	0	0	0.0	0	0.0	0.0	
First Semester Performance							
Total credits earned	1,691	1,299	76.8	392	23.2	100.0	.000[†]
0	176	25	14.2	151	85.8	38.5	
1-3	119	53	44.5	66	55.5	16.8	
4-6	136	90	66.2	46	33.8	11.7	
7-9	308	252	81.8	56	18.2	14.3	
10-12	485	442	91.1	43	8.9	11.0	
13-15	417	388	93.0	29	7.0	7.4	
16-18	48	47	97.9	1	2.1	0.3	
19+	2	2	100.0	0	0.0	0.0	
Total credits earned 2	1,691	1,299	76.8	392	23.2	100.0	.000
4 or more	1,396	1,221	87.5	175	12.5	44.6	
3 or fewer	295	78	26.4	217	73.6	55.4	
Majority of credits earned were developmental	1,691	1,299	76.8	392	23.2	100.0	.000

Variable	n	Did reenroll		Did not reenroll		Did not reenroll	*p*
		#	%	#	%	% of total	
No credits were earned	176	25	14.2	151	85.8	38.5	
Only college-level credits were earned	362	261	72.1	101	27.9	25.8	
Majority of credits earned were college-level	870	785	90.2	85	9.8	21.7	
Equal number of developmental and college-level credits were earned	73	60	82.2	13	17.8	3.3	
Majority of credits earned were developmental	181	156	86.2	25	13.8	6.4	
Only developmental credits were earned	29	12	41.4	17	58.6	4.3	

*One cell (5.6%) had expected count less than five.
†Two cells (12.5%) had expected counts less than five.
‡Three cells (30.0%) had expected counts less than five.
§One cell (8.3%) had expected count less than five.
‖Two cells (16.7%) had expected counts less than five.
¶One cell (12.5%) had expected count less than five.
#Two cells (20.0%) had expected counts less than five.

Appendix T: Model 3 Logistic Regression for Degree-Seeking Students with a Known High School Grad Type who Attempted Seven or More Credit Hours

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95%C.I. Lower	95%C.I. Upper
Cohort Year								
2012			3.612	2	.164			
2013	-.124	.183	.456	1	.499	.883	.617	1.266
2014	-.338	.183	3.397	1	.065	.713	.498	1.022
Age Group								
18-19			4.283	8	.831			
Under 18	-.142	.424	.111	1	.739	.868	.378	1.994
20-21	-.056	.306	.033	1	.855	.946	.519	1.724
22-24	-.439	.416	1.114	1	.291	.644	.285	1.457
25-29	-.218	.348	.394	1	.530	.804	.407	1.589
30-34	-.348	.488	.507	1	.477	.706	.271	1.840
35-39	-.639	.592	1.166	1	.280	.528	.165	1.684
40-49	-.212	.490	.188	1	.665	.809	.310	2.112
50-64	.658	.624	1.112	1	.292	1.931	.568	6.561
Gender (male)	.089	.149	.361	1	.548	1.093	.817	1.463
Race / Ethnicity								
White			5.233	7	.632			
American Indian or Alaska Native	-.401	.456	.773	1	.379	.670	.274	1.637
Asian	-.545	.711	.588	1	.443	.580	.144	2.336
Black or African American	-.260	.518	.252	1	.615	.771	.279	2.127
Hispanics of any race	-.305	.257	1.400	1	.237	.737	.445	1.221
Native Hawaiian or Other Pacific Islander	.251	.715	.124	1	.725	1.286	.317	5.222
Race and Ethnicity unknown	.793	.567	1.956	1	.162	2.210	.727	6.714
Two or more races	-.097	.374	.067	1	.796	.908	.436	1.888
First Generation (yes)	.256	.155	2.729	1	.099	1.292	.953	1.752
Pell Recipient (no)	.656	.157	17.573	1	.000	1.927	1.418	2.619
Veteran (no)	.950	.734	1.676	1	.195	2.585	.614	10.886
Single Parent (no)	.301	.190	2.516	1	.113	1.352	.931	1.962
Displaced Homemaker (yes)	.128	.642	.040	1	.842	1.137	.323	3.996
Migrant Student (no)	-.279	.358	.609	1	.435	.757	.375	1.525
Pre-collegiate Academics								
High School Grad Type								
High School Diploma with Transcript			4.886	4	.299			
GED	-.331	.292	1.290	1	.256	.718	.405	1.272
HiSET	.573	1.159	.244	1	.621	1.773	.183	17.178
Homeschool diploma	-1.022	.924	1.225	1	.268	.360	.059	2.199
High school diploma no transcript	-.872	.523	2.780	1	.095	.418	.150	1.165
High School GPA								
Missing / Unknown			7.259	5	.202			

Variable	β	S.E.	Wald	*df*	*p*	Odds Ratio	95%C.I. Lower	95%C.I. Upper
Greater than 4.0	-.748	.321	5.440	1	.020	.473	.252	.887
3.5-4.000	-.553	.324	2.904	1	.088	.575	.305	1.087
2.5-2.499	-.314	.217	2.105	1	.147	.730	.478	1.117
1.5-2.499	-.495	.272	3.323	1	.068	.609	.358	1.038
0.5-1.499	-.442	1.082	.167	1	.683	.643	.077	5.355
Enrollment								
Full-time Status (part-time)	.283	.209	1.838	1	.175	1.327	.881	1.999
Number of Developmental Courses Enrolled								
1			.972	3	.808			
2	-.120	.183	.428	1	.513	.887	.620	1.270
3	-.122	.284	.184	1	.668	.885	.507	1.544
4	.396	.751	.278	1	.598	1.486	.341	6.473
First Four Weeks Performance								
Majority of credit hours attempted were developmental								
Equal number attempted			1.778	3	.620			
Only college-level attempted	-.061	.488	.016	1	.901	.941	.361	2.450
Majority were college-level	-.337	.354	.905	1	.342	.714	.357	1.429
Majority were developmental	-.069	.378	.033	1	.855	.933	.445	1.957
Credits Earned 2 (6 or fewer)	3.028	.171	313.713	1	.000	20.664	14.780	28.891
Constant	-2.390	.921	6.730	1	.009	.092		

Appendix U: First Semester Performance Statistics for Characteristic 1: Missing / Unknown High School Grad Type

Variable	Missing / Unknown		Known	
	f	%	f	%
Major Declared	222	100.0	1,986	100.0
Major Declared	83	37.4	1,789	90.1
Non-degree	4	1.8	197	9.9
Undeclared	135	60.8	0	0.0
Developmental Math D or F Grade Earned	222	100.0	1,986	100.0
No	150	67.6	1,203	60.6
Yes	39	17.6	571	28.8
Did not take developmental math course	33	14.9	212	10.7
Developmental Math W or Dropped Grade Earned	222	100.0	1,986	100.0
No	70	31.5	1,537	77.4
Dropped	56	25.2	121	6.1
Withdrew	63	28.4	116	5.8
Did not take developmental math course	33	14.9	212	10.7
Developmental English D or F Grade Earned	222	100.0	1,986	100.0
No	41	18.5	361	18.2
Yes	8	3.6	82	4.1
Did not take developmental English course	173	77.9	1,543	77.7
Developmental English W or Dropped Grade Earned	222	100.0	1,986	100.0
No	17	7.7	365	18.4
Dropped	17	7.7	54	2.7
Withdrew	15	6.8	24	1.2
Did not take developmental English course	173	77.9	1,543	77.7
Developmental Reading D or F Grade Earned	222	100.0	1,986	100.0
No	68	30.6	435	21.9
Yes	15	6.8	141	7.1
Did not take developmental reading course	139	62.6	1,410	71.0
Developmental Reading W or Dropped Grade Earned	222	100.0	1,986	100.0
No	28	12.6	506	25.5
Dropped	29	13.1	53	2.7
Withdrew	26	11.7	17	0.9
Did not take developmental reading course	139	62.6	1,410	71.0
Developmental Communications D or F Grade Earned	222	100.0	1,986	100.0

Variable	Missing / Unknown		Known	
	f	%	f	%
No	44	19.8	316	15.9
Yes	14	6.3	101	5.1
Did not take developmental communications course	164	73.9	1,569	79.0
Developmental Communications W or Dropped Grade Earned	222	100.0	1,986	100.0
No	25	11.3	350	17.6
Dropped	20	9.0	51	2.6
Withdrew	13	5.9	16	0.8
Did not take developmental communications course	164	73.9	1,569	79.0
Total Credit Hours Attempted	222	100.0	1,986	100.0
0	43	19.4	0	0.0
1-3	3	1.4	16	0.8
4-6	20	9.0	84	4.2
7-9	23	10.4	167	8.4
10-12	62	27.9	632	31.8
13-15	64	28.8	934	47.0
16-18	7	3.2	148	7.5
19+	0	0.0	5	0.3
Total Credit Hours Attempted 2	222	100.0	1,986	100.0
7 or more	156	70.3	1,886	95.0
6 or fewer	66	29.7	100	5.0
Majority of credit hours attempted were dev.	222	100.0	1,986	100.0
No credit hours attempted	43	19.4	0	0.0
Only college-level credit hours attempted	18	8.1	105	5.3
Majority of credit hours attempted were college-level	118	53.2	1,477	74.4
Equal number of developmental and college-level credit hours were attempted	13	5.9	114	5.7
Majority of credit hours attempted were developmental	27	12.2	282	14.2
Only developmental credit hours attempted	3	1.4	8	0.4
Total Credits Earned	222	100.0	1,986	100.0
0	165	74.3	219	11.0
1-3	8	3.6	136	6.8
4-6	9	4.1	178	9.0
7-9	7	3.2	318	16.0
10-12	13	5.9	554	27.9
13-15	19	8.6	515	25.9
16-18	1	0.5	64	3.2

Variable	Missing / Unknown		Known	
	f	%	f	%
19+	0	0.0	2	0.1
Total Credits Earned 2	222	100.0	1,986	100.0
4 or more	49	22.3	1,631	82.1
3 or fewer	173	77.9	355	17.8
Majority of credits earned were developmental	222	100.0	1,986	100.0
No credits were earned	165	74.3	219	11.0
Only college-level credits earned	9	4.1	406	20.4
Majority of credits earned were college-level	31	14.0	1,026	51.7
Equal number of developmental and college-level credits were earned	4	1.8	89	4.5
Majority of credits earned were developmental	9	4.1	210	10.6
Only developmental credits were earned	4	1.8	36	1.8

Appendix V: First Semester Performance Statistics for Characteristic 2: Undeclared Major

Variable	Undeclared		Declared		Non-degree	
	f	%	f	%	f	%
High School Grad Type	135	100.0	1,872	100.0	135	100.0
Missing / Unknown	135	100.0	83	4.4	4	2.0
GED	0	0.0	217	11.6	11	5.5
HiSET	0	0.0	9	0.5	0	0.0
Homeschool Diploma	0	0.0	18	1.0	2	1.0
High School Diploma	0	0.0	51	2.7	5	2.5
High School Diploma Transcript	0	0.0	1,494	79.8	179	89.1
Developmental Math D or F Grade Earned	135	100.0	1,872	100.0	201	100.0
No	111	82.2	1,079	57.6	163	81.1
Yes	8	5.9	584	31.2	18	9.0
Did not take developmental math course	16	11.9	209	11.2	20	10.0
Developmental Math W or Dropped Grade Earned	135	100.0	1,872	100.0	201	100.0
No	8	5.9	1,431	76.4	168	83.6
Dropped	50	37.0	120	6.4	7	3.5
Withdrew	61	45.2	112	6.0	6	3.0
Did not take developmental math course	16	11.9	209	11.2	20	10.0
Developmental English D or F Grade Earned	135	100.0	1,872	100.0	201	100.0
No	24	17.8	332	17.7	46	22.9
Yes	0	0.0	88	4.7	2	1.0
Did not take developmental English course	111	82.2	1,452	77.6	153	76.1
Developmental English W or Dropped Grade Earned	135	100.0	1,872	100.0	201	100.0
No	0	0.0	342	18.3	40	19.9
Dropped	10	7.4	53	2.8	8	4.0
Withdrew	14	10.4	25	1.3	0	0.0
Did not take developmental English course	111	82.2	1,452	77.6	153	76.1
Developmental Reading D or F Grade Earned	135	100.0	1,872	100.0	201	100.0
No	49	36.3	419	22.4	35	17.4
Yes	1	0.7	153	8.2	2	1.0
Did not take developmental reading course	85	63.0	1,300	69.4	164	81.6
Developmental Reading W or Dropped Grade Earned	135	100.0	1,872	100.0	201	100.0
No	1	0.7	502	26.8	31	15.4

Variable	Undeclared		Declared		Non-degree	
	f	%	f	%	f	%
Dropped	24	17.8	52	2.8	6	3.0
Withdrew	25	18.5	18	1.0	0	0.0
Did not take developmental reading course	85	63.0	1,300	69.4	164	81.6
Developmental Communications D or F Grade Earned	135	100.0	1,872	100.0	201	100.0
No	30	22.2	303	16.2	27	13.4
Yes	1	0.7	114	6.1	0	0.0
Did not take developmental communications course	104	77.0	1,455	77.7	174	86.6
Developmental Communications W or Dropped Grade Earned	135	100.0	1,872	100.0	201	100.0
No	1	0.7	355	19.0	19	9.5
Dropped	18	13.3	45	2.4	8	4.0
Withdrew	12	8.9	17	0.9	0	0.0
Did not take developmental communications course	104	77.0	1,455	77.7	174	86.6
Total Credit Hours Attempted	135	100.0	1,872	100.0	201	100.0
0	43	31.9	0	0.0	0	0.0
1-3	1	0.7	18	1.0	0	0.0
4-6	9	6.7	93	5.0	2	1.0
7-9	9	6.7	176	9.4	5	2.5
10-12	37	27.4	599	32.0	58	28.9
13-15	32	23.7	854	45.6	112	55.7
16-18	4	3.0	127	6.8	24	11.9
19+	0	0.0	5	0.3	0	0.0
Total Credit Hours Attempted 2	135	100.0	1,872	100.0	201	100.0
7 or more	82	60.7	1,761	94.1	199	99.0
6 or fewer	53	39.3	111	5.9	2	1.0
Majority of credit hours attempted were dev.	135	100.0	1,872	100.0	201	100.0
No credit hours attempted	43	31.9	0	0.0	0	0.0
Only college-level credit hours attempted	14	10.4	98	5.2	11	5.5
Majority of credit hours attempted were college-level	62	45.9	1,370	73.2	163	81.1
Equal number of developmental and college-level credit hours were attempted	8	5.9	106	5.7	13	6.5
Majority of credit hours attempted were developmental	8	5.9	287	15.3	14	7.0
Only developmental credit hours attempted	0	0.0	11	0.6	0	0.0

Variable	Undeclared		Declared		Non-degree	
	f	%	f	%	f	%
Total Credits Earned	135	100.0	1,872	100.0	201	100.0
0	135	100.0	247	13.2	2	1.0
1-3	0	0.0	144	7.7	0	0.0
4-6	0	0.0	185	9.9	2	1.0
7-9	0	0.0	314	16.8	11	5.5
10-12	0	0.0	498	26.6	69	34.3
13-15	0	0.0	433	23.1	101	50.2
16-18	0	0.0	49	2.6	16	8.0
19+	0	0.0	2	0.1	0	0.0
Total Credits Earned 2			1,872	100.0	201	100.0
4 or more	0	0.0	1,481	79.1	199	99.0
3 or fewer	0	0.0	391	20.9	2	1.0
Majority of credits earned were developmental	135	100	1,872	100.0	201	100.0
No credits were earned	135	100.0	247	13.2	2	1.0
Only college-level credits earned	0	0.0	391	20.9	24	11.9
Majority of credits earned were college-level	0	0.0	905	48.3	152	75.6
Equal number of developmental and college-level credits were earned	0	0.0	82	4.4	11	5.5
Majority of credits earned were developmental	0	0.0	207	11.1	12	6.0
Only developmental credits were earned	0	0.0	40	2.1	0	0.0

Appendix W: First Semester Performance Statistics for Characteristic 3: Attempted Six or Fewer Credit Hours

Variable	6 or Fewer		7 or More	
	f	%	f	%
Major Declared	166	100.0	2,042	100.0
Major Declared	111	66.9	1,761	86.2
Non-degree	2	1.2	199	9.7
Undeclared	53	31.9	82	4.0
High School Grad Type	166	100.0	2,042	100.0
Missing / Unknown	66	39.8	156	7.6
GED	12	7.2	216	10.6
HiSET	3	1.8	6	0.3
Homeschool Diploma	1	0.6	19	0.9
High School Diploma	7	4.2	49	2.4
High School Diploma Transcript	77	46.4	1,596	78.2
Developmental Math D or F Grade Earned	166	100.0	2,042	100.0
No	100	60.2	1,253	61.4
Yes	28	16.9	582	28.5
Did not take developmental math course	38	22.9	207	10.1
Developmental Math W or Dropped Grade Earned	166	100.0	2,042	100.0
No	49	29.5	1,558	76.3
Dropped	72	43.4	105	5.1
Withdrew	7	4.2	172	8.4
Did not take developmental math course	38	22.9	207	10.1
Developmental English D or F Grade Earned	166	100.0	2,042	100.0
No	23	13.9	379	18.6
Yes	5	3.0	85	4.2
Did not take developmental English course	138	83.1	1,578	77.3
Developmental English W or Dropped Grade Earned	166	100.0	2,042	100.0
No	11	6.6	371	18.2
Dropped	15	9.0	56	2.7
Withdrew	2	1.2	37	1.8
Did not take developmental English course	138	83.1	1,578	77.3
Developmental Reading D or F Grade Earned	166	100.0	2,042	100.0
No	43	25.9	460	22.5
Yes	20	12.0	136	6.7
Did not take developmental reading course	103	62.0	1,446	70.8

Variable	6 or Fewer		7 or More	
	f	%	f	%
Developmental Reading W or Dropped Grade Earned	166	100.0	596	29.2
No	33	19.9	501	24.5
Dropped	29	17.5	53	2.6
Withdrew	1	0.6	42	2.1
Did not take developmental reading course	103	62.0		
Developmental Communications D or F Grade Earned	166	100.0	2,042	100.0
No	40	24.1	320	15.7
Yes	14	8.4	101	4.9
Did not take developmental communications course	112	67.5	1,621	79.4
Developmental Communications W or Dropped Grade Earned	166	100.0	2,042	100.0
No	25	15.1	350	17.1
Dropped	28	16.9	43	2.1
Withdrew	1	0.6	28	1.4
Did not take developmental communications course	112	67.5	1,621	79.4
Total Credit Hours Attempted	166	100.0	2,042	100.0
0	43	25.9	0	0.0
1-3	19	11.4	0	0.0
4-6	104	62.7	0	0.0
7-9	0	0.0	190	9.3
10-12	0	0.0	694	34.0
13-15	0	0.0	998	48.9
16-18	0	0.0	155	7.6
19+	0	0.0	5	0.2
Majority of credit hours attempted were dev.	166	100.0	2,042	100.0
No credit hours attempted	43	25.9	0	0.0
Only college-level credit hours attempted	29	17.5	94	4.6
Majority of credit hours attempted were college-level	27	16.3	1,568	76.8
Equal number of developmental and college-level credit hours were attempted	20	12.0	107	5.2
Majority of credit hours attempted were developmental	36	21.7	273	13.4
Only developmental credit hours attempted	11	6.6	0	0.0
Total Credits Earned	166	100.0	2,042	100.0.
0	103	62.0	281	13.8
1-3	20	12.0	124	6.1
4-6	43	25.9	144	7.1
7-9	0	0.0	325	15.9
10-12	0	0.0	567	27.8

Variable	6 or Fewer		7 or More	
	f	%	f	%
13-15	0	0.0	534	26.2
16-18	0	0.0	65	3.2
19+	0	0.0	2	0.1
Total Credits Earned 2	166	100.0	2,042	100.0
4 or more	43	25.9	1,637	80.1
3 or fewer	123	74.1	405	19.9
Majority of credits earned were developmental	166	100.0	2,042	100.0
No credits were earned	103	62.0	281	13.8
Only college-level credits earned	22	13.3	393	19.2
Majority of credits earned were college-level	8	4.8	1,049	51.4
Equal number of developmental and college-level credits were earned	5	3.0	88	4.3
Majority of credits earned were developmental	20	12.0	199	9.7
Only developmental credits were earned	8	4.8	32	1.6