UNDERGRADUATE DEGREE COMPLETION:

A STUDY OF TIME AND EFFICIENCY TO DEGREE

A Dissertation presented to

the Faculty of the Graduate School

at the University of Missouri - Columbia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

---

by

LISA M. RUNYAN

Dr. Sandy Hutchinson, Dissertation Supervisor

DECEMBER 2011

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

UNDERGRADUATE DEGREE COMPLETION:

A STUDY OF TIME AND EFFICIENCY TO DEGREE

presented by Lisa M. Runyan

a candidate for the degree of Doctor of Education

and hereby certify that, in their opinion, it is worthy of acceptance.

_____

Professor Sandy Hutchinson

_____

Professor Barbara Martin

_____

Professor Richard Sluder

_____

Professor Doug Thomas

_____

Professor Jim Bowman

DEDICATION

This dissertation is dedicated to my wonderful husband, Bill Runyan. His never-ending support, encouragement, love, and sacrifice during the completion of this degree and life in general have not gone without notice. He is my best friend and my companion in life. I cannot imagine having completed this without him by my side.

And

My parents, Jean and Mike Harchalk, who taught me to aim high, persevere, and finish what I start. Their steadfast confidence in me and their loving support have given me the courage to believe that I can reach whatever goals I set for myself.

ACKNOWLEDGEMENTS

I could not have completed this degree without the support, hard work, and assistance of many people. I would like to thank my dissertation committee members Dr. Doug Thomas and Dr. Jim Bowman for their contributions to the paper and Dr. Barbara Martin for her willingness to join in the later stages of the project. My committee chair and advisor, Dr. Sandy Hutchinson, didn't give up on me during the difficult times when I really wanted to give up on myself. A special thank you goes to Dr. Rick Sluder who was invaluable with his assistance in running and interpreting the statistics for this project. He was generous with his time and talents. Finally, Dr. Mike Grelle was also a great friend and mentor through this process. His editing and attention to detail made this a better paper.

A special thank you is extended to Julie Cannon for her work on the data file for this project. She was able to meet every strange request that I had and never ceased to impress me. I sincerely thank my supervisor, Teri Bowman, and the wonderful staff of the UCM Registrar's Office, as I know my absence from the office put additional burden on each of them. I also owe thanks to the many friends and colleagues at UCM who helped me edit, gave me ideas, let me vent, and supported me through this process including Dr. Fran Reddington, Jennifer Pint, Michael Olsen, Andi Newman, and Charissa Davis, to name only a few.

Finally, thank you to my husband, Bill, my parents and in-laws, extended family supporters, and best friends, Kami Bean and Julie Bloom, for their endless encouragement and love.

TABLE OF CONTENTS

LIST OF TABLES

UNDERGRADUATE DEGREE COMPLETION:
A STUDY OF TIME AND EFFICIENCY TO DEGREE

Lisa M. Runyan

Dr. Sandy Hutchinson, Dissertation Supervisor

ABSTRACT

The purpose of this quantitative study was to examine time and efficiency to undergraduate degree completion. Four dependent variables were examined including semesters enrolled, semesters elapsed, graduation efficiency index (GEI), and alternative GEI. Many independent variables were assessed to determine if they had a correlation to time or efficiency to degree. These variables were organized into six categories: student demographics, college preparedness, student enrollment pattern, student financial, college academic achievement, and college curriculum variables. Finally, the results for the dependent variables were compared across colleges, departments, and degrees to determine if any differences existed as a function of these variables.

This study was based on 1,585 undergraduate degree recipients from three semesters (summer 2010, fall 2010, and spring 2011) at the University of Central Missouri (UCM). Multiple methods of analysis were used to answer the research questions. These included a bivariate correlation analysis using a two-tailed Pearson correlation coefficient. After determining which variables were significantly correlated, an analysis utilizing linear, stepwise regression was performed. One-way analyses of variance (ANOVA) were also performed to determine if the differences between colleges, departments, and degree types were significant. When a significant relationship

was found within a comparison group, a post-hoc Tukey HSD test was used to compare all possible pairs of group means.

Twenty-one variables proved to have statistically significant correlations to all four of the dependent variables. The strongest correlations were exhibited by transfer hours earned, age at graduation, cumulative hours attempted, and cumulative hours earned. Other strong relationships were found with age the student began at UCM, total summer semesters enrolled, and the average number of fall/spring hours attempted and earned at UCM. There were six variables that were not correlated to any of the four dependent variables. These were: gender, whether or not the student filed a FAFSA, the amount of loans taken in the senior year, the percentage of need met, the percentage of need met with gift aid, and whether or not a student completed a minor. Significant mean differences were discovered by both college of enrollment and type of degree. No significant mean differences were discovered by department of enrollment.

CHAPTER ONE

INTRODUCTION TO THE STUDY

In the United States, the dream of pursuing a college degree is not just a dream, but instead a reality that is available to all citizens. The U.S. offers this opportunity to a wider segment of the population than any other country in the world. As of 2007, more than 80% of high school graduates in the U.S. went on to college within approximately eight years of high school graduation. In the early twenty-first century, roughly 25% of the U.S. population over the age of 25 had completed four years of college or more, compared to just 5% in 1940 (American Federation of Teachers, 2003; Attewell & Lavin, 2007). "Higher education is one of America's greatest success stories" (American Federation of Teachers, 2003, p. 8).

Undergraduate college enrollments in the United States have grown six-fold in the past 50 years. In 1998, higher education institutions enrolled nearly 15 million students. That figure represents 2.5 times the number of students who were enrolled in 1965, more than six times the enrollment in 1950, and 10 times that of pre-World War II levels (American Federation of Teachers, 2003; Attewell & Lavin, 2007). The United States Secretary of Education has announced a national goal to increase the number of Americans with a college degree or certificate by 50% by the year 2020 (U.S. Department of Education, 2011).

Each year millions of new students enter one of the more than 3,500 colleges and universities in the United States with the hope of success. For many, the determinant of success is the completion of a baccalaureate degree. "But while the United States is

considered in important ways the 'land of opportunity' academically, our institutions are failing many of our students" (Bryan, 2006, p. 177). While nearly 75% of today's young adults pursue some type of higher education, less than half of them complete a certificate or degree within six years (U.S. Department of Education, 2011).

Concerns with Higher Education in the United States

The length of time taken to earn an undergraduate degree has increased. Researchers at UCLA's Higher Education Research Institute (HERI) found that less than 7% of first-time, full-time freshmen enrolled at four-year institutions thought that it would take them more than four years to graduate with their bachelor's degree. Statistics from the National Center for Education Statistics (NCES) show that, in reality, this same population has a four-year graduation rate of only 34.5%. Roughly two-thirds of these students either take longer than four years to graduate or do not graduate at all (Dechter, 2009).

Prior to the 1970s, graduation rates were based on four-year calculations. Now, six years is the new national standard for computing college graduation rates. This shift is reflected in the changing student population and their college attendance patterns (Attewell & Lavin, 2007; Kuh, Kinzie, Schuh, Whitt, & Associates, 2005).

In addition to the length of time to graduate, efficiency is also a concern. Many students today are graduating with many more credit hours than needed for degree completion (Wisconsin University System, 2002). This can be attributed to many different factors, such as: changing majors, losing credits due to transferring, the need for remedial course work, and changing degree requirements. Studying the efficiency of degree completion, in addition to time to degree, can provide a more complete picture of

the path that students take to degree completion and help define accountability and success.

Another concern is the state of the economy in the United States. As a result, colleges and universities are facing increasing demands to demonstrate they are using federal and state dollars wisely. In addition, the cost to students and families for tuition and fees is increasing and higher education budgets are becoming more dependent on these fees to operate (Wisconsin University System, 2002). "Accountability pressures, concern over efficient use of institutional resources, and consumer price sensitivity all point to the need for decreasing students' time to bachelor's degree attainment" (Knight & Arnold, 2000, p. 2).

The open nature of higher education in the U.S. makes data collection on student persistence and graduation very difficult. "It is a system of first, second and third chances, allowing students to move in and out of the postsecondary system over a lifetime" (American Federation of Teachers, 2003, p. 8). As enrollments increase, so do criticisms of higher education. A 2006 Commission on the Future of Higher Education called for greater accountability and the need to graduate students faster (Attewell & Lavin, 2007).

College and university administrators and state lawmakers often use the benchmark of degree attainment to measure the success of institutions of higher education. Graduation rates, time to degree, and hours to degree lend themselves to easy quantification. These elements often are among the top data requested to make decisions for judging institutional performance and to determine funding. Unfortunately, such measures can also provide a skewed view of the reality of degree completion when they

are not presented with enough supporting background information. However, while these numbers may be relatively easy to come by, gathering accurate and meaningful data is more of a challenge (Astin & Oseguera, 2002; Blose, 1999; Cohen & Ibrahim, 2008; Goenner & Snaith, 2003; Johnson & Baum, 2004; Wisconsin University System, 2002; Zhu, 2004).

Attewell and Lavin (2007) stated:

> Many of the questions policy makers ask are distorted by conceptual blinders that evaluate today's undergraduate experience against a norm from an earlier era when students entered college immediately after high school, attended college full-time, lived in dormitories, and rarely worked for pay because they were financially dependent on their parents. But such traditional students, whose needs and experiences still drive public policy, make up less than a quarter of today's undergraduate population. We need to focus on what higher education is, not what it once was. (p. B16)

Statement of the Problem

Even though most degree programs in the United States are designed for completion in four years of full-time study, over the past thirty years the time to earn a bachelor's degree has significantly increased. This increase places a financial burden on students, parents, institutions, and states and has caused stakeholders to question the efficiency and accountability of higher education institutions (DesJardins, Kim, & Rzonca, 2003; Herzog, 2006; Taylor, Lee, & Doane, 2001; Wisconsin University System, 2002).

Cohen and Ibrahim (2008) stated that "graduation rate is the 'high-stakes' measure of success for American public higher education" (p. 48). A study of first-time college students completed by the National Center for Education Statistics (NCES) followed a cohort of students from 1996 through 2001. Over the five-year span, only 29% had earned a bachelor's degree and 10% earned an associate's degree. Of the original

population who had not graduated, 14% were still enrolled in college in 2001 and 35% dropped out without earning any type of degree (Bryan, 2006).

This issue is of such national importance that in 1990 the Student's Right-to-Know and Campus Security Act was passed. This law ruled that federally supported college and universities must compile and publish graduation statistics each year, making these readily available to both prospective and current students (Astin, 1997; Blose, 1999; Johnson & Baum, 2004; Knight, 1994). Bender and Schuh (2002) suggested:

> Declining confidence in the academy, combined with increasing scrutiny of higher education by funding agencies, legislators, and the public has compelled academic leaders to improve the extent to which their colleges and universities are meeting goals. (p. 1)

A number of sources that rely on nationally collected higher education data have determined that five years has replaced four years as the new average measurement of time to a bachelor's degree (Knight & Arnold, 2000). Even the U.S. Department of Education measures college graduation rates in terms of six years instead of four (Selingo, 2001). Many reasons are believed to impact this new norm, including more students are requiring remedial course work, many students attend more than one institution, more students are attending college part-time, and many are working while attending college (Knight & Arnold, 2000). Knight and Arnold stated:

> Educational authorities and state legislatures have also begun to question whether lengthened time-to-degree is the fault of malingering students or of the institutions themselves through practices such as poor advising, insufficient class availability, and a proliferation of degree requirements. (p. 3)

Thus, further research on the factors that influence time and efficiency to degree is important for all stakeholders in higher education.

Purpose of the Study

The purpose of this study was to examine time and efficiency to undergraduate degree completion. Four different dependent variables were examined including: time to degree, measured by semesters enrolled; time to degree measured by semesters elapsed; graduation efficiency index; and the alternative graduation efficiency index. A number of individual and institutional variables were included to assess their correlation to time and efficiency to degree. In addition, these items were compared across colleges, departments, degrees, and academic programs to determine if any differences exist as a function of these variables.

There was an abundance of literature on the issue of college student retention. Research on the issue of time to degree was less robust. In addition, models which use various factors to predict retention have been developed and tested, but factors impacting time to degree are less clear (Herzog, 2006). This research will add to the body of literature on time to degree and graduation efficiency and will shape a starting point for future research regarding graduation.

Research Questions

This study addressed the following eight research questions:

1. What individual and institutional variables affect time to degree (as measured by semesters enrolled) for undergraduate students?
2. What individual and institutional variables affect time to degree (as measured by semesters elapsed) for undergraduate students?
3. What individual and institutional variables affect the Graduation Efficiency Index (GEI) for undergraduate students?

4. What individual and institutional variables affect the alternative Graduation Efficiency Index (GEI) for undergraduate students?
5. How does time to degree (as measured by semesters enrolled) differ among graduates by college, degree, and department?
6. How does time to degree (as measured by semesters elapsed) differ among graduates by college, degree, and department?
7. How does Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?
8. How does alternative Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?

Hypotheses

To answer the research questions, the following null hypotheses were tested:

*Ho*1: There is no statistically significant relationship between the individual and institutional variables and time to degree (as measured by semesters enrolled).

*Ho*2: There is no statistically significant relationship between the individual and institutional variables and time to degree (as measured by semesters elapsed).

*Ho*3: There is no statistically significant relationship between the individual and institutional variables and Graduation Efficiency Index (GEI).

*Ho*4: There is no statistically significant relationship between the individual and institutional variables and alternative Graduation Efficiency Index (GEI).

*Ho*5: There is no statistically significant difference in time to degree (as measured by semesters enrolled) by college, degree, and department.

*Ho*6: There is no statistically significant difference in time to degree (as measured by semesters elapsed) by college, degree, and department.

*Ho*7: There is no statistically significant difference in Graduation Efficiency Index (GEI) by college, degree, and department.

*Ho*8: There is no statistically significant difference in alternative Graduation Efficiency Index (GEI) by college, degree, and department.

Importance of the Study

Time to degree and efficiency to degree are important topics for various stakeholders at many different levels. The main stakeholders include college and university students, parents of college students, college and university administrators, state lawmakers, tax payers, and businesses (DesJardins, Ahlburg, & McCall, 2002; Gillmore & Hoffman, 1996; Knight, 1994; National Center for Education Statistics, 1993; Selingo, 2001; Wisconsin University System, 2002).

On a global scale, the United States' ability to compete internationally will require a college-educated workforce. Much of the responsibility of preparing that workforce is on the shoulders of public higher education (Cohen & Ibrahim, 2008). Our society also benefits from timely and efficient college graduation. Studies conducted by the Institute for Higher Education have shown that college graduates are more likely to participate in civic duties and engage in community service opportunities. College graduation benefits our nation as a whole, local communities and individual families, as well. The families of college educated individuals benefit, as spouses are likely to be more educated and their children perform better academically and are less likely to get into trouble (DesJardins, Ahlburg, & McCall, 2002; Tinto, 2004). College graduates help

to create a society with less crime, less money spent on social services, and more taxpayer revenue (Bryan, 2006; Tinto, 2004; Zhu, 2004).

It is estimated that every person with a baccalaureate degree yields an average of $5,900 more per year in federal, state, and local tax revenue compared to a person with only a high school diploma. Over a lifetime, this can add up to an additional $177,000 in tax contributions. If some states were to increase their percentage of college graduates by only 5%, they could generate over $100 million dollars each year in new taxes (U.S. Department of Education, 2011).

The issue of graduation rates and time to degree also affects the reputation and national rankings of institutions in such popular magazines as *U.S. News and World Report* and *Money Magazine* and is of importance to those determining the rankings. *Money Magazine* cites graduation rates (four-year, five-year, and six-year) as part of their "educational quality" index and notes the percentage of students who graduate in six years in their "vital data" section. A study in 1995 revealed that some schools go out of their way to exaggerate their graduation rates to affect their rankings in these guidebooks (Cohen & Ibrahim, 2008; Mallette, 1995).

McGuire's study (1995) of *U.S. News and World Report's* ranking factors revealed that graduation rate was the second most weighted factor in their ranking system, accounting for 15% of the weight in an institution's total score. They determined graduation rate over a six-year period for the last four first-year cohorts. The only factor that was more heavily weighted in the 1994 rankings was reputation, as determined by a survey completed by college administrators (Cohen & Ibrahim, 2008; McGuire, 1995). In the magazine's 1992 rankings, graduation rate only accounted for 10% of the overall

institution ranking. In addition, in 1992 a five-year graduation rate was used instead of a six-year (McGuire, 1995).

Importance of Time to Degree for Students

Possibly the most important stakeholder, concerning efficiency in higher education, is the individual student. U.S. Census data have shown that on average, individuals with a bachelor's degree will earn one million dollars more during their lifetime than individuals with only a high school education. This amounts to about twice the earnings of those with only a high school diploma and six times that of high school dropouts. Students who complete some college, but do not earn a degree, do not see nearly the same benefit (Bryan, 2006; Cohen & Ibrahim, 2008; DesJardins, McCall, Ahlburg, & Moye, 2002; Tinto, 2004).

Many students have the goal of graduating with their undergraduate degree in a four-year time span. For many this is an economic decision, both to control the amount of money borrowed to fund higher education and to be able to move into the work force as soon as possible to begin earning more substantial wages. Other students may want to graduate in a short time period to meet family demands or to pursue career goals or graduate education.

On the other hand, some students actually wish to purposefully extend their time to degree. Students site many reasons for this, including the desire to add optional education programs such as study abroad or internships or to explore course work outside of their required curriculum. Depending on the state of the economy in their career fields, some students may choose to wait to enter the work force to pursue additional course work for developing job skills. Finally, some students do not have the goal of timely

graduation, or even graduation at all, and wish to remain in college for other personal reasons (Selingo, 2001).

The longer students take to graduate, the greater the financial burden on them and their families. While instructional costs may be spread out, the likelihood of increasing tuition can affect students. Also, some costs such as living and commuting expenses are accumulated regardless of the number of credit hours in which they are enrolled. Extending graduation likely increases the overall cost of a degree, even if extra courses are not completed (Office of Resource Management & Planning, 2004).

Importance of Time to Degree for Higher Education Institutions

Many institutions of higher education support students earning their undergraduate degree in four years or in as timely a manner as possible. While the longer students stay, the more money the institution could gain from those students, it prevents institutions from expanding their enrollments and forces them to devote more resources to those students. In a time where many colleges are experiencing enrollment growth and tightened operating budgets, it is best to have students move through the system and earn a degree within a reasonable time frame (Knight, 2004; Selingo, 2001; Wisconsin University System, 2002).

Time to degree is a topic that has been long debated among institutions in the United States. Many states (e.g., Maryland, Minnesota, Pennsylvania, and Texas) have pursued legislation to encourage students to graduate on time. Some proposed methods include rewarding institutions with high graduation rates with additional funding or offering tuition deals to students who take advanced course loads (Hebel, 1999). Punitive measures have also been attempted which withhold benefits from institutions or require

students to gain permission to take smaller course loads or extend their graduation (Selingo, 2001).

In times of increasing accountability for higher education, graduation rates are a measureable indicator of institutional performance (Blose, 1999; DesJardins, Ahlburg, & McCall, 2002; Knight, 2004; Poch, 1998; Wisconsin University System, 2002). "The indicators selected for performance reporting reflect the attitudes of state policymakers on the goals, values, and models for excellence for public college and universities" (Burke & Minassians, 2002, p. 33). As consumer demand for accountability in higher education has grown, state appropriations for public institutions are dwindling (Barak & Kniker, 2002).

In addition to accountability issues, individual departments at institutions can use their students' time to degree statistics as a possible bargaining chip for accumulating more resources. For example, a department that has a longer than average time to degree when compared to the rest of the university could argue that it takes their students longer to graduate due to a lack of professors, course section offerings, or limited classroom space. However, this argument could also be turned on the department and their longer time to degree may instead be related to a bloated major curriculum, poor use of existing resources, or rigidity in the curriculum structure (i.e., prerequisites and sequencing) (Johnson & Baum, 2004).

Tracking time to degree for various student populations can assist higher education institutions in identifying students' needs and create programs or policies to assist students who are falling behind in their progress towards a degree (California Postsecondary Education Commission, 2006). Students who take longer to graduate often

do so because they are not attending school full-time. Depending on an institution's funding model, this can negatively affect the amount of money that the school receives from the state. Often funding is based on student full-time equivalents. However, the cost of instruction and many campus services are driven by headcount, not the amount of hours in which these students are enrolled (Knight, 2004; Office of Resource Management & Planning, 2004).

Definition of Key Terms

For the purpose of this study, the following terms are defined.

Attempted credit hours. Attempted credit hours are the number of credit hours that a student attempted or was enrolled in as of the eighth day of the semester. Courses dropped during the first week of each semester were not recorded. Any course dropped after the first week of classes results in a W grade on a student's record and does count towards attempted hours. An attempted credit hour is one in which either a letter grade was earned (including F's), or the student dropped out of after the first week of the class.

Attrition. Attrition is the loss of students from the institution. A high attrition rate will result in low graduation rates and may demonstrate that the university is failing to either admit students who have a chance of success at the institution or to integrate them into the academic and social values of the school.

Baccalaureate/bachelors. A bachelor's degree is a primary degree that is typically comprised of 120 semester credit hours and can reasonably be completed in a four-year span. These two terms are used interchangeably in this study to refer to the type of undergraduate degree pursued by college and university students.

Credit hour. Credit hours are a measurement used by colleges and universities to determine progress towards degree. A one credit hour class roughly equates to spending three hours (in and out of the classroom) devoted to class work per week or 45 hours during a semester. In addition to translating learning into credentials, credit hours are also used as the basis for student transfer and are a main component used for public accountability including enrollment tracking, faculty workload, and budget allocation (Wellman & Ehrlich, 2003). Most regional accreditation agencies require a minimum of 120 semester credit hours for the baccalaureate degree (Wellman, 2003).

In order to complete a 120-hour degree in four years, full-time students are expected to carry a semester credit load of 15 credit hours during each of the fall and spring semesters. Most courses at semester institutions are worth three credit hours. Three academic credit hours roughly equates to spending nine clock hours on course work each week, or 135 hours during the semester.

Degree. A degree is an academic title conferred on students by a college or university upon completion of a program of study. Most colleges and universities offer a variety of types of bachelor's degrees.

Degree program. A degree program (also referred to as academic program in this study), is the combination of the degree, major, and possibly minor. Some majors are offered with multiple degree choices. For example, a student may pursue either a Bachelor of Science (B.S.) or a Bachelor of Arts (B.A.) in the major of History. The degree program would be the B.S. in History. If a minor is required by the major, it would be considered part of the degree program.

Earned hours. This refers to the number of semester credit hours that a student earned after grades are recorded. Earned hours may have a traditional letter grade (A, B, C, D), a pass (P) grade, or special credit (CR or SC, often awarded by testing out). Often a student's earned hours are less than their attempted hours due to course drops, repeated work, and failing grades.

Full-time status. Typically, full-time status for undergraduate students is defined as being enrolled in at least 12 credit hours during the fall and spring semesters and at least nine credit hours during the summer semester.

Grade point average. Grade point average (GPA) is actually not an average, but a point hour ratio. The number is computed by taking the student's total earned quality points divided by their attempted graded hours. Quality points are earned based on the letter grade (A, B, C, or D) earned in a class. One quality point is earned per credit hour of the course for each grade. "A" grades are worth four quality points, "B" grades are worth three quality points, "C" grades are worth two quality points, and "D" grades are worth one quality point. The number of points per letter grade is multiplied by the number of credit hours the course is worth to obtain the total quality points for each course.

Graduation Efficiency Index (GEI). This term was coined by the University of Washington and examines the amount of credit hours it takes a student to earn a degree versus the amount of credit hours required by that degree program. The GEI measures how efficiently students complete degrees, not the length of time they take to complete them. It considers the minimum amount of hours required for a degree and the number of hours earned, dropped, repeated, and transferred (Gillmore & Hoffman, 1996; Poch,

1998; Washburn & Priday, 2003; Washington State Higher Education Coordinating Board, 2000).

Graduation rate. Graduation rate refers to the proportion of an entering class cohort who graduates after a specified period of time. Graduation rates are often expressed in four-year, five-year, and six-year terms. Graduation rates are often based on first-time, full-time freshmen and do not account for students who leave the institution or transfer into the institution (Gillmore & Hoffman, 1997).

Major(s). The major is the primary area of academic study. Most majors are associated with one degree type, while some majors are offered with different degrees.

Minor(s). A minor is a secondary area of academic study. For most degree programs, a minor is optional.

Non-traditional student. While there is no formal definition of a non-traditional student, they are typically characterized by age (over 24) and part-time status. Non-traditional students typically live off campus, are more likely to be independent of their parents, or to have dependents of their own. They are more likely to work full-time and have children. Across the U.S., ironically, these students account for the vast majority (over 70%) of students in higher education.

Part-time status. Part-time status for undergraduate students is defined as being enrolled in less than 12 credit hours during the fall and spring semesters and less than nine credit hours during the summer semester.

Persistence. Persistence is defined as progressive re-enrollment in college. This may mean the student continuously enrolls in subsequent terms or they may take time off and resume studies at a later date. This term is often interchangeable with the term

"retention". Enrollment in summer terms is considered optional and is not usually considered in persistence studies (Pascarella & Terenzini, 2005).

Retention. Retention refers to the persistence of undergraduate students in pursuit of their bachelor's degree. Retention is often one key benchmark by which colleges judge their success. This term is often interchangeable with the term "persistence".

Semester. Fall and spring semesters consist of 15 weeks of course work followed by a week of final exams. Each fall and spring semester also includes a week of break, to make the total semester 17 weeks long. Summer semesters are twelve weeks long, though many courses are offered in three, six, or nine week options as well.

Semesters elapsed. This is the total number of semesters of both enrollment and non-enrollment from the time a student first enrolls in college up through their semester of graduation. Counting semesters elapsed is one way to calculate a student's time to degree.

Semesters enrolled. This is the number of semesters (including summer semesters) that a student attempted or was enrolled in course work as of the eighth day of the semester. Any complete withdrawals during the first week of each semester are not recorded as semesters enrolled. Any courses dropped after the first week will result in a W grade on a student's record. A semester enrolled is one in which either a letter grade was earned (including F's), or the student withdrew after the first week of the class. Counting semesters enrolled is one way to calculate a student's time to degree.

Time to degree. Time to degree (TTD) is a common measure of efficiency in higher education. Some define this as the time from high school graduation to college graduation. Others define it as the time elapsed from first undergraduate matriculation to

college graduation (Gillmore & Hoffman, 1996). Time to degree is retrospectively measured back to a student's first date of entry. Time to degree can also be determined by the number of terms enrolled at an institution of higher education and not count semesters (fall/spring) of non-enrollment. This study examined time to degree both as semesters elapsed and semesters enrolled.

W grades. Three different "W" grades are used: "W", "WP", and "WF". The "W" stands for withdrawal. A "W" grade is assigned when a student drops a class after the 100% refund deadline (usually one week into the semester). The "W" is reported on the student's transcript but does not impact the grade point average (GPA). It simply indicated that the student dropped the class late. Students have the ability to drop a class with a "W" grade through the first two-thirds of the semester (or through the 10^{th} academic week). After this deadline, drops are not permitted without a petition. Late withdrawal petitions are seldom approved and only for extenuating, documentable circumstances. Late withdrawals that are approved after the "W" deadline are assigned the grade of either "WP" or "WF". A "WP" indicates that the student was passing the class at the time of the approved drop. A "WF" indicates that the student was not receiving a passing grade at the time of withdrawal. Both grades show as a matter of record on the transcript, but only a WF impacts the GPA.

Retention Theory and Degree Attainment

Time to degree is closely linked to retention because in order to graduate a student the institution must obviously retain them. There are many factors that have been shown to influence student retention: student background variables, institutional variables,

academic and social integration, student attitudes, institutional fit and commitment, and environmental factors (Bean 1986; Blose, 1999).

"Persistence is a precondition of graduation, thus the factors that affect graduation chances can be better understood if we have information on first-year persistence" (DesJardins, Kim, & Rzonca, 2003, pp. 410-411). Retention from year one to year two is often used as a benchmark to evaluate institutional success (DesJardins, Kim, & Rzonca, 2003; Wisconsin University System, 2002). Many studies have shown that the first two years are when most students leave college. A study by the Board of Governors in Florida (March 2004) showed that of students beginning college in 1996, 37% left before beginning their second year and 61% left before their third year.

Levitz, Noel, and Richter (1999) noted that an institution's first-to-second year attrition rate is the most important predictor of their graduation rate. They have found that attrition rates are typically halved each year after the first. Thus, if an institution has a 30% attrition rate after the first year, it would likely drop to 15% after the second year, 7.5% after the third year and so on (Levitz, Noel, & Richter, 1999).

Academic and social attachments form the basis for much of the research on persistence and attainment in higher education (Pascarella & Terenzini, 2005; Scott, Bailey, & Kienzl, 2006; Tinto, 1993). The more institutions can integrate students to the campus both in and out of the classroom, the more likely that the student will be committed to staying at the institution and graduating. Institutions that have large populations of older, part-time, and commuter students will have a harder time establishing social integration with these students as they balance their school, work, and family responsibilities (Scott, Bailey, & Kienzl, 2006). Academic integration includes a

student's study skills and habits and class attendance. Certainty of major has a big impact on student persistence, as undecided or wavering students are less likely to persist. Student interaction with faculty both in and out of the classroom can also impact retention (Bean, 1986; Schuh, 2003).

In addition to being tied to the university on an academic level, it is important for student success that students bond with the institution socially as well. This occurs when students feel they have developed friendships on campus and have social support systems in place. Informal contact with university faculty and staff can also assist in this sense of belonging on campus (Bean, 1986; Schuh, 2003).

Many researchers (Adelman; Braxton; Cabrera; Des Jardins; Hossler; Kuh; Nora; Pascarella; Seidman; St. John; Terenzini) have conducted various retention studies exploring multiple variables and experiences that have an impact on student retention. Four of the most influential authors (Astin; Bean; Spady; Tinto) on college student retention will be reviewed in the following section.

Influential Retention Theorists

Astin

Alexander Astin is a prolific author in the field of higher education with twenty books and over 300 published articles. He began studying college student retention in the 1970s. He is most known for his work as the founding director of the Higher Education Research Institute (HERI) at UCLA. Astin's theory (1984) was the Theory of Involvement and had students playing an active role in their development. This theory focuses on the behavior and motivation of the student and purports that students learn more when they are actively involved with both the academic and social aspects of their

college experience. Based on this theory, Astin encourages faculty and institutions to provide students with varied, quality opportunities for involvement, both in and out of the classroom focusing on both academic and social interests (Anders & Carpenter, 1997; Astin, 1984).

Astin's later student development model, referred to as "I-E-O" (1993), evaluated three elements that affect student development: Inputs, Environment, and Outcomes. Inputs included the student's background, demographic characteristics and their previous educational experiences. Environment referred to the campus environment and the experiences that the student had on campus. Lastly, outcomes are the beliefs, knowledge, characteristics, and values that the student exhibited after experiencing the college environment. This theory viewed students as a passive participant in the development process that the faculty and university acted upon (Astin, 1993; Hutley, 2001).

Bean

John Bean's Student Attrition Model (1980) was based on theories from human resources and worker turnover. Bean's theory focused on the student's intent to leave and their attitudes towards college. It examines how institutional characteristics and rewards affect student retention. His model included five categories of variables: student background variables, organizational variables, intent to leave, environmental variables, and outcome/attitudinal variables (Bean, 1980, 1982, 1983; Cabrera, Nora, & Castaneda, 1993; DesJardins, Kim, & Rzonca, 2003).

In regards to integration with the campus, Bean's research found that a student's peers play a larger role than university faculty in developing a connection to the campus. Bean and Metzner's (1985) model of student dropout showed the effects of academic

factors, social-psychological factors, and environmental factors on socialization. The more socialized a student, the less likely they would be to drop out of college (Andres & Carpenter, 1997; Bean & Metzner, 1985).

Spady

Spady's (1970/1971) model of student retention is founded in the sociological theories on suicide of Durkheim (1897/1966). His theory supported the notion that students must be integrated to the college campus both socially and academically and that the family background plays a great deal in the student's ability to adjust to college life. He noted that family support can encourage academic potential leading to positive grade performance. Students who are succeeding academically are more likely to persist in college. The family also plays a role in the student's ability to socially integrate with the college experience. Greater social integration and friendship support leads to higher satisfaction and a greater commitment to the institution, thus reducing student attrition (Andres & Carpenter, 1997; Spady, 1970; Spady, 1971).

Tinto

Tinto (1975) is one of the foremost classical theorists on college student retention (Bean, 1986). Much of his research focuses on the "fit" between the student and the institution (Andres & Carpenter, 1997). "Tinto's model has provided an excellent framework for thinking about how institutions can address the challenge of improving graduation rates" (Schuh, 2003, p. 54). Tinto's study showed that one of the best ways to increase retention, and thus graduation, is to increase the frequency and quality of interactions that students have with individuals on campus, with both peers and

faculty/staff. These interactions are the most powerful when they occur in informal, out of class settings (Schuh, 2003; Valentine et al., 2011).

Tinto built upon Spady's model, agreeing that the more academically and socially involved students are on a campus, the more likely they are to be retained (Andres & Carpenter, 1997; Desjardins, Kim, Rzonca, 2003; Valentine et al., 2011). Between the two different types of involvement, he found that academic integration seems to be more important to persistence in most cases (Gansemer-Topf & Schuh, 2003). Tinto expanded upon Durkheim's theory of suicide with exchange theory, or a cost/benefit analysis. He purported that students avoid "costly" behavior and seek rewarding experiences and relationships. If the student views the benefits of college as outweighing the costs, they will remain in school.

Tinto also concurred with Spady that the family background has a great influence on integration to college. In particular, the family's values, socioeconomic status, and race have shown to be impactful. Also, the educational experiences that a student has prior to enrollment in college, such as secondary school grades, have an impact on academic integration in college (Andres & Carpenter, 1997; Valentine et al., 2011).

In 1993, Tinto developed a theory of student departure. This model sought to explain student attrition by examining the effects of both positive and negative experiences with integration to college. This theory examined student attributes prior to enrollment in higher education, a student's goals, their institutional experiences, their integration with the campus, and the outcomes from these experiences (Pascarella & Terenzini, 2005; Tinto, 1993).

This study focused on some of the aspects of these popular retention theories. In particular, the role of student input and output characteristics and institutional characteristics and how they impact time and efficiency to degree. These input characteristics include things such as demographic background, prior educational experiences, and socio-economic factors and the role of institutional characteristics such as the curriculum that the student has followed. Student outcomes will be also be studied by analyzing student enrollment behaviors and college academic achievement variables.

Limitations of the Study

This study was limited in scope to one institution. As the literature review will show, research on what variables are important to time and efficiency to degree vary greatly across institutions (Brune, 1996). "The very characteristics that make higher education institutions unique such as size, location, composition of the student body, mission, and type of control make the assessment of factors influencing time to degree institution specific" (Brune, 1996, p. 4). The results of this study are primarily for the benefit of the institution of study and may not be transferable to other institutions.

A second limitation is that the subjects of this study were taken from only one year's (2010-2011) pool of graduates. Studies that examine additional years across the institution or longitudinal studies may offer additional data on factors that affect time and efficiency to degree.

A third limitation is that of missing data. Not all students had data elements available for all of the independent variables (standardized test scores, high school GPA, etc.). It is possible that the results may have been different with this missing data or that

students with missing data are in some way inherently different from those with complete data.

Another limitation of this study is that the researcher collected data only on students who have earned their degree. This implies that the sample has reached some level of success. This study does not address issues related to students who did not graduate. Additional valuable data on retention and graduation rates could be gathered from students still pursuing a degree or who have dropped out or transferred out of the institution.

Lastly, there are many other factors that researchers have shown to impact retention and graduation. This research certainly did not investigate all possible variables, but it does provide a framework for institutions to conduct a time to degree or graduation efficiency analysis using additional variables.

Summary

After decades of prosperity and increasing enrollments at higher education institutions through the 1980s, a changing economy in the United States led taxpayers and legislators to begin to demand proof that students were getting what they were paying for from colleges and universities. An easy metric used to compare institutions is graduation rate. Novices assume that an institution with a higher graduation rate must be doing a better job than those with a lower rate. However, many consumers of higher education are not aware of how these rates are calculated and what they really mean.

"The importance that is placed on graduation rates as a measure of the success of institutions of higher education warrants the ongoing research into understanding the determinants of these educational outcomes" (Goenner & Snaith, 2003, p. 409). Studies

of time and efficiency to degree are important to students and their families because they can better plan for tuition expenses. For institutions, knowing these data can help with institutional planning in regards to residence halls, course scheduling, and utilization of academic and student services (Knight, 1994).

Learning more about students' paths to a degree is important for many stakeholders and requires examining many different variables, both of the individual student and the institutions they attend. While there are some limitations to this study, this research attempts to identify what universities can do with the existing data that are routinely collected on students that has the potential to affect student outcomes and policy initiatives.

CHAPTER TWO

REVIEW OF THE LITERATURE

Chapter 2 provides a review of the literature related to degree attainment. A review of the different methods for studying degree attainment will be discussed, including the findings from other researchers on graduation rates and time to degree in the United States. Also included in this chapter is an examination of how time to degree has influenced higher education policy, funding, and collegiate reputation and rankings. A summary of the major variables, both student and institutional, that prior research has found to have an impact on time and efficiency to degree is provided. Finally, the researcher highlights some measures taken at U.S. institutions to increase graduation rates and improve time and efficiency to degree.

There are numerous factors that can influence whether or not a particular student will earn a college degree and how long it might take. While some of these variables can be attributed to the institution, many are related to the individual student. If the average student at all institutions had the same characteristics it would be much easier to compare graduation rates of institutions. However, different types of institutions tend to attract different types of students for a variety of reasons (Blose, 1999; Pascarella & Terenzini, 2005).

Studying Degree Attainment

There are many different methods used to study degree attainment in higher education. Different states use different methods to measure institutional accountability and to measure student or institutional success. Some of the most commonly used

measures are that of graduation rates, time to degree, and credits to degree. Some newer methods include the Graduation Efficiency Index (GEI) and an institutional Graduation Efficiency.

In addition to the various ways to measure degree attainment, it is important to note that some statistics do not offer a complete picture of student degree outcomes and often have many exclusions in their reporting methods. For example, in the United States, national data on graduation statistics often do not include degree attainment information on students who attend college part-time, those who take longer than six years to graduate, and often excludes students who transfer from one institution and graduate at another (Astin, 2006; Florida Board of Governors, 2004a). The following section will describe how degree attainment can be studied using different methods: graduation rates, time to degree, and the graduation efficiency index.

Graduation Rates

"Graduation rates are not, by themselves, indicators of institutional quality or efficiency" (Florida Board of Governors, 2004a, p.3). Graduation rates measure the odds that a student who begins a degree at an institution will finish that degree within a specified period of time. Graduation rates are typically calculated for four, five, and six-year time frames. Graduation rates are based on the number of first-time college students (those who have earned less than 12 hours of college credit since high school) who enter an institution full-time in the fall semester and attend full-time (12 semester hours or more). Students who start in the preceding summer and continue for the fall semester are also included, but students who begin in the spring semester are not included. In addition,

students who transfer from one institution and graduate from another are usually not counted in graduation rates (Astin, 2006; Florida Board of Governors, 2004a).

To obtain a six-year graduation rate institutions count the number of graduates from the original cohort of full-time students at the end of the sixth year (after summer semester) and divide that number by the total number of full-time, first time students in the original cohort. Institutions are allowed, by federal calculations, to exclude students who have died, left for military service, joined the Peace Corps, or took leave for religious mission trips. These exclusions account for very small numbers when calculating graduation rates (Astin, 2006; Florida Board of Governors, 2004a).

Graduation rates do not take into account the different missions of institutions, their selectivity, or the reasons that students may leave. Any metric that is used to compare different institutions needs to take into account the populations they serve and the resources they are given. This is not the case when comparing graduation rates alone (Scott, Bailey, & Kienzl, 2006). Graduation rates are also affected negatively by students who leave an institution and by those who take longer to graduate than the specific time period being measured (Astin, 2006; California Postsecondary Education Commission, 2006; Florida Board of Governors, 2004a). The high number of students taking more than four years to graduate has resulted in a change in the way that national education databases and other media such as college guidebooks report graduation rates. No longer are schools measured on four-year graduation rates solely, but also now on five and six-year rates (Taylor, Lee, & Doane, 2001).

Graduation rates are also misleading because they assume that a student enrolls in one institution and remains there to complete their degree. It also assumes continuous

enrollment. These statistics do not reflect the true enrollment patterns of today's students. Many students attend part-time or stop out of higher education for a while. Also, more than half of all college students have attended one or more institutions. This percentage is much higher at some institutions. Transfer students would be viewed as a failure in the graduation rates of their first institution and would not be counted in the graduation rates of their degree-granting institution (Attewell & Lavin, 2007; Capaldi, Lombardi, & Yellen, 2006).

"Current definitions of retention and graduation rates distort the picture of student success by limiting it to completion of a degree at the institution of entry" (Jones-White, Radcliffe, Huesman, & Kellogg, 2009, p. 154). This methodology alters the true picture of student success by underestimating the actual rate of degree completion. It is estimated that over 40% attend part-time. These students will be depicted as institutional failures since they are excluded from most studies of graduation rates (Jones-White, Radcliffe, Huesman, & Kellogg, 2009). Cohen and Ibrahim (2008) noted that "the changing patterns of college attendance have, over time, eroded the value of the traditional measure of graduation rates (p. 52)." A more realistic picture of today's college students shows that they cycle in and out of college. They vary between semesters of full-time and part-time enrollment and transfer between sometimes multiple institutions numerous times (Attewell & Lavin, 2007; Capaldi, Lombardi, & Yellen, 2006).

Another issue with how the federal government measures graduation rates is the determination for full-time status (12 credit hours). If a student did take 12 credit hour for four years (not including summer semesters), they would not be able to meet the minimum semester credit hours required for graduation at most institutions (120).

Students would instead need 10 semesters (five years) or would be required to take summer semesters or increased course loads to graduate in four years. In addition, many degree programs require more than the 120 credit hour minimum (Capaldi, Lombardi, & Yellen, 2006).

A study performed by UCLA's Higher Education Research Institute (HERI) of 262 higher education institutions found that six-year graduation rates ranged from 18% to 96% across the sample. This research found that it was possible to calculate an expected six-year graduation rate for any institution by using weighted aggregates of entering student characteristics. Some student characteristics that proved to have influence over degree completion rates included gender, standardized test scores, and high school grades (Astin, 2006).

Astin's research (2006) clearly showed that "an institution's degree completion rate is primarily a reflection of its entering student characteristics, and differences among institutions in their degree completion rates are primarily attributed to differences among their student bodies at the time of entry" (p. 7). Important results of Astin's research are the equations discovered which can help institutions in predicting their expected graduation rate. This can be best determined using data from the Cooperative Institutional Research Program (CIRP), or simpler equations can be developed using student entry characteristics. Once institutions have this expected rate, they can compare their actual rate against the expected rate to assess how they are doing (Astin, 2006).

> Comparing graduation rates among colleges might seem easy to do: define a common entering cohort, give the students sufficient time to complete the academic requirements of their degree program, and calculate the percentage that received their degree. Although it would seem relatively straightforward, any comparison must be predicated on the assumption that the institutions should have the same or similar graduation rates. If it turns out that the rates are not the same, the institutions with the higher percentage will generally be presumed to be doing the better job. (Blose, 1999, p. 70)

While the idea of studying graduation rates as a measure of institutional accountability is a good one in theory, in practice many institutions lack a precise way to accurately measure much of the educational process in regards to institutional mission. A problem exists with comparing graduation rates of different institutions. It infers that the difference in graduation rates is attributable mostly to characteristics of the institutions without fully exploring the differences of the students who attend each school and the mission of the organization. If comparisons are to be fair, one must take into account these differences. Researchers are then challenged to either compare only those institutions which are equally selective or coming up with a way to relate one institution to another regardless of the characteristics of the students involved (Blose, 1999). Howard and Rogers (1991) noted:

> Comparison of retention and graduation rates between institutions is problematic because institutions differ in their educational philosophies and missions. Institutions with an open-door admissions policy, whose mission is to provide educational opportunity to all applicants within a certain region or who have certain characteristics, will probably have retention and graduation rates different from those of colleges and universities with selective admissions standards. Institutions that serve adult and non-traditional students will have retention and graduation rates different from those of institutions that serve the traditional college-aged populations. (pp. 68-69)

Blose (1999) did not propose equating colleges, but instead defining a set of reasonable expectations taking into account the institution type and demographics of the students enrolled. To do this, institutional researchers would need to define a list of variables related to graduation that focus solely on characteristics of the students and not of the institution. It helps the researcher if these variables are readily available through the student application process or collected in other ways (Blose, 1999).

In the United States, from the 1980s to the 1990s, five-year graduation rates dropped from 58% to 52% (Scott, Bailey, & Kienzl, 2006). One thing that can be used to explain this decrease in graduation rates over time is the changing college student population. Today's students represent a heterogeneous, diverse group of students who begin college with different academic abilities, experiences, and socioeconomic status. More non-traditional students are entering higher education (Attewell & Lavin, 2007; Taylor, Lee, & Doane, 2001).

"The fact that only about one-half of college attendees graduate is widely perceived as a failure – a failure of either the students, the institution, or the entire educational system" (DesJardins, Ahlburg, & McCall, 2002, p. 556). Among U.S. higher education institutions, even between institutions of the same classification there is great disparity in graduation rates. For example, both Texas Southern University and Harvard University are doctorate granting institutions. Harvard boasts a six-year graduation rate of 97%, while it is only 9% at Texas Southern (Goenner & Snaith, 2003).

For the past few decades the college graduation rate in the United States has been fairly static at about 50%. About 25% of four-year institutions will graduate less than one-third of their first-time, full-time freshmen within six years (Kuh, Kinzie, Schuh,

Whitt, & Associates, 2005). A study by the Illinois State Board of Higher Education (1999) discovered that only 26% of students at public institutions were graduating within four years. They found that 48% were able to earn their degree in five years (Taylor, Lee, & Doane, 2001). As of 2006 in the United States only 42% of students were graduating in four years at the best public institutions. Within six years at these same institutions only 71% had graduated. The average four-year graduation rate at all U.S. public institutions was a low 20% and the six-year rate was 45% (Capaldi, Lombardi, & Yellen, 2006).

The six year graduation rate in 2008 at the University of Central Missouri was 52%. This rating placed UCM fifth out of the twelve public four-year colleges in the state. The range among these institutions was a high of 69% at the University of Missouri – Columbia to a low of 24% at Lincoln University (Complete College America, 2011).

Despite increased concern on the topic, college graduation rates have not changed much over the past 40 years. Between the years of 1977 and 1990, the percentage of college students graduating within four years of their high school graduation declined, while the percentage taking longer than six years to finish a bachelor's degree increased (Kuh, et. al., 2005; NCES, 1993). In 1990, Americans graduated 43.3% of college students in four or fewer years, 70.8% in five or fewer years, and 81% in six or fewer years. Nineteen percent of college graduates in 1990 took more than six years to graduate. Recent data (2007) indicated that 28% of bachelor's recipients take more than six years to earn their degree. These students, who are successful in the long run, are left out of traditional graduation rates (Attewell & Lavin, 2007).

Time to Degree

Time to degree is another way to evaluate degree attainment. Time to degree can be measured a few different ways. Some studies consider time to degree to be the time from high school graduation to college graduation. This method does not take into account whether or not the student began higher education immediately after high school. A more commonly used method measures the time from initial matriculation at the university to graduation at the same institution. In many time to degree studies, transfer students are often measured separately from native students – or not considered at all in the equation. Some time to degree studies take into account stop-out semesters when the student is not enrolled, while others count only those semesters when a student is actually enrolled in classes. Time to degree is also dependent on student enrollment patterns, including full-time versus part-time status (Florida Board of Governors, 2004b; Knight, 2004; Wisconsin University System, 2002).

In addition to taking into consideration enrollment patterns, it might also be useful to consider the admission status of students. Many institutions have Conditional Admissions Programs (CAP) which allow for the admission of students who do not meet regular admission's requirements. These students are admitted to the university on probation and take part in a first-semester learning community and intensive advising program. It can be assumed that their retention and graduation rates may differ from students who are admitted regularly and those who are admitted into an Honors College. Researchers might consider excluding these subgroups when reporting retention or graduation rates or accounting for them with comparisons to the cohort as a whole (Howard & Rogers, 1991).

Traditionally, time to degree studies are based on a model of student behavior where a student enrolls in college immediately after high school, has continuous enrollment with summers off and graduates four years later. However, this model is no longer the norm for today's college students. In addition, the old "two plus two" model for transfer students no longer holds true for most transfer students (Gillmore & Hoffman, 1997).

Using time to degree to study degree attainment is often used to measure students in a traditional four-year plan to graduation. Native students – those who begin and finish at the same university, or transfer students – those who typically spend two years at one institution and then finish the last two years at another, are often evaluated on this measure (Poch, 1998; Poch & Wolverton, 2006). However, a minority of "traditional" college students is currently graduating in four years and this measure may not be an accurate tool for examining their graduation efficiency. As higher education institutions increasingly target more diverse groups of students, particularly those seeking distance learning, using time to degree from matriculation to graduation will be a less valid measure of efficiency (Gillmore & Hoffman, 1997).

Interruptions in attendance (as identified by missing one or more regular terms) have a great effect on time to degree. Stop-outs can be either student initiated or institution enforced. Some students require a semester or more away from school for personal reasons (health, caring for family, financial difficulty) and some may be suspended from the institution due to academic or disciplinary punishments. The state of Florida found that over half (55%) of all students who started in 1997-1998 had at least one "stop-out" semester by 2002-2003 (Florida Board of Governors, 2004b).

Howard and Rogers (1991) noted that it is important to consider the time to degree and graduation rates for students who were continuously enrolled and those that stopped-out, separately. It is likely that students who attended continuously would graduate earlier than students who stopped-out during their academic career. In addition to students who have willingly opted-out, there are those who are forced out for academic or disciplinary reasons. These students should also be reported on separately. While most graduation and retention studies at institutions will include these special groups as part of their total reporting, a more complete picture of time to degree and graduation rates is provided by examining these special populations and comparing them against the aggregate data (Gillmore & Hoffman, 1996; Howard & Rogers, 1991; Poch, 1998).

Time to degree is heavily dependent on the number of credits that students attempt towards degree completion. This would include not only courses earned towards a degree, but those failed, dropped, and repeated as well. The cost to states is greatly affected by a student's attempted hours. It costs colleges more when a student has failed or withdrawn from a course, or has repeated a course multiple times (Wisconsin University System, 2002). In the Florida State system, course withdrawals, failures, and repeats account for 50% of all "excess" attempted hours by students (Florida Board of Governors, 2004b).

Timely degree completion is not all that matters in terms of learning outcomes. There may be some value-added experiences that outweigh the cost of extending one's time to degree. Students may intentionally choose to enroll in optional internships, co-ops, or study abroad experiences to enrich their academic experience or to gain additional skills for future employment. Some students also enroll in supplemental courses or even

add second degrees, majors, or minors. Also, the eventual graduation of some at-risk students might be as important an issue as the timely graduation of all students (Knight, 2004).

Poch (1998) noted that studying time to degree can provide university administrators with a clear picture of the resources that a student uses while enrolled. It is surmised that the longer a student attends an institution, the more resources they use and the institution is left with less resources to provide to additional students. Time to degree studies also show how students progress through academic programs. Time to degree studies can provide institutions with information regarding graduation rates over varying timeframes.

One downfall of using time to degree as a measure of accountability is that it may favor students from high socioeconomic families versus those less privileged and favor traditional aged students over non-traditional students. Low-income and older students often have to work more hours while attending school and finish at a slower pace due to taking fewer credit hours per semester (Gillmore & Hoffman, 1996, 1997). As higher education funding models move towards rewarding those with high graduation rates and punishing those who do not perform on this metric, universities that admit more disadvantaged and non-traditional students will suffer (Gillmore & Hoffman, 1997).

Graduation Efficiency Index (GEI)

The Graduation Efficiency Index (GEI) is an equation developed by Gerald Gillmore and Phillip Hoffman at the University of Washington used to measure a student's (or institution's) efficiency in graduation. Unlike traditional time to degree methods which count lapsed time, either in calendar years or academic units

(semesters/quarters), the GEI considers the amount of credits a student has attempted versus those that were required for their graduation. A student who is required to have 120 semester credit hours for their degree and attempts exactly that amount of hours is determined to be 100% efficient. Their efficiency is not affected by the length of time it took them to earn that degree. On the other hand, a student who graduates in four years, but with 140 hours in the same degree program would be only 85% efficient (Lam, 2006; Gillmore & Hoffman, 1996, 1997; Poch, 1998; Poch & Wolverton, 2006; University of Washington, 1997; Washburn & Priday, 2003).

Gillmore and Hoffman (1997) argued that the majority of costs associated with graduation inefficiency are related to instructional costs and not student service expenditures. "The amount of instructional space a student consumes contributes significantly to the cost of education independent of the calendar time it takes him/her to graduate. Thus, calendar time may not be a valid measure of efficiency (p. 679)."

Gillmore and Hoffman (1996, 1997) purported that the GEI is a much better measure of degree attainment efficiency than the more typical measure of time to degree. They argued that this is because the GEI takes into account the following six variables:

1. The total number of credit hours that a student has earned.
2. The total number of credit hours that a student has withdrawn from.
3. The total number of credit hours that have been repeated.
4. The total number of credit hours that have been failed.
5. The minimum number of credit hours required by the student's degree program.

6. The total number of credit hours that have been transferred to the degree granting institution.

Gillmore and Hoffman (1997) cited a number of advantages to using the GEI over more traditional graduation efficiency measures.

1. The GEI range is from zero to 100%. Using percentages as efficiency ratings is familiar to people. The average reader would understand what it means to be 50% efficient versus 90% efficient.
2. The GEI can be used at any institution where there are a minimum number of credit hours required for a degree and is able to evaluate degrees of any level, from community colleges degrees to graduate programs.
3. The GEI can be used to evaluate both students who attend school full-time or part-time.
4. The GEI can be averaged to compare different groups of students or degree programs and thus used as a dependent or correlative variable in studies. For example, researchers could compare native versus transfer students, students across academic departments, or students in different degree programs.
5. The GEI can be easily tracked longitudinally. Results can be used to assess the impacts of practice or policy changes.

(Gillmore & Hoffman, 1997; University of Washington, 1997)

Gillmore and Hoffman (1996, 1997) stated that the more credit hours a student attempts beyond what their degree requires reduces efficiency. However, degree programs that require more credits do not necessarily add to inefficiency. Students who

drop courses add to inefficiency because those seats are left vacant in the classroom. Also, students who fail courses and repeat courses add to inefficiency. These students who take a seat in course, two or more times, are reducing the institution's ability to put new students in those courses (University of Washington, 1997).

The equation developed by the University of Washington to measure the GEI is as follows:

$$\frac{\text{Minimum Required Credits for the Degree} - \text{Transfer Credits}}{\text{Sum of Enrollment Census Day Credits}} \times 100 = \text{GEI}$$

(Gillmore & Hoffman, 1997; University of Washington, 1997)

The "minimum required credits for degree" can be adjusted to accommodate different degree programs. For example, at the institution of study in this project, the university minimum for a bachelor's degree is 120 semester credit hours. However, there are programs at the institution that require as many as 131 hours. Using this equation, students in larger credit hour programs would not be penalized for variations in degree requirements (Gillmore & Hoffman, 1996, 1997; Poch, 1998; University of Washington, 1997; Washburn & Priday, 2003).

This equation subtracted the number of "transfer credits" a student has. Transfer credits are those the student completed at another institution and that have been accepted at the degree granting institution. The "sum of enrollment census day credits" is the total number of credit hours a student has enrolled in on the census day of each semester/quarter over his or her academic career at the institution of study (Gillmore & Hoffman, 1996, 1997; Lam, 2006; Poch, 1998; University of Washington, 1997; Washburn & Priday, 2003).

Using the census date helped the equation by allowing for the fluctuations that many students make to their course schedules early in the academic term, but it also accounted for courses that are dropped later in the semester, courses that are repeated, and how failing grades would affect efficiency. Another reason that Gillmore and Hoffman (1996) chose to use the census date was to find a time after which if a student dropped a course, it would be less likely that another student would take their place in the course. The quotient is then multiplied by 100 to gain a percentage that is the index of efficiency. The higher the number (index), the greater the efficiency of graduation is (Gillmore & Hoffman, 1996, 1997; Lam, 2006; Poch, 1998; University of Washington, 1997; Washburn & Priday, 2003).

Proponents of the GEI argue that time to degree measurements do not measure student or institutional efficiency regarding graduation and do not take into account the fact that the majority of college students do not graduate in four years. The GEI is a better measure of graduation efficiency because it takes into account how many hours are required for a particular degree program and the amount that the student took to complete the program. Because the GEI is not limited to elapsed or enrolled time it provides a clearer picture of degree efficiency using the number of credit hours a student has attempted (Gillmore & Hoffman, 1996, 1997; Lam, 2006; Poch, 1998; University of Washington, 1997; Washburn & Priday, 2003).

Some institutions in the state of Washington have found a secondary use of the GEI and use it to evaluate efficiency among academic departments. Studies have shown that lower GEIs existed in the science areas, while the social sciences had higher indexes.

This could be explained by many factors including curriculum structure and the need for students to repeat course work (Poch, 1998).

Relationship between the GEI and Time to Degree

Gillmore and Hoffman (1997) purported that GEI is a better measure of graduation efficiency than time to degree. To prove this, they compared GEI and time to degree (as measured by years divided into fourths to match their quarter system at UW). They also computed this comparison across the two degree types (B.A. and B.S.) and whether or not students were transfer students or native students. The correlation of GEI and time to degree between the four groups ranged from -.35 to -.48. The negative correlation shows that the longer the time to degree, the lower the graduation efficiency index. While their results show the presence of a relationship between GEI and TTD, it is a weak correlation.

There are considerable differences in the two methods of measuring graduation rates. Each measures a different part of the graduation rate for an institution or student. In addition, there are many factors that affect each measurement. The developers of the GEI proposed that institutions and researchers studying the issue of time to degree should use a mixed method incorporating both traditional time to degree measures and an efficiency index to gain a more complete picture (Poch, 1998).

Knight's research (2004) did not find that the ratio of student credit hours earned at graduation to the minimum hours required for the degree had an impact on either the number of semesters enrolled or elapsed in time to degree. However, this measurement differs in that it only examined hours earned and not all of those attempted (including course failures, repeats, and withdrawals) as the GEI does.

GEI Studies

Gillmore and Hoffman (1997) studied all graduates at the University of Washington who graduated during the 1993-1994 academic year, a population of nearly 5,000 graduates. Their study excluded students who graduated with double majors or double degrees, as their efficiency would most likely be lessened due to the additional required credit hours. The researchers also excluded students whose calculated GEI was 0 or less (this would account for transfers students who transfer in more hours than are required for a degree) or those greater than 100% (students who somehow graduate with less than the required hours).

The researchers found that the average GEI for all UW graduates was 85%, with a standard deviation of 15%. Only 8.5% of the population had a perfect GEI of 100. They defined transfer students as those with 30 or more transfer credits. By this definition, 51% of their population was considered transfer students. They also divided the population by those who earned Bachelor of Science degrees vs. Bachelor of Arts degrees. Only 1.5% of their population earned a degree other than a B.A. or B.S. They ran a two way analysis of variance (ANOVA) with transfer status and degree type as independent variables and GEI as the dependent variable (Gillmore & Hoffman, 1997). Their results showed that B.A. students were more efficient than BS students. Also, transfer students (both B.A. and B.S.) were less efficient than non-transfer students. However, BS transfer students were significantly more inefficient than B.A. transfer students (Gillmore & Hoffman, 1997).

The researchers then grouped the transfer students by number of transfer credits at 30 hour intervals. They discovered that the average GEIs for these groups were highly

statistically significant, specifically that the number of transfer credits accounted for 36% of the variance in GEI. They found that there was only a slight different (7.5%) between students in the lowest category (0-30 hours) and those with 91-120 transfer hours; however, there was a great different once students fell into the 121 transfer hours and above group. As expected those bringing in the most transfer credits (151 or more hours) had the lowest GEI at an average of 27%. Not surprisingly, they also found that the average age of the students increased with each category of transfer credits, indicating that those with larger number of transfer credits were older adults returning to finish their degree (Gillmore & Hoffman, 1997).

Limitations of the GEI

The creators of the GEI admit that it is not a perfect instrument. There are many limitations in using the GEI alone. One such limitation of the GEI is that it is a retrospective instrument because it can only be used to calculate efficiency after a student has completed their degree. Also, the GEI is not an instrument to study graduation rates, only the efficiency for actual graduates (Gillmore & Hoffman, 1996, 1997; Poch, 1998).

Also, while the GEI can measure efficiency, it may not measure effectiveness. For example, students may take courses for remediation, review, or to learn skills not offered by courses required in their degree. While this may produce a better educated student, it goes against efficiency when looking solely at credits attempted (Gillmore & Hoffman, 1996, 1997; Poch, 1998).

Applying the GEI to transfer students is also problematic because the equation simply takes into effect the number of hours transferred to the degree granting institution and does not account for classes that were dropped, repeated, or failed at the transfer

institution. In addition, while the number of transfer credits can be determined for students, it is not easily determined how many of those credits were needed for a student's degree program. If a student graduates with more hours than necessary, it is impossible without detailed transcript review to determine how many excess credits were from the transfer institution versus the degree granting institution. In effect, the efficiency at that transfer institution is inferred from the efficiency determined at the degree-granting institution (Gillmore & Hoffman, 1996, 1997; Lam, 2006; Poch, 1998; University of Washington, 1997).

Lastly, the GEI assumes that the number of credits required to earn a degree is appropriate. The typical minimum number of hours required for a degree is 120. This minimum was instituted at UCM in the fall of 2008. Prior to this time, 124 credit hours was the minimum required of any degree. Of all of the degree programs at UCM in the 2010 Undergraduate Catalog, approximately half have 120 required credit hours as their minimum. The other programs require a range between 121 and 131 hours for completion, with 124 as the mode. By raising the minimum number of credits required, programs could create a false high in their efficiency levels (Gillmore & Hoffman, 1997).

The creators of the GEI chose to eliminate transfer credits from the equation. One consequence of this decision is that the efficiency at the transfer institution is estimated by the efficiency at the graduating institution and is affected by the relative number of credits taken at both places. An alternative calculation suggested by the researchers is to add the number of transfer credits to the sum enrollment of credits at the graduating institution (the denominator), instead of subtracting them from the numerator. When this alternative method of calculation is used, the efficiency is always equal to or greater than

the efficiency from the original formula. Because it is impossible to know, without detailed transcript review, the number of transfer courses dropped or repeated or courses that were unnecessary for graduation requirements all of the inefficiency determined by the equation rests on the graduating institution (Gillmore & Hoffman, 1997). The equation to measure the alternative GEI is as follows:

$$\frac{\text{Minimum Required Credits for the Degree}}{\text{Sum of Enrollment Census Day Credits + Transfer Credits}} \times 100 = \text{GEI}$$

(Gillmore & Hoffman, 1997; University of Washington, 1997)

When Gillmore and Hoffman (1997) tested this alternative method, they concluded that the average efficiency index of transfer students was nearly identical to that of non-transfer students. However, research and experience overwhelmingly supports the notion that the transfer process adds some degree of inefficiency for most transfer students (Gillmore & Hoffman, 1997).

It is possible to determine how many transferrable credits a student brought into the institution; however, without individual review of each student's transcripts, it is impossible to determine the efficiency of those credits. For example, how many of those transfer classes were used to meet actual requirements of the degree, versus those that are free electives above and beyond degree requirements. Another challenge of considering transfer credits in the GEI occurs when students transfer in more than the minimum hours required for a degree. In these instances, it is not possible to determine which institution is responsible for the excess credits a student has earned (Gillmore & Hoffman, 1997). While the GEI may not be an adequate measure between colleges, it may prove useful in the comparison of academic programs across an institution.

Implications of Degree Attainment Studies

This section will explore how the results of degree attainments studies of all types (time to degree, graduation rates, graduation efficiency index) have influenced higher education policy, institutional funding, and collegiate reputation and rankings.

Time to Degree as a Policy Issue

The "Student Right-to-Know and Campus Security Act of 1990" (SRK) (Public Law 101-542) was signed into law in November 1990 by the U.S. Department of Education. This law applied to all higher education institutions that receive federal financial assistance. It requires universities to compile and release institution-wide graduation rates to all students (prospective and current) and more detailed statistical information concerning the graduation rates of student athletes to the Department of Education and certain individuals. The numbers reported for SRK are the six-year graduation rates of students who begin as full-time freshmen at an institution (American Federation of Teachers, 2003; Astin, 1997, 2006).

Reporting rates to the National Center for Education Statistics (NCES) varies by public, private and for-profit institutions. In 2003, less than half (46%) of all institutions combined had reported graduation data from the 2001 graduating class. On average, two-year institutions have more reliable reporting, at nearly 67%. Also, public schools at all levels have better reporting than private and for-profit schools. Only 28% of four-year for-profit institutions provided graduation statistics to NCES in 2003 compared to 76% of four-year public institutions (American Federation of Teachers, 2003).

It is assumed from this crude measure that schools with low six-year graduation rates are doing "worse" than those with higher rates of graduation. However, the numbers

alone do not take into account the characteristics of the institution or the students they admit. Proponents of SRK argue that it is the higher education equivalent of the "No Child Left behind Act" and that it rewards or punishes institutions based on the performance of their students. It is important that policy makers consider the very different nature and goals of the K-12 arena and that of higher education (American Federation of Teachers, 2003).

Critics of SRK point out its shortfalls such as the exclusion of part-time students (which make up 40% of the college going population) and the large number of students who transfer between two or more institutions. It also labels students who do not graduate as failures, though graduation may not have been the goal for many students. SRK also fails to include students who take longer to graduate, including those who may go from full-time to part-time status or have a need to take time off from college and extend beyond six years (American Federation of Teachers, 2003).

Using graduation rates as a determinant for rewards or punishments has the potential to have unintended consequences for higher education. If rewards are given those institutions with higher graduation rates, institutions may be tempted to lower academic standards to increase graduation rates. Some institutions may change admissions criteria to stop serving students who are more likely to have retention problems (American Federation of Teachers, 2003).

Federal government concern for the problem of time to degree was also expressed with the creation of the Integrated Postsecondary Education Data Systems (IPEDS) Graduation Rate Survey. IPEDS is the official federal clearinghouse for higher education data (Cohen & Ibrahim, 2008; Knight & Arnold, 2000). Similarly, in 2005, the House of

Representative drafted reauthorization legislation for the Higher Education Act which included a requirement for colleges and universities to report degree completion statistics for students earning certificates and degrees. This act applies to both students who begin at the institution and those to transfer to it (American Federation of Teachers, 2003; Kuh, et. al, 2005).

Accountability, Funding, and Time to Degree

Graduation rates and time to degree have been widely included as measures of efficiency in higher education (Wisconsin University System, 2002). For example, in California, the Higher Education Compact (2005) called for measuring efficiency by examining the total number and percentage of students graduating who have taken excess hours required for their degree program and the average number of excess hours accumulated by these students (Office of Resource Management & Planning, 2004).

In 1997, the state of Washington's Legislature began to require its public higher education institutions to use the GEI as an accountability measure in an effort to increase graduation efficiency in the state's baccalaureate schools. This occurred at the urging of provosts at the state's four-year institutions (Gillmore & Hoffman, 1997). Many other states (Arkansas, Colorado, Florida, Kentucky, Louisiana, Minnesota, Missouri, Ohio, South Carolina, Tennessee, and Washington) have similar accountability measures. It has been determined that external policymakers tend to define quality in terms of efficiency more than internal higher education stakeholders. In many states, accountability is measured quantitatively by efficiency versus academic quality or learning outcomes (Poch & Wolverton, 2006).

Many states use an accountability system that is based on individual institutions and not individual students; therefore, students who begin at one institution and later graduate from another institution in the state are regarded as failures and not successes. In reality, however, that student who transferred is both personally successful and has a positive effect on the state (Scott, Bailey, & Kienzl, 2006). It is also unfair to compare institutions to one another based solely on graduation rates or time to degree statistics. "Because of differences in institutional policies and practices, the best use of retention and graduation statistics may be for the internal evaluation of policies, programs, and procedures" (Howard & Rogers, 1991, p. 69).

In 1998, 37 states used some sort of performance measures to evaluate higher education and seven additional states noted they were in the process of developing such an evaluation (Barak & Kniker, 2002). Barak and Kniker further noted:

> The major objectives noted by the state higher education boards in the use of performance measures were to improve institutional performance, enhance undergraduate education, and increase institutional accountability. Legislators and governors either mandated most of the performance measures or accountability or were heavily involved in their development. (p. 94)

There is a catch-22 in regards to state funding and time to degree. Some states are considering basing funding partially on productivity and accountability of higher education institutions. A big measure of accountability is graduation rates and time to degree. However, it has been argued (Hauptman, 1997) that part of the increase in time to degree can be directly related to decreased state support which effects enrollment caps and fewer course offerings that limit the ability of students to enroll in the courses required for graduation.

Many states have linked graduation rates to performance funding including Florida, Louisiana, Ohio, South Carolina, Texas, and Virginia. The state of Ohio offers financial reward to state institutions via the Success Challenge funds to reward institutions that have timely degree completion rates (DesJardins, Kim, & Rzonca, 2003; Knight & Arnold, 2000; Knight, 2004). Washington is the only state that evaluates institutions on credits to degree instead of time to degree (Poch & Wolverton, 2006).

A study conducted by the Education Commission of the States (1994) revealed eight indicators used for performance reporting in a ten state study. The most cited indicators were graduation rates by gender, ethnicity and program; degree completion; and time to degree. In Burke's study (1998) of eleven states, ten of the states identified retention and graduation rates as funding indicators for baccalaureate institutions and eight of the eleven states for two-year colleges.

Burke and Minassians (2002) conducted an evaluation of 29 state higher education performance reports to determine what indicators were being studied and valued. Eleven of these reports were also used to determine performance-based funding. From these studies, the researchers identified 158 generic indicators used to measure performance and 66 used to determine performance based funding. In each category, graduation and retention were the most cited indicators. In regards to performance measures, 24 of the 29 reports used graduation and retention as indicators of performance. Of those using these reports for funding purposes, 10 out of 11 states cited graduation and retention as a measure (Burke & Minassians, 2002).

In addition to graduation and retention, 16 of 29 institutions used the number of degrees awarded as a performance indicator and 4 of 11 used time to degree as a measure

for performance-based funding (Burke & Minassians, 2002). A study by Albright (1998) discovered that more than half of the states (32) were already using or planning to use performance measures in their state budgeting process for higher education. The most widely cited indicators of performance were retention and graduation rates (Albright, 1998).

Since the mid-1980s the states put a focus on institutional accountability in higher education. Between 1994 and 1997 the number of states using accountability plans doubled. There is wide variety among the states in regards to the performance measures and methods used to evaluate performance in higher education (Education Commission of the States, 2010). States typically employ one or more of three basic performance models. These include: performance funding, performance budgeting, and performance reporting. Many states combine their use of more than one of these measures. For example, more than two-thirds of the states that utilize either performance funding or performance budgeting also participate in performance reporting (Education Commission of the States, 2010).

As of 2010, 19 states reported using performance funding. This type of funding links a portion of the funds allocated to an institution to its performance on individual indicators. If the institution meets its goal for the item being evaluated, the institution receives that percentage of the funding linked to it (Education Commission of the States, 2010). More states (27) used performance budgeting. This involves the discretion of the state and is more flexible. Performance budgeting gives legislators the leeway to consider campus achievements when determining campus allocations. Finally, performance reporting is used most widely (30 states). Performance reporting involves a campus

providing performance reports on a variety of indicators to constituents such as the governor or the media (Education Commission of the States, 2010).

In addition to the three performance models, the states use a variety of different performance indicators. The number of indicators used by the states ranged from 3 to 37. The most commonly included indicators include graduation rates and the number of degrees awarded. Three main ways that the states measure performance are by comparing performance of their own institution over time to look for improvements. Another way to measure performance is to compare an institution to a peer institution or, lastly, to measure the institution against target goals established by the state (Education Commission of the States, 2010). Howard and Rogers (1991) recognized that

> although national statistics on average retention and graduation rates may be helpful in interpreting overall institutional statistics, comparisons with peer institutions, that is, institutions with similar students and missions, are more informative. (p. 69)

Variables Impacting Time and Efficiency to Degree

Researchers have studied numerous variables that impact time and efficiency to degree. Some of these variables are related to the student while others are characteristics of the institution itself (Adelman, 1999; DesJardins, Ahlburg, & McCall, 2002; Knight, 2004; Lam, 1999; Volkwein & Lorang, 1996; Zhu, 2004). Student characteristics have been shown in research to have a greater impact on time to degree than institutional characteristics. Student characteristics may include a student's demographic background or academic preparation for college. A student's college enrollment patterns (stopping out, transferring, dropping/failing classes, credit hour load per term) and financial need also have an impact (Dechter, 2009; Knight, 2004).

This section will review six broad categories of variables: student demographics, pre-college preparation, student enrollment patterns, financial need, college achievement, and college curriculum. Finally, some current strategies and policies to increase efficiency and degree time to degree that are being utilized at various institutions across the United States will be reviewed.

Student Demographics and Degree Attainment

Student demographic variables include characteristics that the student brings to the table before they begin at the institution of higher education. These include personal variables such as gender, age, and ethnicity. These are all factors that are beyond the student's control. Parental characteristics also have an impact on student persistence, such as parent income, level of education, and the support that they provide their student in the pursuit of higher education (Astin, 1993, 1997; Bean, 1986; Blose, 1999; Pascarella & Terenzini, 2005; Poch & Wolverton, 2006). This section will explore five different student demographic characteristics which have been shown to impact time and efficiency to degree.

Gender

Studies have shown that on average, women earn a degree in less time than men (Astin, 2006; California Postsecondary Education Commission, 2006; DesJardins, McCall, Ahlburg, & Moye, 2002; Jones-White, Radcliffe, Huesman, & Kellogg, 2009; Knight, 1994; Lam, 1999; NCES, 1993; Taylor, Lee, & Doane, 2001; Weissman, 1999). A study of degree completion within years of high school graduation over time (1977-1990) shows that women consistently earn their degree earlier than men. In 1977, 52.8% of women versus 39.2% of men graduated from college in four or less years after high

school graduation. While the four-year graduation rate decreased for both men and women during the time frame, women still graduated in a shorter amount of time. In 1990, 35.1% of women and only 26.6 % of men graduated within four years of completing high school. Knight's study (2004) of graduates at Bowling Green State University, however, found that being female was significantly related to increased semesters elapsed, unlike most studies which found that women graduate in a more timely fashion than men.

A study by the National Center for Education Statistics (NCES) (1993) also showed differences in completion time for men and women. For all students, an average of 43.3% graduated in four or fewer years. Women scored above average with 47.4% and men below average at 39.9% (NCES, 1993). A 1994 study of five-year graduation rates by NCES revealed that 50.3% of women graduated within five years compared to only 41.3% of male students (DesJardins, McCall, Ahlburg, & Moye, 2002).

Gillmore and Hoffman's 1997 study of University of Washington graduates was performed with a three-way analysis of variance on sex, transfer status, and degree type. They found that women had an average graduation efficiency index (GEI) that is 2.4 points higher than men across all graduates (transfers/non-transfers and by degree type). However, their study did reveal that women had a slightly lower GEI for the B.S. degree than men, at 80.1 and 81.2 respectively.

A 2002 study by DesJardins, McCall, Ahlburg, and Moye discovered that while time-constant coefficient models show a negative relationship between being male and degree completion, the effect of gender actually changes over time and the trend is

actually positive for men as they progress towards their degree. Overall, most studies of gender and time to degree reveal that woman have an advantage over men.

Residency

Lam (1999) and DesJardins, Kim, and Rzonca (2003) found that out-of-state students graduate more quickly than in-state students. One can assume that because out-of-state tuition is often much greater than in-state tuition, these students have an added incentive to completing their degree in a timely manner. Goenner and Snaith (2003) also found that institutions with greater numbers of out-of-state students had better four-year and six-year graduation rates when compared with institutions with less out-of-state students. They do recognize that this may be attributed to the overall quality of the institution since more students are willing to come from out of state to attend, instead of the characteristics of the student.

Unlike Lam, and Goenner and Snaith's studies, a 2002 study by DesJardins, Ahlburg, and McCall did not reveal any correlation between a student's home location (in-state near campus, in-state away from campus, or out-of-state) and their timely graduation.

Ethnicity

In 2003, the U.S. Department of Education reported the following six-year graduation rates for students enrolled at four-year universities, by race:
57% total, 39% American Indian, 41% African American, 47% Hispanic, 60% white, and 65% Asian American (Walker, 2006). In Missouri, the six-year gradation rate for students at public and private four-year colleges was 58% for white students, 47% for

Hispanic students, and 40% for African American students (Complete College America, 2011).

Studies in the United States (American Federation of Teachers, 2003; Astin, 2006; NCES, 1993) have shown that white and Asian American students perform at about the same level on graduation rates. Both of these groups graduate in a shorter time period when compared to African Americans, Hispanic Americans, and American Indians. Among college graduates in 1990, 44.4% of both white and Asian American students graduated college in four years or less. This is slightly higher than the overall average of 43.3%. African American students graduated in four or fewer years at a rate of 37% and Hispanic Americans at a rate of 31.1%. American Indians fared the worst with only 26.6% graduating in four or less years (American Federation of Teachers, 2003; NCES, 1993).

Astin's research (2006) showed a positive correlation to being white and degree completion. Research by the National Center for Education Statistics (1994) supports this, finding five-year graduation rates for whites to be the highest at 48.1%. Asian/Pacific American students had similar results with 46.8% completing in five years. Black and Hispanic students graduated in five years at much lower rates of 34.2% and 32.4%, respectively (DesJardins, McCall, Ahlburg, & Moye, 2002).

The study conducted at the University of Minnesota by DesJardins, Ahlburg, and McCall (2002) examined the effect of race on persistence and graduation over time during a student's college career. They discovered that the effects of race changes over time. For example, they found that Asian students are less likely to stop out than white students, but only during the first year of college. As time passes, this benefit does not

hold nor does it increase an Asian student's chances of timely graduation (DesJardins, Ahlburg, & McCall, 2002).

A study conducted by the American Federation of Teachers (2003) found that there is a significant gap in degree attainments between minority students and white students. Ethnicity is often compounded by socioeconomic status, parental education level, and student academic preparedness (American Federation of Teachers, 2003; DesJardins, Ahlburg, & McCall, 2002). One study (DesJardins, McCall, Ahlburg, & Moye, 2002) showed that when controlling for GPA, the negative effects of belonging to an underrepresented minority group were diminished by 58%, revealing that much of the effect of race on graduation operates through a student's GPA.

Knight and Arnold's (2000) study revealed that white students graduate in less time than non-white students. Historically, white and Asian students have graduated at higher rates than both Hispanic and African American students (California Postsecondary Education Commission, 2006). Jones-White, Radcliffe, Huesman, and Kellogg, (2009) also found that under-represented minorities were less likely to complete their bachelor's degree at their initial institution. Transferring institutions has been shown to increase time to degree. Not all studies show that underrepresented minorities are at a disadvantage in regards to time to degree. Lam's research (1999), however had different findings and concluded that being a student of color actually is predictive of more timely degree completion.

Age

Studies have found that older students, on average, take longer to graduate than younger students (American Federation of Teachers, 2003; DesJardins, Ahlburg, &

McCall, 2002; Gillmore & Hoffman, 1996; Gillmore & Hoffman, 1997; Knight, 1994). Some graduates are older because they have taken a longer time to graduate, while some students are earning their degree later in life due to a break between high school graduation and college enrollment. Delayed matriculation into college has been shown to increase the chances that a student will drop out of college and decreases their probability of graduation by up to 35% (DesJardins, Ahlburg, & McCall, 2002; Gillmore & Hoffman, 1996; Pascarella & Terenzini, 2005).

As of 2003, 57% of undergraduate students in the U.S. were 21 or older. Older students tend to have additional risk factors that extend time to degree. They are more likely to be financially independent of their parents, have children of their own, and are more likely to be working full-time and attending college part-time. Older students more often have delayed entry into college and are more likely to have something other than a traditional high school diploma (American Federation of Teachers, 2003).

Goenner and Snaith (2003) found that institutions with student populations with higher than average student age had lower graduation rates across four, five, and six-year measures than those institutions with lower average student age. They found a signification negative relationship between the two variables and as average age increased, graduation rates decreased.

Parental Education

A student's parental level of education can have an impact on their own goals. A first-generation college student is one who has had neither parent complete a college degree. These students often do not have their parents as a resource for information on navigating the social and academic challenges of higher education (Corrigan, 2003).

Studies have found that first generation status is a significant predictor of a longer time to degree. Astin (2006) discovered that the father's level of education is positively related to students completing their degree in four years. Parental education level and first-generation status has also been shown to be interrelated to other variables such as race and socioeconomic status. In particular, black and Hispanic students are disproportionately represented among first-general students (Alon & Tienda, 2005; Knight, 2004).

Pre-College Preparation and Degree Attainment

High school academic rigor has been found to be the most influential variable affecting college graduation by two major U.S. Department of Education studies. Its effect on predicting college graduation was greater than that of race, parental education, and family income (Adelman, 2006; U.S. Department of Education, 2011). While the current study does not conduct an examination of high school transcripts, the research does include standardized test scores, high school grade point average, and admissions status to examine pre-college preparation.

Standardized Test Scores

Research on the impact of standardized test scores (both SAT and ACT) has been inconclusive in regards to impact on time to degree, efficiency, and graduation rates. There are studies that have found a positive correlation between standardized test scores and others which have not had these findings. Findings have also differed when crossed with different student characteristics and controlling for other variables.

Knight's (1994) research revealed that students with higher SAT scores graduated more quickly. These findings are also supported by statistics available from

NCES (American Federation of Teachers, 2003). Astin's (1993, 2006) research also supports this, showing that both mathematical and verbal scores on the SAT were highly correlated with degree completion. Goenner and Snaith (2003) also found that SAT scores had a positive, significant effect on graduation rates measured for four, five, and six-year graduation rates.

Gillmore and Hoffman (1996, 1997) did not find strong correlations between standardized test scores and a student's graduation efficiency index. Similarly, Hall, Smith, and Chia (2008) found that high school grades were a much stronger predictor of college success than were standardized test scores, particularly for minority students. A study at the University of Minnesota – Twin Cities also did not find standardized test scores to be predictive for graduation (Jones-White, Radcliffe, Huesman, & Kellogg, 2009).

Astin's research at UCLA (2006) concluded that SAT is not very important in the prediction of four-year or six-year graduation rates and that available variables from the Cooperative Institutional Research Program (CIRP) freshman survey contain almost all of the relevant information that is contained in the SAT. Similar findings were discovered by Astin, DesJardins, Ahlburg, and McCall (2002) revealing no clear link between ACT scores and college graduation chances, particularly when college cumulative grade point average was controlled for.

High School Grade Point Average

Like standardized test scores, the impact of high school grade point average on time and efficiency to college degree differs among scholars. Some have found a positive

correlation between the variables, but methods which hold other variables constant seem to diminish the impact of high school GPA.

Students with lower high school grade point averages have been found to take longer to earn their degree (American Federation of Teachers, 2003; Astin, 2006; Florida Board of Governors, 2004; Hall, Smith, & Chia, 2008; Knight, 2004; Knight & Arnold, 2000). Astin's (1993, 2006) extensive research on retention and the collegiate experience has shown that a student's high school GPA is the strongest predictor of college graduation.

DesJardins, Ahlburg, and McCall's (2002) research found that while high school GPA had an effect on college GPA, it was not necessarily linked to college graduation when this was controlled for. DesJardins, McCall, Ahlburg, and Moye (2002) had similar findings, noting that if they controlled for college performance (GPA) that the strength of pre-college academic measures declines substantially. While high school performance appears to positively affect graduation, it is doing so through college GPA. Gillmore and Hoffman (1996, 1997) also did not find strong correlations between high school grade point average and a student's graduation efficiency index.

Student Enrollment Patterns and Degree Attainment

Attendance Patterns

A student's attendance pattern has a great impact on their time to degree and chance of degree completion (Belcheir, 2000). Attendance patterns can be studied in many different ways. It can be viewed as whether or not a student attends an institution in consecutive semesters, whether or not they include summer semester enrollment, or how many hours are taken per term (Wisconsin University System, 2002). A study in the state

of Florida identified interruptions in attendance as a major factor in time to degree (Florida Board of Governors, 2004).

Students who do not maintain continuous college enrollment are 23% less likely to graduate than those who do not stop out (Cabrera, Burkum, La Nasa, & Steven, 2003). One of the main recommendations to come from Adelman's (1999) study was that to increase chances of college graduation, students should strive for continuous college enrollment.

A study conducted at the University of Minnesota on the 1991 entering freshman class revealed that 61% of the students studied had at least one stop-out during their time at the university. Stop-outs were more likely to be male, from an underrepresented minority group, have lower ACT scores and high school rank, and have lower first-term GPAs. Those who graduated without a stop-out were more likely to be female, white, have higher ACT scores and high school rank, and first term GPAs that were one-half letter grade higher than the stop-out students (DesJardins, Ahlburg, & McCall, 2002).

DesJardins, Ahlburg, and McCall's study (2002) also determined that almost 60% of those who stopped-out did not return to the institution during the six-year time frame of their study and, of those who did return after a stop-out, more than 70% had a second stop-out occurrence. Less than 40% of second stop-outs returned during the time of the study. Of their study sample of 2,373 students, only one person graduated who had more than two stop-outs (DesJardins, Ahlburg, & McCall, 2002).

It has also been discovered that students who enroll in college immediately following high school graduation are more likely to graduate in four years than those who delay enrollment, even if only by one year. Students who delay are almost three times

more likely to take six or more years to graduate than their counterparts who enroll directly after high school (Taylor, Lee, & Doane, 2001).

Course Load

Many researchers have found that the average number of credit hours per term that a student was enrolled in strongly predicted timely graduation (Adelman, 2006; Bound, Lovenheim, & Turner, 2010; Dechter, 2009; DesJardins, Kim, & Rzonca, 2003; Knight, 2004; Knight & Arnold, 2000; Lam, 1999; Tinto, 2004; Wisconsin University System, 2002). Knight's study (2004) found that the higher the average credit hour load per semester significantly decreased both the number of semesters enrolled and the number of semesters elapsed from initial enrollment to graduation. Many researchers have found that lower course loads per term lead to increased amount of time to earn a degree (Bound, Lovenheim, & Turner, 2010; California Postsecondary Education Commission, 2006; Dechter, 2009; Gillmore & Hoffman, 1996, 1997; Knight, 2004; Knight & Arnold, 2000; Volkwein & Lorang, 1996; Wisconsin University System, 2002).

There are many possible reasons a student may choose to take less credit hours. This could include the inability to pay for additional hours or the need to work more to pay for school. Low-income students (42%) are less likely to attend full-time (and full-year) than their middle and upper-income (64%) counterparts. This trend is the same across all institution types (King, 2003). Students also may want to take a lighter load to focus on grades or to accommodate time for family and other personal interests. Course load may also be impacted by course offerings and availability (Bound, Lovenheim, & Turner, 2010; Taylor, Lee, & Doane, 2001).

Gillmore and Hoffman (1996) discovered that part-time students had an average GEI of 79%, while full-time students had an average of 89%. Research has shown that students who attend part-time instead of full-time have less of a chance of ever completing their degree and take longer to do so. The U.S. Department of Education (2002) found that more than 50% of all undergraduates attend college part-time and 80% work while enrolled in classes. This trend makes it increasingly difficult for institutions to improve their graduation rates and to shorten time to degree (Bound, Lovenheim, & Turner, 2010; Corrigan, 2003; King, 2003; Knight & Arnold, 2000).

Most four-year degree programs in the U.S. are based on a 120-hour minimum curriculum. This means that students who do not attend summers must complete on average 15 credit hours per term. However, many full-time qualifications for institutions and federal financial aid require only 12 hours to be considered full-time. This works against a four-year completion plan. Certainly lighter course loads can benefit students in other ways, giving them more time to focus on learning and grades or more time for work. But it would be recommended that academic advising and academic planning tools push students to enroll in at least 15 hours per term to shorten time to degree (Knight, 2004).

Summer Semester Enrollment

Studies on the role of summer semester enrollment and time to degree differ. Some studies have found that summer enrollment decreases time to degree, while others find it increases time to degree (Adelman, 2006; Carlson & Lipka, 2009; Knight, 2004; Knight & Arnold, 2000; Taylor, Lee, & Doane, 2001; Wisconsin University System, 2002).

Many studies revealed that summer semester enrollment was found to have a positive correlation to lengthening time to degree. This fact is surprising because it might be assumed that students attend summer semesters to stay on track or even in an attempt to graduate early. One explanation could be that students use summer enrollment to repeat courses in which they previously failed or had to drop during the normal school year (Knight, 2004; Knight & Arnold, 2000; Volkwein & Lorang, 1996; Wisconsin University System, 2002).

Transferring Institutions

Researchers estimate that nearly 60% of all undergraduates attend more than one institution of higher education (Cohen & Ibrahim, 2008; U.S. Department of Education, 2011). Statistics from the National Center for Educational Statistics (2005) revealed that one in five college students have attended three or more different institutions (U.S. Department of Education, 2011). The number of times a student transfers between institutions of higher education is associated with increased time to degree (American Federation of Teachers, 2003; Gillmore & Hoffman, 1996; Gillmore & Hoffman, 1997; Oklahoma State Regents for Higher Education, 1999; U.S. Department of Education, 2011). However, Knight and Arnold (2000) discovered that the more transfer hours a student brings into an institution, the quicker the student will graduate. They also discovered that the number of transfer credit hours was the single strongest predictor of credit hour load per term. Gillmore and Hoffman's research (1996) found that students who transferred in large numbers of transfer credits (more than 120) had very low GEI averages.

Some studies have shown that students who begin at community colleges and complete at least 10 credit hours are more likely to earn bachelor's degrees than those who begin at a four-year institution and transfer. Most research has shown that transfer students (from both two-year and four-year institutions) take longer to graduate than native students who start and finish at the same four-year institution (American Federation of Teachers, 2003; Gillmore & Hoffman, 1997; Poch & Wolverton, 2006). The American Federation of Teachers' (2003) study had similar findings, indicating that students who begin at a two-year institution took about a year and a half longer to complete their degree versus their peers who began at public four-year institutions (71 versus 55 months). The gap was even greater when compared those who began at private four-year institutions, whose students took on average 50 months to graduate (American Federation of Teachers, 2003).

It has been found that students who transfer after two years of study at one institution usually require five additional terms to graduate. It is assumed that students who transfer are not able to apply all of their credits to the degree at the degree-granting institution (Illinois State Board of Higher Education, 1999; Taylor, Lee, & Doane, 2001). Knight (2004) found that the greater the number of transfer hours that a student had was significantly related to decreasing the number of semester enrolled, but was linked to increasing the number of semesters elapsed from time of initial college enrollment to graduation. Adelman (1999) found that transferring for the right reasons was not detrimental to a student's likelihood of earning their degree. He stressed, though, that students who intend to transfer need to make sure beforehand that their credits will

transfer to the receiving institution and be applied to their degree program (Adelman, 1999; DesJardins, McCall, Ahlburg, & Moye, 2002).

Gillmore and Hoffman's research (1996) found that students who transferred from a two-year institution were much more efficient than those transferring from four-year schools. This effect might be related to a Washington state rule that students may not transfer more than 90 hours from a two-year institution to a four-year institution. There is no credit hour limit for those students transferring from one four-year institution to another. Another factor may be that the state of Washington has invested more time in creating articulation agreements from two-year to four-year schools, and not for four-year to four-year transfers (Gillmore & Hoffman, 1996).

A study by the American Federation of Teachers (2003) found that students who attended only one institution averaged 51 months to complete a bachelor's degree. Those who attended two institutions took an average of 59 months and those attending three or more institutions took 67 months to earn their bachelor's degree. Scott, Bailey, and Kienzl (2006) found that graduation rates of transfer students did not differ significantly from students at public versus private schools. They also found that across both types of institutions, about 30% of students transfer.

Financial Need and Degree Attainment

Since approximately 2001, college student debt has more than doubled. Decreasing state budget allocations to higher education institutions have led to tuition increases, placing more of the financial burden on students and their families. Many students report that the increasing cost is one of the major reasons they do not finish their college degrees (U.S. Department of Education, 2011).

The National Center for Public Policy and Higher Education (2006) reported that the state of Missouri does not invest much into need-based financial aid compared to leading states. They also noted that Missouri does not offer any low-tuition college opportunities and that the net college costs for low and middle income students attending public institutions represents, respectively, 34% and 46% of their annual family income (National Center for Public Policy and Higher Education, 2006).

A student's socioeconomic status has been shown by many researchers to impact degree completion and time to degree (American Federation of Teachers, 2003; Bound, Lovenheim, & Turner, 2010; Cabrera, Burkum, La Nasa, & Steven, 2003; Corrigan, 2003; DesJardins, McCall, Ahlburg, & Moye, 2002; Gillmore & Hoffman, 1996; Tinto, 2004). The types and amount of financial aid offered to students is directly related to their socioeconomic status.

Socioeconomic Status

Research has shown that students who are financially disadvantaged also tend to be academically disadvantaged (Cabrera, Burkum, La Nasa, & Steven, 2003; Tinto, 2004). Students from low-income families are less likely to persist in higher education and to earn a degree than higher-income students (American Federation of Teachers, 2003; Tinto, 2004). A comparison of low-income and high-income students after three years of initial enrollment showed that in 1998 only 59% of low-income students were still enrolled, versus 75% of high-income students (Corrigan, 2003). National statistics of five-year graduation rates for students beginning college in 1989 revealed that 22% of students from low SES (bottom 25%) families, 39% of students from the middle 50%,

and 53% those from the high (top 25%) SES families graduated within five years (DesJardins, McCall, Ahlburg, & Moye, 2002).

"Low-income students often have multiple risk factors affecting their persistence in postsecondary education. Because these risk factors often are highly intercorrelated, the challenges faced by low-income students are compounded" (Corrigan, 2003, p 27). Their financial need may be in part due to family circumstances and the education level of their parents. This in turn can have an impact on their academic background, institutional choice, and attendance patterns (American Federation of Teachers, 2003; Attewell & Lavin, 2007; Cabrera, Burkum, La Nasa, & Steven, 2003; Corrigan, 2003; Gillmore & Hoffman, 1996). Less than 20% of low-income students have had at least one parent who earned at least a bachelor's degree compared with half of all students who identify as middle- or upper-income (Corrigan, 2003). The parents of low-SES students are less likely to be involved in their school activities and are generally less knowledgeable about how to prepare them for college (Cabrera, Burkum, La Nasa, & Steven, 2003).

Students in low SES categories are also less likely to have taken a challenging high school curriculum and are more likely to have completed an alternative high school credential (GED, etc.). Research has shown that students who do not earn a traditional high school diploma are less likely to persist and attain a college degree (Cabrera, Burkum, La Nasa, & Steven, 2003; Corrigan, 2003). When controlling for academic preparedness for college, students in the lowest SES categories were still 22% less likely to complete a college degree than students in the highest SES category (Cabrera, Burkum, La Nasa, & Steven, 2003; Corrigan, 2003).

Research has shown that unmet financial need is greater for low-income students than for middle and high-income students (American Federation of Teachers, 2003; Tinto, 2004). That means that these students must find other ways to pay for their education. This often equates to attending school part-time and working more hours. Students who work off-campus and who work full-time while in school take longer to graduate (Astin, 1975; Corrigan, 2003; Howard & Rogers, 1991; Lam, 1999). These students are often unable to take full-time course loads and often take longer to graduate. Students with families often need to work to support their families and to pay bills. Lower-income students are no more likely to work while enrolled in college than students from middle or high-income families; however, they do tend to work more hours on average (Corrigan, 2003; Gillmore & Hoffman, 1996).

Family circumstances also often vary greatly by socioeconomic status. One-third of low-income students support a family of their own while pursuing their degree, while only 4% of students in middle- or upper-income brackets have this additional responsibility. In fact, the majority of students who are supporting a family are also low-income (Corrigan, 2003).

Financial Aid

Studies show mixed results in regards to the effects of financial aid on time to degree. Students who received grants were found to take longer to earn their degree (Volkwein & Lorang, 1996) in some studies, but shorter in others (Knight & Arnold, 2000). Some studies found that students who receive more grants than loans were more likely to graduate overall (Alon & Tienda, 2005; Cabrera, Burkum, La Nasa, & Steven, 2003). Lam's research (1999) showed that students who received aid in the form of loans

took less time to graduate, but Knight and Arnold's (2000) study showed the opposite. Some of this discrepancy might be explained by differences in the institutions and the composition of their student population.

DesJardins et al. (2002) studied the effects of financial aid over time and found that while loans and grants were positively associated with graduation, their effects lessened over a student's time in college. They also discovered that work-study was negatively related to graduation, unlike many other researchers, but found that around year six, this trend reverses itself (DesJardins, McCall, Ahlburg, & Moye, 2002).

Knight (2004) found that students who were defined as a dependent for financial aid purposes had greater semesters elapsed and enrolled between entering college and graduation. No significant relationship was found between a student's amount of unmet financial need and the number of semesters enrolled or elapsed to degree attainment (Knight, 2004).

Students who work off-campus during the school year are less likely to graduate in a timely fashion, but those who work during the summers to support their education show a positive correlation to graduation rates (Astin, 2006). Work-study has been linked to positive graduation rates in many studies (Adelman, 1999; Cabrera, Burkum, La Nasa, & Steven, 2003; Corrigan, 2003).

DesJardins, Ahlburg, and McCall (2002) believed that while financial aid promotes persistence, the components of financial aid have differential and time-varying effects on student persistence. The types of aid that students receive, loans versus scholarships, and when those are offered to students and in what amounts may have different impacts over time and depending on where a student is in their degree plan.

They did find a strong correlation between work-study and graduation, though for all other types of financial aid the influence on graduation was indirect. For example, merit-aid was not found to have an impact on graduation as often found by other researchers, but it did directly influence the likelihood of a stop-out, thus indirectly impacting graduation (DesJardins, Ahlburg, & McCall, 2002).

College Academic Achievement and Degree Attainment

Grade Point Average

Researchers have found conflicting results on the impact of cumulative GPA at the time of graduation on time to degree. Knight (1994) and Lam (1999) both found that students with higher cumulative GPAs both graduated earlier and with less total credit hours earned. Adelman's study (1999) also supports college GPA as an important predictor of college graduation. He studied both freshman year GPA and the ratio of the freshman GPA and their final cumulative GPA. However, Volkwein and Lorang's (1996) and Knight and Arnold's (2000) studies revealed that higher grade point averages corresponded with longer time to degree. This can possibly be explained by students taking lighter course loads in order to focus more attention to their grades.

DesJardins, Ahlburg, and McCall (2002) found that there is a very positive relationship between college grade point average and persistence and timely graduation. Their study revealed that this effect is fairly constant over time as students progress through to their degree. They found that every one grade point increase in GPA more than doubled a student's chance of earning their degree (Belcheir, 2000; DesJardins, Ahlburg, & McCall, 2002; DesJardins, McCall, Ahlburg, & Moye, 2002). The work done by Cabrera, Burkum, La Nasa, and Steven (2003) supports this finding. They found that

for every increasing grade change in GPA a student's chances of degree completion increased by 32%.

Earned Credit Hours

Knight (1994) found that students who had earned a greater number of credit hours had a longer time to degree. The greater the number of hours a student earns by graduation the more likely they are to have elapsed and enrolled in more semesters from initial enrollment to graduation. There are many reasons why students may have extra earned credit hours. Some students may have chosen to enroll in extra classes, lost work in the transfer to a different institution (not applying to degree requirements), or may have extra hours if they changed majors. Some students earn extra hours due to additional major or minors or the choice to add experiences such as study abroad, internships, and extra classes to their curriculum. Some students may have acquired extra hours if they were unable to take required courses and had to sign up for electives in order to maintain full-time status (Knight, 1994).

Attempted Credit Hours

Attempted credit hours are those that a student enrolls in, but which do not result in hours earned. These hours are accumulated when a student drops courses, repeats courses, or fails courses. Extra attempted hours can be very costly to both students and the institution. The Wisconsin University System (2002) reported:

> Credits-to-degree is one gauge of institutional efficiency since it is a measure of resource allocation and utilization. When students attempt more credits than required for degree completion, they use institutional resources that could be used to serve additional students. (p. 6)

Cabrera, Burkum, La Nasa, and Steven (2003) found that students who dropped or failed between 10-20% of their attempted course work were 13% less likely to earn

their baccalaureate degree. When that amount exceeded 20% of their course work, their chances of graduation decreased by more than 25% (Cabrera, Burkum, La Nasa, & Steven, 2003).

Researchers have found that dropping and repeating courses had a strong correlation with a longer time to degree (Adelman, 2006; Jones-White, Radcliffe, Huesman, & Kellogg, 2009; Knight 1994, 2004; Knight & Arnold, 2000; Weissman, 1999). In particular, dropping and repeating courses had more of an effect on the number of semesters enrolled versus the number elapsed (Knight, 2004). Research on time to degree (Knight, 2004; Knight & Arnold, 2000) revealed that the number of courses a student fails is one of the strongest predictors of the number of total terms enrolled and the number of terms elapsed prior to earning a degree.

Institutional Factors and Degree Attainment

While there are many student characteristics and behaviors that institutions of higher education have no control over, research has shown that there are institutional characteristics that are also important determinants of four, five and six-year graduation rates. "The reason why some students take more than four-years [to graduate] may have as much to do with the institution as with the student" (Astin, 1997, p. 652). There are many institution characteristics that can influence the retention and eventual graduation of students. These include things such as student-faculty ratios, the percentage of faculty who are full-time, expenditures per student, and tuition and fees. Institution type, accreditation, geographic location and mission can also have an impact (Goenner & Snaith, 2003). In the research, students cite many different institutional factors that have affected their timely degree completion. These range from course availability, the

availability of financial aid, complexity of degree requirements, inadequate academic advising, and the loss of credits from transferring between institutions (Bean, 1986; Poch & Wolverton, 2006; Schuh, 2003).

Studies comparing graduation rates across institutions show that the inclusion of institutional characteristics, as well as student characteristics, improves the ability to predict graduation rates. It is important to consider institution size, cost, quality, and budgetary expenditures. Many studies on graduate rates and time to degree have ignored the impact of institutional characteristics (Goenner & Snaith, 2003).

Goenner and Snaith (2003) found that all of the institutional variables they studied were significantly related to graduation rate at the six-year graduation rate, but not for all four or five-year rates. Institutions with a higher percentage of full-time faculty members had better six-year graduation rates, but no significant findings were found for four and five-year graduation rates. Oddly, they discovered that a *higher* student-faculty ratio is positively related to graduation rates. They surmise that this variable might be linked to some other institutional variable that they did not study. For example, institutions with a high student-faculty ratio may invest additional resources into other academic support services to offset a poor ratio. It is also purported that maybe student-faculty ratio does not impact earning a degree, but might impact the quality of education received.

Public versus Private Institutions

In the 1960s and 1970s many states and the federal government expanded their role in higher education. The benefits of higher education both personally and to society at large were well understood and the goal of access to a broader portion of the population led to changes in federal financial aid and admissions practices. Many state

institutions were encouraged to open their doors to formerly underserved students and to practice "need-blind" admissions (Scott, Bailey, & Kienzl, 2006). While this mission of access met needs in higher education it also created challenges for higher education administrators. By the beginning of the 21st century nearly 78% of the college-going population was attending state sponsored institutions. At the same time, college graduation rates were falling and state financial support for higher education was waning (Scott, Bailey, & Kienzl, 2006).

It is clear from the research that private institutions have better graduation rates than public institutions (American Federation of Teachers, 2003; Bound, Lovenheim, & Turner, 2010; Scott, Bailey, & Kienzl, 2006). Among public institutions Ph.D. schools had the greatest graduation rate of 72.7% (compared to 81.6% at private institutions) and among private institutions B.A. schools had the greatest graduation rate of 82.9% (compared to 70% at public institutions) (Levitz, Noel, & Richter, 1999).

Unlike public colleges, time to degree at private institutions has not changed substantially over time (Hauptman, 1997; Selingo, 2001). Public school officials have argued that their student demographic is different from that of private schools. Public school officials claim to enroll more non-traditional students at their institutions. In general, students who attend private institutions are younger, have higher standardized test scores, commute less, and are more likely to attend full-time than students who attend public colleges. Less than half (46%) of all students at private institutions commute to campus compared to 73% of students who attend public institutions (Scott, Bailey, & Kienzl, 2006). However, the private sector notes that this is a poor excuse and that their

populations are in fact similar and that private schools enroll more part-time students than do public institutions (Selingo, 2001).

Studies have found that students attending private institutions graduate, on average, in a shorter time period than those who attend public college and universities. In a study of college graduates in 1990, four-year or fewer graduation rates at public and private schools were 36.1% and 57.9%, respectively (American Federation of Teachers, 2003; NCES, 1993; Scott, Bailey, & Kienzl, 2006). That represents a significant difference of over 20% of students. As expected, private institutions also had fewer students take more than six years to graduate (15.5%) compared to at public institutions (20.7%) (NCES, 1993).

Students who attend public institutions are more likely to take five or more years to graduate than are those students attending private institutions. About two-thirds of private school students complete their baccalaureate degree within a four-year period, versus about half that for public school students. College administrators argue that the high cost of private colleges and universities encourages students to stay on track and graduate in a timely manner (American Federation of Teachers, 2003; Bound, Lovenheim, & Turner, 2010; Brune, 1996; Selingo, 2001).

The study by the American Federation of Teachers (2003) reported that, on average, students who graduated from private institutions did so in about 6 months less time than those students at public institutions (51 months compared to 57 months). In Missouri the average four-year graduation rate at four-year public institutions was 29% and the six-year graduation rate at these schools was 55%. Private institutions had

graduation rates of 41% in four years and 60% in six years (Complete College America, 2011).

Institutional Selectivity

Institutional selectivity has been shown to have an impact on graduation rates. Selectivity is often measured on required standardized college admissions test scores (ACT/SAT) and high school GPA or rank required for admission to the university. The better academically prepared the student, the more likely they will reach graduation (Alon & Tienda, 2005; Astin, 2006; Blose, 1999; Levitz, Noel, & Richter, 1999). Astin (2006) found that the most important institutional characteristic that affects graduation rates is selectivity. This is not surprising, as more selective schools would be admitting better prepared students. Institution selectivity is a function of the types of students who are admitted. Having a strong, academically prepared peer group also motivates students to succeed at these institutions. Alon and Tienda (2005) found an interesting correlation that Hispanic and Black students who attended selective institutions were more likely to graduate than their peers at non-selective institutions. The racial and ethnic gap in graduation rates narrows as institutional selectivity increases.

Data compiled by the American College Testing Program (ACT) in 1999 compared national graduation rates by type of institution and level of selectivity for both public and private institutions. Their study broke institutional selectivity into five categories: highly selective (ACT $\geq$ 27.0), selective (ACT 22.0 - 26.9), traditional (ACT 20.0 - 21.9), liberal (ACT 18.0 – 19.9), and open (ACT < 18). Type of institution was analyzed for associate, B.A., M.A., and Ph.D. institutions. The researchers used a three

year graduation rate for associate degrees and a five-year graduation rate for baccalaureate degrees (Levitz, Noel, & Richter, 1999).

A summary of their findings revealed that, overall, the more selective the institution, the higher the graduation rate. For example, among public institutions that identified as highly selective, all institution types had at least a 67.3% graduation rate while those that were open institutions had a top retention rate of 32.5%. There was less disparity among the private institutions, but the difference by selectivity was still significant. Among all institution types, those with high selectivity had a least a 75.7% graduation rate and the best graduation rate among the open private institutions was 55.1%. There were small variations for both public and private schools among some of the levels of selectivity where this did not always hold true, particularly between the traditional and liberal, and liberal and open levels of selectivity (Levitz, Noel, & Richter, 1999).

Among private schools, the associate institutions had much better graduation rates than the other types of institutions at all levels of selectivity. However, there were no associate institutions at the highly-selective level. Within the other institution types there are no apparent patterns for graduation rates across the different selectivity levels. Even fewer conclusions can be drawn for the public institutions. While the associate schools have the best graduation rate at the open selectivity level, they have the worst rate at the traditional selectivity level. In summary, the highest degree offered at an institution does not seem to have a great impact on graduation rates. But whether a school is public or private and their level of selectivity does have a great potential impact on graduation rates (Levitz, Noel, & Richter, 1999).

Curriculum Structure

Degree, major, and minor. Gillmore and Hoffman (1996) found that the type of degree (B.A. vs. B.S.) that a student was pursuing had an impact on graduation efficiency. They found that B.A. degree recipients had higher efficiency than B.S. recipients. Interestingly, they found a difference in gender and degree, finding that women were more efficient in B.A. degrees than men, but that women were less efficient than men within those earning B.S. degrees (Gillmore & Hoffman, 1996, 1997). Their 1996 study pointed out that academic programs can artificially raise their measured efficiency levels by raising the minimum number of credits required. However, this can actually lower efficiency. They warned that "care must be taken to assure that program credit requirement minimums that exceed the institution's minimum are grounded on academic necessity" (p. 3).

The curriculum choices (major, minor, degree) that a student makes can have an impact on their time to degree. The number of credit hours required for each program versus the number of free choice electives available, the prerequisite structure, and course offerings are a few issues that vary by curriculum. Many studies (Astin, 1993, 1997, 2006; Kroc, Howard, Hull, & Woodard, 1997) have shown that students in science and engineering programs, the allied health professions, and in fine arts take longer than four years to graduate. This is probably due more so to the structure of the curriculum instead of student initiated factors. Many programs in the sciences are more than the minimum 120 hours and often these programs may entail time away from classes in co-op or internship experiences. Conversely, students studying majors in the social sciences, humanities, and business tend to graduate in a more timely fashion (Astin, 1993, 1997).

A study at the University of Minnesota (DesJardins, Ahlburg, & McCall, 2002) demonstrated that students in majors in their Institute of Technology were more likely to graduate than those in their General College. This may be due to higher labor market returns for students graduating in high-paying technology fields (DesJardins, Ahlburg, & McCall, 2002).

Research has shown that approximately one-half of entering freshmen change their major at least once (Howard & Rogers, 1991). Often times a change in major equates to longer time needed to earn a degree (Illinois State Board of Higher Education, 1999; Lam, 1999; Oklahoma State Regents for Higher Education, 1996). A study of recent graduates at a large public university by found that of students who changed their major, 57% took more than 5 years to graduate versus only 37% of those who did not change their majors. Of students who took more than four years to graduate, 21% cited changing their major as a factor to their increased time to graduation (Howard & Rogers, 1991).

While changing majors is clearly a factor that influences time to degree, researchers have also found that what the majors are makes a difference. Students who changed their major to one in technical and scientific programs took longer on average to graduate than did those who changed to majors in other areas (Howard & Rogers, 1991). In summary, the more structured and technical the major, the more likely a student's time to degree would increase.

In the 2010 UCM catalog roughly one quarter of the majors required a minor. In 2007 the university made changes to its curriculum, including removing the required minor from many programs, to assist with retention and time to degree and to be more in-

line with other institutions in the state (UCM, 2010). While there are advantages to graduation with a minor, in regards to time to degree it can be a disadvantage because a minor would account for more required hours in a student's curriculum instead of the flexibility of free electives.

General education. At UCM all students must graduate with a minimum of 48 hours of general education. Some students are required to take as many as 53 hours of general education, particularly in the mathematics and science majors (UCM, 2010). While the overall number of hours required in general education is similar for graduates across different majors, the flexibility in the general education varies greatly. For example, students in the Criminal Justice major have only one specified course in the general education, but those in the Elementary Education major have to take 12 specific required classes in the general education (UCM, 2010).

This structured curriculum poses a few different problems. Students must be sure to take the right courses and run the risk of the course not being offered when they plan to take it or the course may not have enough seats when needed. Students who enter college without a major in mind are often encouraged to take general education courses while they explore different majors. However, once a major is decided upon, the student may need to take extra courses in general education to meet the specific requirements of their new major. Students who change majors can also run into the problem of general education course work in the first major not working for the second major.

All of the curriculum items mentioned (majors, minors, required hours, general education, and free choice electives) all have a potential impact on a student's ability to change their major and still graduate within a four-year period and with the minimum

number of hours required for a degree. The more structured a program, the more difficult it can be to change to that major to another.

Course Schedule and Prerequisites

Access to courses can delay a student's graduation. Depending on demand departments may not be able to offer multiple sections of a course (Bound, Lovenheim, & Turner, 2010; Johnson & Baum, 2004). This can be limiting to students if they are unable to take the course at the offered time or if they have conflicting course schedules. In addition to the number of course sections offered per term, some departments are limited to offering courses once per academic year or even less often (UCM, 2010). This problem can be complicated even further if the course in question is a prerequisite for future courses and can cause a domino effect, pushing a student's graduation date back even further.

Many non-traditional students rely on the availability of evening course work to accommodate their work schedule. Graduate and traditional students also depend on these courses to supplement course offerings during the day and to fit courses in to stay on track. More than one-third of students surveyed at Brigham Young University reported that they believed it would take them an additional year or more to graduate if evening classes were not available. Of these students, nearly 60% of nontraditional students felt this way (Hoyt, Howell, & Young, 2009).

The prerequisite structure within degree programs can also have an impact on time to degree and course sequencing. In majors with few prerequisites, students have added flexibility in their course schedules. But when a major, such as nursing, has courses that build upon each other or are designed in a cohort based system, students who

are unable to take courses during a semester can throw off their entire graduation plan (Dechter, 2009).

Strategies to Increase Graduation Rates and Efficiency

Many different strategies have been employed by colleges and university across the United States in an effort to increase graduation rates and to improve upon time and efficiency to degree. Some of these strategies involve changing practices, policies, and services on campus to aid students in degree completion. Other strategies are aimed at impacting student behaviors by rewarding them for timely graduation or punishing them for taking extra time or credits to graduate.

Strategies Aimed at Institutional Factors and Practices

In 1996 the University of Florida began a "tracking" program. This new software program linked student degree audit reports to the campus enrollment system, allowing the system to automatically track the progress of students. This type of automated system proved very effective at a large institution that does not have enough faculty or support staff to meet face to face with each student. The program would identify critical courses that students need to take and specify when they should take them. It also could put holds on students who are not on track to prevent them from future registration without an intervention (Capaldi, Lombardi, & Yellen, 2006; Office of Program Policy Analysis & Government Accountability, 2006).

The tracking program was a success and improved each of the university's graduation rates (4-, 5-, and 6-year) by 7% for the first cohort of students. It was so successful that the state of Florida encouraged all universities in the state to adopt a similar program (Capaldi, Lombardi, & Yellen, 2006; OPPAGA, 2006). The tracking

program helped students to navigate the large and confusing campus bureaucracy by focusing on improved academic advising services providing students with more coherent paths towards their intended degrees. The program also focused on their enrollment management system and identified course availability issues in required and prerequisite courses (Capaldi, Lombardi, & Yellen, 2006: OPPAGA, 2006).

The tracking program takes into account the student's major, perquisites, and course sequencing, combined with the student's transcript and delineates a sequential plan of action that leads the student to graduation. Tracking also enables students to see how a change in major would affect their time to degree by applying their academic history to the requirements of a different program. (Capaldi, Lombardi, & Yellen, 2006; OPPAGA, 2006)

Other institutions (e.g., the University of Florida, University of Iowa; University of Maine at Orono; University of Missouri at Columbia; Washington State University) have instituted "graduation contracts" with students, signed as early as freshman orientation. These agreements make a promise to the student that the institution will offer the necessary classes for the student to graduate in four years. In turn, the student agrees to maintain good academic standing and complete a minimum number of hours each year (Capaldi, Lombardi, & Yellen, 2006; Lonabocker & Wager, 2003; Selingo, 2001; Taylor, Lee, & Doane, 2001).

A study of 216 public and private research and doctoral universities by Gansemer-Topf and Schuh (2003) found that the schools that invested more financial resources to instructional and academic support services had higher first year retention rates. The study found that private institutions, for both Research I and Doctoral I spent more than

their public counterparts on these per student headcount. In addition to increased first year retention, these institutions also had higher graduation rates. A federally funded program that supports academic integration is Supplemental Instruction (SI). Supplemental instruction has proven to not only assist students with short term goals such as a better grade in a particular class, but research has shown that students who take SI during their freshmen year actually have better chance for graduation than their peers who do not participate in SI. Holding all other factors constant, researchers found that SI increases the chance of four-year graduation by nearly 11%. (Bowles, McCoy, & Bates, 2008)

Campuses can actively engage their students with academics by offering programs such as academic based learning communities, service-learning experiences, internships and study abroad materials, or by encouraging opportunities for students to interact with faculty outside of the classroom (Gansemer-Topf & Schuh, 2003). Some institutions target retention programs geared towards student populations with historically low persistence and graduation rates. Some examples of these programs include programs such as summer bridge programs, conditional admissions programs, early alert programs, and probation recovery programs (California Postsecondary Education Commission, 2006).

Enrollment management practices can enhance time to degree. Instead of scheduling courses based on when departments and faculty want to teach them, offering them when students need them and with enough seats to meet demand will assist students with timely graduation (Capaldi, Lombardi, & Yellen, 2006). Another way that institutions and states can increase efficiency is to have strong transfer articulation

agreements between institutions in the state (Office of Institutional Research, Demography, and Assessment, 2003; Poch & Wolverton, 2006).

The first step that the University of Wisconsin System took in an effort to reduce credits to degree, and thus improve time to degree, was to examine their major curricula and identify programs that required more than the university minimum (120 credits) for graduation and reduced them where appropriate. In 1995, their Board of Regents set the goal of reducing credits to degree from 145 to 140 by 2001. They exceed their goal and reduced it to 137 average credits to degree. Their efforts to reduce credits to degree also increased their four-year graduation rate from 21% to 33% during the same time frame (Wisconsin University System, 2002).

Strategies that Reward or Punish Student Behavior

To encourage timely graduation, some colleges offer flat-rate tuition for students taking over a certain number of hours. For example, students below full-time (12 hours) would pay a per-credit hour fee, while students who take 12 or more hours would pay the same flat fee whether they are enrolled in the minimum 12 hours or a maximum of 19 hours. Students at these institutions would be encouraged to take more than 12 hours each semester to benefit from "free" classes (Selingo, 2001).

To increase the amount of performance funding received from Ohio's Success Challenge Program, Bowling Green State University offered tuition discounts to students who enroll in their final summer term if it will help them to graduate within a 48 month time frame (Knight, 2004). Other institutions have instituted lower summer tuition rates to encourage students to make up hours or get ahead in their curriculum during the summer terms.

The University of Minnesota instituted a mandatory advisement program, requiring students to meet with their academic advisor prior to registering for courses each term. This has proven to decrease the number of course withdrawals for their students (Brotherton, 2001).

Some schools have attempted to punish or control student behavior in an attempt to increase efficiency and timeliness to degree. One method is to put restrictions on students' ability to drop courses, by either limiting the time available for course withdrawals or limiting the number of times a student can drop a course. Some institutions have implemented required academic advisement prior to course enrollment or disenrollment to ensure that students are taking the correct courses for progress towards degree and so they realize the consequences of dropping a course (Selingo, 2001).

Some institutions and states are considering imposing consequences for students extending their degrees beyond four years. Some plan to restrict financial aid offerings beyond four years or charge an increase in tuition for hours completed above a set maximum (DesJardins, Kim, & Rzonca, 2003).

Summary

The research on time to degree shows that there are many possible variables that can affect a student's time and efficiency to degree. Some of these characteristics are student based and others are institutional. Research has shown that many of the student-reported reasons for delaying graduation are things over which an institution has no control, thus it is important to look at both time and efficiency to degree when studying graduation (Gillmore & Hoffman, 1997).

The research also shows some mixed and surprising results. Research on the many variables that impact degree completion is inconsistent and yielded different results based on the different populations studied. It is important for institutions to determine which factors are salient for their students and to determine if any institutional interventions or policy changes can be implemented to assist students with more timely and efficient graduation plans.

Past research on degree attainment shows that many factors have an impact on time to degree and efficiency. It is very important that policy makers look at more than simply snapshot graduation rates, as these rates do exclude many college students and cannot be compared fairly across different institutions. When looking at the entire picture, it has been found that more than three-fourths of students who start at four-year institutions earn a bachelor's degree or are still enrolled more than six years later, beyond the timelines typically studied.

Although prior research has shown that institutional factors are much less important than the student factors in the study of time to degree, institutions should examine their practices, policies, and curriculum to find ways to increase student efficiency and persistence to a degree.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter provides a description of the research design and methodology used to conduct the study. Included in this chapter is a review of the problem and purpose of the study, the eight research questions, and the research hypotheses which will be tested. A description of the setting in which the study took place, the population studied, and definitions of the dependent and independent variables are also included. This chapter also explains the data collection methods and statistical analyses utilized. Finally, the researcher acknowledges the ethical considerations, researcher bias, and the methodological research limitations of this study.

Problem and Purpose Overview

Time to degree and efficiency are two important issues in higher education today. Graduation rates and time to degree have been widely included as measures of efficiency in higher education. These are valid concerns for all types of institutions: public, private, for-profit, two-year, and four-year schools. Many different stakeholders are affected by these issues. Knight (2004) stated:

> Concerns on the part of students, parents, governmental agencies, and the media about ever-increasing tuition levels have led to calls to improve higher education effectiveness and efficiency. This external accountability mandate accompanied with institutional sensitivity about efficient use of scarce resources has pointed to the need for decreasing undergraduates' time to bachelor's degree attainment. (p. 1)

These concerns have led to mandatory federal reporting programs such as the "Student Right-to-Know and Campus Security Act of 1990". This law requires universities to compile and release institution-wide graduation rates to all students

(American Federation of Teachers, 2003; Astin, 1997, 2006). In addition, many states are using or considering the use of performance based budgeting or funding based on these metrics. States and institutions have employed programs to encourage students to graduate in a more timely fashion, ranging from financial rewards or punishments, specialized advising services, and graduation contracts.

By examining the variables that affect timely and efficient graduation, institutions can identify areas to focus attention and resources to assist students in the completion of their degree. One part of studying time to degree is to develop a baseline of where an institution stands. Another goal of such studies is to create predictive models that can assist higher education administration in being proactive with recruitment and retention efforts with the goal of graduating students in a timely manner (Blose, 1999; Floyd 2002).

The purpose of this study was to provide a rigorous analysis of graduation measurements, resulting in a comparison by college, department, and degree. This study also sought to identify individual and institutional variables that have an impact on time to degree (measured by both semesters enrolled and semesters elapsed) and efficiency to degree (measured by both GEI and alternative GEI). This was accomplished by the study of students who received their undergraduate degree during the period of one academic year (summer 2010 - spring 2011).

This study is unique because it analyzed graduation measures using four different dependent variables. In addition to examining time to degree by two different measures, it also evaluates efficiency to degree using two different equations. Time and efficiency to degree have different consequences for both students and higher education institutions.

Time and efficiency may be, but are not necessarily, related. These differences (or similarities) can provide administrators with additional information to make decisions that can affect student retention and graduation.

This study is intended to add to the general body of literature on graduation research, and in particular, to cultivate an interest in the future study of time to degree and graduation efficiency. The findings from this study may encourage further and more detailed investigation about the paths students take to earning a degree. University administrators and current and future students may benefit from this research as it has the potential to impact services provided to guide students in the pursuit of a degree and in the evaluation of curriculum and its potential impact on graduation and retention.

Research Questions

This study addressed the following eight research questions:

1. What individual and institutional variables affect time to degree (as measured by semesters enrolled) for undergraduate students?
2. What individual and institutional variables affect time to degree (as measured by semesters elapsed) for undergraduate students?
3. What individual and institutional variables affect the Graduation Efficiency Index (GEI) for undergraduate students?
4. What individual and institutional variables affect the alternative Graduation Efficiency Index (GEI) for undergraduate students?
5. How does time to degree (as measured by semesters enrolled) differ among graduates by college, degree, and department?

6. How does time to degree (as measured by semesters elapsed) differ among graduates by college, degree, and department?
7. How does Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?
8. How does alternative Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?

Hypotheses

To answer the research questions, the following null hypotheses were tested:

*Ho*1: There is no statistically significant relationship between the individual and institutional variables and time to degree (as measured by semesters enrolled).

*Ho*2: There is no statistically significant relationship between the individual and institutional variables and time to degree (as measured by semesters elapsed).

*Ho*3: There is no statistically significant relationship between the individual and institutional variables and Graduation Efficiency Index (GEI).

*Ho*4: There is no statistically significant relationship between the individual and institutional variables and Graduation Efficiency Index (GEI).

*Ho*5: There is no statistically significant difference in time to degree (as measured by semester enrolled) by college, degree, and department.

*Ho*6: There is no statistically significant difference in time to degree (as measured by semester elapsed) by college, degree, and department.

*Ho*7: There is no statistically significant difference in Graduation Efficiency Index (GEI) by college, degree, and department.

*Ho*8: There is no statistically significant difference in alternative Graduation Efficiency Index (GEI) by college, degree, and department.

Setting

This study was conducted at the University of Central Missouri (UCM), which is located in the town of Warrensburg. Warrensburg is a community of approximately 17,000 residents and is located about 50 miles southeast of Kansas City. UCM is a medium-sized, public institution with a basic Carnegie Classification of "Master's L". This classification is assigned to institutions that award at least 50 master's degrees and fewer than 20 doctoral degrees each year. The Undergraduate Profile Classification from Carnegie lists UCM as a "FT4/S/HTI" institution, which means that at least 80% of undergraduates are enrolled full-time, the university has selective admissions, and at least 20% of entering undergraduates are transfer students (Carnegie Classification, 2011; Fast Facts, 2011).

UCM has a total enrollment of 11,454 (as of spring semester 2011) comprised of 20% graduate students and 80% undergraduate students. The student population represents 40 states and 56 different countries. UCM offers over 150 academic programs leading to certificates and bachelors, masters, specialist, and cooperative doctorate degrees. The university offers a wide variety of online course work and classes at a site in Lee's Summit, Missouri, closer to Kansas City. UCM has 451 full-time faculty members and the student to faculty ratio is 17:1. The average undergraduate class has 23 students. Seventy percent of the faculty has a Ph.D. or other terminal degree in their field (Fast Facts, 2011).

This study examined time to degree and graduation efficiency across the colleges, departments, and degrees at UCM. A description of these units is provided here. At the time of this study, UCM was comprised of five academic colleges. They are the Harmon College of Business Administration (HCBA), the College of Health and Human Services (CHHS), the College of Education (COE), the College of Science and Technology (CST), and the College of Arts, Humanities, and Social Sciences (CAHSS).

The Harmon College of Business Administration (HCBA) houses the School of Accountancy and four academic departments. The HCBA offers eight degree programs, enrolls 12% of all UCM undergraduate students, and accounts for almost 16% of degrees awarded of the population studied. The largest college at UCM is the College of Health and Human Services (CHHS) with over 27% of the undergraduate students on campus. This college is home to seven departments and one institute (the Institute for Rural Emergency Management). Half of the students in this college are either Criminal Justice or Nursing majors. CHHS offers 23 degree programs and awarded over 26% of the undergraduate degrees in the time period studied.

The smallest college at UCM, with 11.4% of the undergraduate population, is the College of Education (COE). COE is comprised of four departments and offers 11 degree programs. Graduates from this college accounted for nearly 14% of the degrees for summer 2010 through spring 2011. While COE is the only college at UCM to offer education programs for elementary and middle school education, they do not offer all of the secondary education degrees on campus. Two other colleges (CST and CAHSS) offer Bachelor of Science in Education degrees for subjects in the arts, mathematics, sciences, humanities, and social sciences.

The College of Science and Technology (CST) and College of Arts, Humanities, and Social Sciences (CAHSS) are similar in size with 20.6% and 20.4% of the undergraduate population, respectively. CST is home to six departments and one large school, the School of Technology (SOT). The SOT has 33 different degree programs (including majors with concentrations) and accounts for almost 43% of all CST students. The other departments in CST offer a total of 36 degree programs. CST graduates accounted for 18% of the population studied. CAHSS is comprised of two specialty Centers (Religious Studies and Woman's and Gender Studies), ten departments, and 47 different degree programs (including majors with concentrations). Almost 23% of graduates from summer 2010 through spring 2011 were in CAHSS majors.

Population and Sample

To better understand the demographics of the research sample, some information about the undergraduate student body as a whole is presented here. These demographic data were drawn from the university reporting software, Argos, on February, 20, 2011. During the spring semester of 2011, the University of Central Missouri (UCM) had 9,238 enrolled undergraduate students. Removing special populations such as visiting students, international exchange students, and dual credit students reduces this number to 8,209 students. Nearly 86% of this population was enrolled full-time (12 hours or more) during the spring semester.

Using the more traditional undergraduate student population (8,209), just over 53% are female and 61% are reported as Caucasian (this number is likely much higher, as over 26% of students do not have ethnicity information available in the student information system). Other ethnic groups are represented as follows: African American

(6.4%), American Indian/Alaskan Native (.53%), Asian/Pacific Islander (1.1%), and Hispanic (1.3%). Almost 2% of students identified their ethnicity as "other".

In regards to residency, almost 90% of the undergraduate student body is a resident of Missouri. Out-of-state students represent 7.5% and international students account for less than 3% of the undergraduate population. Just over 31% of undergraduates have transferred from one or more institutions. The average age of the undergraduate population is 22.6 and about 30% of undergraduate students reside in campus housing ("About Our Undergraduates," 2011).

The population (N=1,629) for this study consisted of all undergraduate degree recipients from one academic year at UCM (summer 2010 – spring 2011). This includes graduates from summer 2010, fall 2010, and spring 2011 semesters. The sample (N = 1,585) studied from this population included the majority of the graduates, but did exclude some special cases.

Students with a student type of "post-baccalaureate" were excluded from the sample. These students are coded as such because they have already earned at least one bachelors degree from either UCM or a transfer institution. There were 22 of these students in the population. In addition, students pursuing double degrees (defined as two different degree types) were excluded from the study. Double degrees are rare and students pursuing this are required by university policy to earn a minimum of 30 hours of additional course work beyond the minimum required by their first degree program. From summer 2010 to spring 2011 only four students were awarded double degrees.

Research Methodology

This study is an ex post facto, causal-comparative type of research. Causal-comparative research seeks to understand relationships between variables. This type of research attempts to determine what causes differences in groups or individuals (Fraenkel & Wallen, 2003). There are some threats inherent to internal validity in using this type of research methodology. Researchers conducting casual-comparative research lack the ability to manipulate independent variables and there is a lack of randomization in the study. This study will be examining an entire population of students, so the sample will include all possible members. Also, there is not a need in this study to manipulate the independent variables. Another possible threat to internal validity is subject selection bias (Fraenkel & Wallen, 2003). This study does not have this threat as subjects are not self-selecting for participation in the study. Another factor that increases the internal validity of this study is the amount and diversity of independent variables studied.

In regards to external validity, the sample of study for this research is from one institution. While the results reflect the nature of this particular institution, the findings may also be useful to other four-year public institutions that have similar admissions standards and student bodies as UCM. The findings of this study would not be representative of or applicable to all types of higher education institutions (Fraenkel & Wallen, 2003).

The purpose of this study was to explore the possible causes and effects of the various independent individual and institutional variables on the dependent variables of time and efficiency to degree. No independent variables were manipulated in any way. The students in the sample studied had all earned their baccalaureate degree at the time

the research was conducted. In effect, all of the students in the sample had achieved some level of academic success – they completed their bachelor's degree. Variations in this success, as determined by time to degree and GEI, are examined to determine variables that are predictive.

This study was also descriptive in nature, as summarized and provided descriptive statistics for the state of affairs regarding graduation data at the University of Central Missouri. Descriptive studies explain the current state of affairs as thoroughly as possible (Fraenkel & Wallen, 2003). This analysis was necessary to gauge a starting point of graduation statistics at the university. After this baseline is established and it is determined which (if any) student and institutional characteristics and behaviors impact time and efficiency to degree, the university can develop programs and services to help improve upon these metrics. A secondary descriptive analysis can then be performed to measure improvements in time and efficiency to degree. Descriptive statistics are also important because they assist researchers in describing the information contained in many occurrences (in this case, students) with easy to understand indices such as range, average, median, and standard deviation (Fraenkel & Wallen, 2003).

Analysis regarding time and efficiency to degree will be discussed with their variance by each independent variable to show how these dependent variables are influenced by both student and organizational characteristics. The results will be analyzed to show differences by gender, race, age, socioeconomic status, enrollment patterns, and academic achievement. The results will also be compared across academic colleges, departments, and degrees.

Variables Studied

Variables associated with time to degree and graduation efficiency were collected and analyzed using data obtained using a data mining technique of existing UCM records. The selection of variables studied was based on the literature review and the researcher's experience working in higher education. While many variables were studied, this is certainly not an exhaustive list. The variables selected were intended to cover a broad range of a few different categories of variables.

Dependent Variables

This study has four dependent variables: time to degree (as measured by semesters enrolled), time to degree (as measured by semesters elapsed), Graduation Efficiency Index (GEI), and alternative GEI. Studying all four of these variables offers a more complete picture of the path to graduation for students as compared to studying just one.

Time to Degree

There are many different ways to measure time to degree. Some research is based on years, months, or academic terms. With these different measurements of time, some models include time actually enrolled while others consider time elapsed from first enrollment. Additionally, some research includes only the time spent at one institution (typically the degree granting institution), and others consider student enrollment across their lifetime at many institutions. There is also research (Floyd, 2002) which uses a few of these different types of measurement in one study.

For the purpose of this study, the researcher measured time to degree two different ways. Time to degree was evaluated both as semesters enrolled and semesters

elapsed. A semester enrolled is one where a student was enrolled in course work (even if they may have withdrawn late or failed the course work). Semesters elapsed include all semesters (enrolled or not) beginning with the student's first enrollment through their semester of graduation. Semesters were used as the unit of measurement. This included both "regular" (fall/spring) semesters and summer semesters. Semesters of full-time and part-time enrollment were both considered.

Efficiency to Degree

The GEI and alternative GEI were included as variables to measure graduation efficiency at UCM. The term GEI was coined by the University of Washington and examines the amount of attempted credit hours it takes a student to earn a degree versus the amount of credit hours required by that degree program. The GEI measures how efficiently students complete degrees, not the length of time or credit hours they take to complete them. It considers the minimum amount of hours required for a degree and the number of hours earned, dropped, repeated, and transferred (Lam, 2006; Poch, 1998; Washburn & Priday, 2003; Washington State Higher Education Coordinating Board, 2000).

The data for the GEI were obtained by the researcher using a data mining technique with existing data in the UCM student information system (Banner) and through document review of the Undergraduate catalog. After the three parts of the equation were determined, the GEI equation was applied to each student record.

While time to degree is a valuable unit of study, it does not offer a complete picture. The GEI is based on hours attempted versus hours required for degree (minus transfer credits) to determine the efficiency with which students earn their degrees. Some

advantages of using the GEI include the fact that it can be used to equally evaluate both students who attend school full-time or part-time and it can be averaged to compare different groups of students or degree programs. The GEI may be used as a dependent or correlative variable in studies.

Again, the equation developed by the University of Washington to measure the GEI is as follows:

$$\frac{\text{Minimum Required Credits for the Degree} - \text{Transfer Credits}}{\text{Sum of Enrollment Census Day Credits}} \times 100 = \text{GEI}$$

(Gillmore & Hoffman, 1997)

To compute the GEI for the students in the population, the researcher determined the number of credit hours required for each student's degree program. This was not a variable that could be extracted from the student information system (SIS). At the time of the study, the minimum number of hours for any degree at UCM was 120 semester hours. However, prior to 2008, the university minimum was 124 semester hours. Additionally, some degree programs require more than the university minimums of 120 or 124. Students in this study were eligible to follow catalogs as old as the 2002 edition. The researcher determined the catalog that the student was evaluated on for meeting graduation requirements and used the appropriate hours required for that degree program during that catalog year.

Once the number of required hours was determined, the number of credits hours that a student transferred to UCM was subtracted from the numerator. The number of transfer credit hours is a value that is available in the student information system. As noted before, applying the GEI to transfer students can be problematic because the

equation simply takes into account the number of hours transferred to the degree granting institution and does not account for classes that were dropped, repeated, or failed at the transfer institution (Poch, 1998).

For the denominator, the sum of enrollment census day credits was computed from data available in the SIS. This value consists of not only the number of hours a student has earned when his degree is completed, but the total number of credit hours in which a student has enrolled on the census day of each semester. Using the census data allows for the fluctuations that many students make to their course schedules early in the academic term, but it also takes into account courses that are dropped later in the semester, courses that are repeated, and failing grades.

The alternative GEI was also used because of the large number of transfer students who attend UCM. The alternative GEI add the transfer credits to the denominator instead of subtracting them from the numerator. This results in either equal or higher GEI scores when compared to using the traditional equations. The equation developed to measure the alternative GEI is as follows:

$$\frac{\text{Minimum Required Credits for the Degree}}{\text{Sum of Enrollment Census Day Credits + Transfer Credits}} \times 100 = \text{GEI}$$

(Gillmore & Hoffman, 1997)

Independent Variables

Many different independent variables were used in this study. Some of the variables represent student characteristics, while others are institutional measures. The variables have been divided into six categories: (a) student demographics, (b) college preparedness, (c) student enrollment patterns, (d) student finances, (e) college academic

achievement, and (f) college curriculum. These categories and the variables studied within each are described below.

Student Demographic Variables

Five different demographic variables were studied. Two of these variables, ethnicity and age, were studied using two different measures. Each of these variables is briefly described below.

Gender. Gender is a categorical variable available for the entire sample of students studied.

Residency. While there are five different values (including undeclared) for residency available in the SIS, this variable was reduced to three values for the purpose of this study. Students were either coded as "in-state", "not in-state", or "not reported".

Ethnicity. Ethnicity was evaluated two different ways. First, students were coded either "white", "non-white", or "not reported". A second evaluation was based on specific ethnicity. UCM uses six categories to define ethnicity: Caucasian, African American, Hispanic, Asian/Pacific Islander, American Indian/Alaskan Native, and Other. Students listed as "other" chose that designation. There is also the option to have none of the six choices declared.

Age. Two different measurements of this quantitative variable were used for this study. Age at the time of matriculation at UCM and age at the time of graduation were considered.

First generation status. Students are designated as "first generation" if neither parent graduated from college with a bachelor's degree. This value is not housed in the SIS, but is asked on the admissions application and stored in a separate recruitment

database kept by the Office of Admissions. The question is worded on the admissions application as "Did either of your natural or adoptive parents (with whom you were living before your 18th birthday) complete a bachelor's degree?" and it is an optional question.

College Preparedness Variables

Three variables were studied to capture "preparedness" of the sample. These are briefly described below.

Standardized test scores. At the University of Central Missouri, the ACT (or SAT) is required as part of the admission process for all freshmen (students with less than 24 hours of college credit earned) who are applying within two years of high school graduation. ACT is the most common and preferred of the two tests. Transfer students (with more than 24 earned hours) and non-traditional aged students are not required to provide standardized test scores for admission. Standardized test scores are kept in the SIS. For students who provide SAT scores, a conversion equation is used to convert the combined SAT score to a combined ACT score.

High school grade point average (GPA). This value is not housed in the SIS, but is stored in a separate recruitment database kept by the Office of Admissions and is recorded from official high school transcripts. Transfer students (who have 24 hours or more) are not required to submit high school GPA information.

Conditional Admissions Program. UCM has a Conditional Admissions Program (CAP) for new freshmen who do not meet regular admissions requirements. This program requires a learning contract and is supported with intensive advising services, an early start orientation program, and a required freshman seminar course.

Student Enrollment Pattern Variables

This study included four variables that examined enrollment patterns including: (a) the number of transfer institutions a student has attended, (b) the number of summer semesters in which a student has enrolled, (c) the average number of credit hours earned per fall and spring semesters at UCM, and (d) the average number of credit hours attempted per fall and spring semesters at UCM. These numbers were all computed from data available in the SIS.

Student Financial Variables

This study included eight student financial variables. Many of the financial variables can differ over a student's time to degree. For example, Expected Family Contribution (EFC) could change over time as family circumstances change or a student may receive the Pell Grant one year, but not another. Due to this possible fluctuation by year, data were included based on the student's last year of enrollment.

The following three variables were queried using a "yes" or "no" value: (a) is there a Free Application for Federal Student Aid (FAFSA) on file for the student, (b) did the student receive a Pell Grant, and (c) did the student receive institutional aid (scholarships, tuition discount, athletic stipend). The remaining five variables were evaluated by dollar amount.

Expected Family Contribution (EFC). This number is determined after a student completes the Free Application for Federal Student Aid (FAFSA). It is calculated based on family economic information and produces a number that represents the amount that family or student is expected to pay out of pocket for educational expenses (Noel-Levitz,

Inc., 2007). The wealthier the family, the higher the EFC would be. EFC can range from zero to the total sum of the cost to attend the institution.

Percentage of need met. Student need is the "Student Budget minus Expected Family Contribution" (Noel-Levitz, Inc., 2007, p. 2). The student budget is defined as the student's total cost of attendance and will vary by institution. It includes tuition, fees, housing, books, and other personal expenses. Thus, the percentage of need met is the total financial aid awarded from all sources divided by the need (Noel-Levitz, Inc., 2007).

Percentage of need met with gift aid. This calculation is the same as the one above, but only includes financial aid in the form of gift aid (scholarships, grants, tuition discounts, etc.). Unlike loans or work study, gift aid does not need to be repaid or earned (Noel-Levitz, Inc., 2007).

Gap. Gap is also referred to as unmet need. This is calculated by subtracting the total amount of financial aid awarded (gift and non-gift) from all sources from the student need (Noel-Levitz, Inc., 2007).

Amount of accumulated loan debt. This is the amount of loan debt that a student accumulated during their last year at UCM.

College Academic Achievement Variables

Thirteen different college academic variables were considered for this study. Grade point averages; hours earned and attempted; courses failed; repeated and dropped; and academic standing were included. These are briefly described below.

Grade Point Averages (GPAs). Three different GPAs were examined: transfer GPA, UCM GPA, and cumulative GPA. All grade point averages are determined by dividing the number of quality points earned by the number of attempted graded hours.

Repeated course work. The number of course repeats was used as the measure, not the hours of repeated course work. For example, if a student took a course three times, only two of those attempts would be calculated in this figure. Courses which are legitimately available for multiple repeats (and multiple earned hours) are not included in the calculation of this variable.

Course withdrawals. Withdrawals are recorded three ways: W, WP, and WF. Only withdrawn course work at UCM was included because UCM does not record withdrawn transfer work. A "W" indicates that a course was dropped after the last day for a 100% refund but before the drop deadline (typically the first two-thirds of the semester). A WP (withdraw passing) or WF (withdraw failing) grade is assigned when a student has petitioned for a late drop, after the two-thirds deadline. A WP is assigned if the student was passing the course (A, B, C, or D grade) at the time of the approved withdrawal and a WF is assigned if the student was failing the course at the time of the withdrawal. A WP has no impact on GPA, but a WF does count in the GPA like a regular F grade.

Failed course work. This includes all F and WF grades earned.

Earned credit hours. Three different values of earned credit hours are included: transfer, UCM, and cumulative earned hours.

Attempted credit hours. Attempted credit hours includes all earned hours, plus any repeated, failed, or withdrawal hours. Attempted hours at UCM were used in this study. Transfer or cumulative attempted hours were not included because of incomplete transfer data.

Academic standing. Academic standing was evaluated on three different measures: the number of semesters a student was on probation at UCM, the number of times a student was suspended from UCM, and the number of times a student was dismissed from UCM.

College Curriculum Variables

For Research Questions Four, Five, and Six, three additional independent variables were studied to make comparisons across the academic units at UCM. Results of the three dependent variables were compared across college, school/department, and degree. A brief description of these three variables follows.

College. As described earlier in the Settings portion of this chapter, during the year of study (2010-2011) UCM was comprised of five academic colleges: the College of Arts, Humanities, and Social Sciences; the Harmon College of Business Administration; the College of Education; the College of Health and Human Services; and the College of Science and Technology. This five-college structure began at the university in the fall of 2007. Prior to that time, there were only four colleges. For the purpose of this study, a sixth college category ("Other") was added to account for students who graduated with Individualized majors. These majors might include course work from multiple colleges or the student may have graduated with the General Studies major, which currently is not housed in any of the colleges.

Academic department. During the time of study, UCM had 31 departments, two schools (the School of Accountancy in the HCBA and the School of Technology in the CST), and one institute (Institute for Rural Emergency Management) that offered majors.

An additional department category ("Other") was added for students who graduated with Individualized majors.

Degree. UCM offers eight different baccalaureate degrees. Students pursuing double degrees (as defined as two different degree types) are required by university policy to earn 30 hours of additional course work beyond the minimum required by their first degree program (so 150 or 154, respectively). Thus, students pursuing double degrees were excluded from the study.

In addition to the three variables described above, whether or not a student completed a double major and/or a minor was also taken into account for the study. The inclusion of these many various independent variables across the six broad categories lends to a robust study of some of the many variables that can impact time and efficiency to degree.

Data Collection

Data on the variables were obtained using a data mining technique. The data for this study were acquired from various systems at UCM including the student information system (Banner) and a database created at UCM to manage student recruitment. This required the assistance of staff in the Admissions Office, Student Financial Services Office, and Office of Information Services on the UCM campus.

Data mining is a relatively new statistical technique. Its use is quite popular in business, medicine, banking, and many other fields. It has been slower to reach acceptance in academia. Traditional statisticians and institutional researchers are often hesitant to employ its methods because it is fundamentally different from traditional data

collection methods. Data mining, like traditional statistics, is a way of analyzing data to extract meaning from it (Eykamp, 2006; Luan & Zhao, 2006).

In today's technological age, universities have amassed thousands of pieces of data stored in data-warehouses and student information systems. Universities collect data elements from many different sources including admissions applications, the Cooperative Institutional Research Program (CIRP), the National Survey of Student Engagement, (NSSE), the ACT/SAT questionnaires, the FAFSA application, orientation surveys, academic assessments, and satisfaction surveys. While there is no shortage of data, institutional researchers face different challenges in evaluating and making use of this information. Rarely do institutional researchers have the luxury of performing true experimental research. This has led to the adoption of data mining techniques in higher education (Eykamp, 2006; Luan & Zhao, 2006).

The data for this study were collected on graduates from the summer 2010, fall 2010, and spring 2011 semesters (N = 1,600). Information on all of the variables described above was collected. However, not every student had a value for each variable. For example, if a student only attended UCM, he would not have a transfer GPA or transfer credit hours. Also, some students choose to not report items such as ethnicity, and parental education level.

Additional data items were collected to compute some of the variables. For example, catalog year was not a variable studied, but was needed to determine the number of hours that a student's degree program required so that the GEI could be calculated. Similarly, birth date was collected to determine the two age variables considered in the study.

An Excel spreadsheet was created for this study to compile all of the data in one place. After conducting separate analyses for each semester, information from the three semesters was merged together to create the sample. A nominal scale was used to define some of the categorical variables. For example, gender and residency were assigned number codes such as Female = 1, Male = 0 and In-state = 1, Out-of-state = 0, respectively. Coding of the variables in this way was required for the regression analysis. The raw numbers collected from other variables were coded into groupings. This was the case for many of the financial variables and some of the academic variables.

Statistical Analysis

Descriptive Statistics

The first level of statistical analysis for this study includes the use of descriptive statistics. Measures of central tendency including mean and median were calculated for the dependent and independent variables, as appropriate. In addition, measures of variability such as standard deviation and range were calculated for some variables.

Hypotheses Testing

For Research Questions 1 through 4, two levels of statistical analysis were used. First, the researcher employed the use of bivariate analysis. This involves the comparison of two variables to test their association and causality. The researcher tested the correlation coefficients (r) using all three dependent variables against some of the independent variables. This technique provides a summary of the strength and direction of the linear association between the variables. For example, if comparing ACT scores and time to degree, one might expect that as ACT scores increase, time to degree would decrease. The correlation coefficient values can range from -1 to 1. Values close to 1

indicate a strong correlation, while values close to -1 indicate a weak relationship between the variables. A value of zero implies that there is no linear correlation between the variables (Fraenkel & Wallen, 2003).

The second level of analysis used multiple regression. Multiple regression is a useful tool to learn more about the relationship between several independent variables to a dependent variable. Three separate multiple regression analyses were carried out using each of the dependent variables: time to degree as measured by semester enrolled at UCM, time to degree as measured by semesters elapsed from initial enrollment at UCM to graduation, and a student's graduation efficiency index (GEI). Multiple regression works best when there are large numbers of observations in the study, as there are in this study. It is recommended that the researcher have at least ten to twenty times the number of observations as variables (Blose, 1999).

The regression statistic results in a coefficient of determination (r^2) that represents the percentage of the variation in the dependent variable that is explained by the regression line. If r^2 equals one, all of the variation in the dependent variables is explained by the independent variable. If r^2 equals zero, none of the variation of the dependent variable is explained by the independent variable.

When using multivariate analyses such as multiple regression, it is important to consider and deal with the issue of multicollinearity, strong relationships among independent variables that may cause instability in the regression weights. There are a few different ways of using SPSS software to determine if multicollinearity exists between independent variables. Researchers can study the correlation between the variables by judging the tolerance levels and variance inflation factors (VIFs) (Knight,

2004; Mertler & Vannatta, 2002). For the purpose of this study, tolerance values close to zero were assumed to indicate multicollinearity.

Research Questions 5 through 8 examined whether or not the dependent variables differ across different subsets of the university. "Although overall retention and graduation statistics may provide a global picture of the university's effectiveness in retaining and graduating its students, statistics reported separately for subgroups of students are much more meaningful, especially for internal policy decisions" (Howard & Rogers, 1991, p. 69). Thus, in addition to studying time to degree and GEI across the entire sample, results were also computed by college, department, degree, and academic program.

Howard and Rogers (1991) noted that institutional retention and graduation rates are reasonable indicators of institutional effectiveness for smaller colleges where there are few academic offerings and the curriculum is somewhat standardized across campus. However, at larger institutions like the University of Central Missouri where there are many different academic programs with varied curricular requirements, they argued that overall retention and graduation are less useful. Instead, these broad statistics should be used as a benchmark for examining trends among smaller subpopulations of students within the university (Howard & Rogers, 1991).

After compiling descriptive data for each academic unit, analysis of covariance (ANOVA) was used to determine if differences existed for the three dependent variables across college, department, and degree type. The null hypotheses *Ho*5, *Ho*6, *Ho*7, and *Ho*8, state that there are no significant differences in time or efficiency to degree by college, department, and degree. The *p*-Value, or observed level of significance, for these

hypotheses was set at the $p < .05$ level. This represents the smallest level of significance for which the null hypothesis will be rejected, assuming that the null hypothesis is true.

Ethical Considerations

This research study was approved by the Campus Institutional Review Board (IRB) at the University of Missouri, Columbia (MU) as well as the Human Subjects Review Committee at the University of Central Missouri (UCM) and was conducted in a manner to protect the privacy rights and well-being of the subjects included in the sample. The findings and results of this study are provided as aggregate, confidential data and do not identify any of the subjects.

Researcher Bias

The researcher works at the university under investigation and works closely with the graduation clearance process. The researcher also has experience with the academic advisement of students at UCM and is very familiar with university curriculum. The researcher has assumptions from these experiences and knowledge of what variables might be barriers to students at the institution in regards to time and efficiency to degree. One method the researcher used to control for bias was to include a variety of different types of independent and dependent variables. The sample size and composition of the sample studied also help to control for bias (Fraenkel & Wallen, 2003).

Summary

This study examined a multitude of independent variables, ranging from student demographics to university curriculum, to determine if there was a correlation with any of the four dependent variables (semesters enrolled, semesters elapsed, GEI, and alternative GEI). In addition, results were compared across the different academic units

such as college, degree, and department. The study was conducted at the University of Central Missouri and answered eight research questions using a combination of descriptive statistics, correlations, regression, and analysis of variance. Data for the study were collected using a data mining technique across several different sources of data at UCM. The sample studied included all of the students earning a baccalaureate degree from UCM from the summer 2010 to the spring 2011 semesters, with some exclusions. Results of this study are limited in generalizability to UCM and similar peer institutions.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

Chapter 4 provides a review of the purpose of the study, the research questions, and the research hypotheses. An account of the preparation of the data is included and descriptive statistics for all of the independent variables are presented. The statistical findings for each research question are displayed in tables and noteworthy findings are explained. Finally, summary data are provided for the four dependent variables.

The purpose of this study was to examine time and efficiency to undergraduate degree completion. Four different dependent variables were examined including: time to degree, measured by semesters enrolled; time to degree measured by semesters elapsed; graduation efficiency index; and the alternative graduation efficiency index. A combination of 36 individual and institutional independent variables was statistically tested to determine if they had any correlation to time or efficiency to degree. In addition, these items were compared across colleges, departments, and degrees to determine if any significant differences existed among groups as a function of these variables.

This study addressed the following eight research questions:

1. What individual and institutional variables affect time to degree (as measured by semesters enrolled) for undergraduate students?
2. What individual and institutional variables affect time to degree (as measured by semesters elapsed) for undergraduate students?
3. What individual and institutional variables affect the Graduation Efficiency Index (GEI) for undergraduate students?

4. What individual and institutional variables affect the alternative Graduation Efficiency Index (GEI) for undergraduate students?
5. How does time to degree (as measured by semesters enrolled) differ among graduates by college, degree, and department?
6. How does time to degree (as measured by semesters elapsed) differ among graduates by college, degree, and department?
7. How does Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?
8. How does the alternative Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?

This study was designed with eight research hypotheses. The following research hypotheses were tested in this study:

*Ho*1: There is no statistically significant relationship between the individual and institutional variables and time to degree (as measured by semesters enrolled).

*Ho*2: There is no statistically significant relationship between the individual and institutional variables and time to degree (as measured by semesters elapsed).

*Ho*3: There is no statistically significant relationship between the individual and institutional variables and the Graduation Efficiency Index (GEI).

*Ho*4: There is no statistically significant relationship between the individual and institutional variables and the alternative Graduation Efficiency Index (GEI).

*Ho*5: There is no statistically significant difference in time to degree (as measured by semesters enrolled) by college, degree, and department.

*Ho*6: There is no statistically significant difference in time to degree (as measured by semesters elapsed) by college, degree, and department.

*Ho*7: There is no statistically significant difference in the Graduation Efficiency Index (GEI) by college, degree, and department.

*Ho*8: There is no statistically significant difference in the alternative Graduation Efficiency Index (GEI) by college, degree, and department.

Data Preparation

The original data file received included a total of 1,629 students who graduated during the semesters of summer 2010, fall 2010, and spring 2011. Based on the literature, concerns from the information services (IS) staff member who provided the data file, and the researcher's own knowledge and assumptions, 44 students were excluded from the study. Table 1 contains basic information regarding the original population, the exclusions, and the final study sample.

Table 1

Population, Exclusions, and Study Sample Counts and Percentages

Population	N	Percent
Entire Population	1629	100%
Summer 2010	203	12.46%
Fall 2010	553	33.94%
Spring 2011	873	53.59%
Exclusions	44[a]	100%
Post-Baccalaureate	22	50%
Invalid Transfer Work	9	20.45%
Pre-1985 UCM Work	5	11.36%
Double Degree	4	9.09%
UG Certificate Only	3	6.81%
Incorrect Data Entry	1	2.27%
Study Sample	1,585	100%
Summer 2010	197	12.42%
Fall 2010	541	34.13%
Spring 2011	847	53.43%

[a]Cases excluded account for 2.70% of original population.

Half of the students excluded were removed because they were coded as post-baccalaureate students. For these students, this was not the first undergraduate degree they had earned. These students were excluded because of the assumption that they

would have accumulated more semesters and credit hours to earn a second degree and also because the focus of the study is on first degree recipients.

The other 22 exclusions come from five other categories. Nine students had transfer work that was posted with no starting semester listed. This problem is sometimes discovered in UCM data when the transfer work was entered into the computer before the installment of the current student information system. The way the work is entered into the database makes it impossible to determine semesters enrolled or elapsed. There were five students who had UCM course work dating before 1985. The IS staff person identified this as a problem because UCM was on a five-term per year system instead of the current three-term per year calendar. This problem would give an inaccurate representation of both semesters enrolled and elapsed.

Four of the students in the original population were concurrently earning two different degree types. These students were eliminated because curriculum rules at the time required that students earn a minimum of 30 additional credit hours beyond the first degree. This requirement would automatically skew the GEI for these students. Three of the students in the original population did not earn an undergraduate degree, but were included in the file because they had "graduated" with an undergraduate certificate. Finally, one student was eliminated from the study because it is presumed that a data entry error was made in their data. The researcher noticed that they had a recorded age of eight years old at the time of their first transfer work; this implies that an error was made when their transfer work was posted. The final study sample consisted of 1,585 degree recipients.

Descriptive Statistics and Summary Data for the Independent Variables

Thirty-six different independent variables were considered in this study. The following section provides summary information (counts, frequencies, and descriptive statistics) about the variables studied. This information is organized by the different variable types described in Chapter 3. The first five variable types will be discussed first, followed by the results for Research Questions 1, 2, 3, and 4. The sixth variable type, the college curriculum variables, will be discussed later in the chapter before the results for Research Questions 5, 6, 7, and 8.

Student Demographic Variables

This study explored seven different demographic variables. Summary data for these variables is provided in Tables 2 and 3. More than half (57%) of the study sample were females and very small percentages were out of state students (6%) or minority students (6%). Almost half (49%) of the students reported that they did not have a parent with a bachelor's degree. While the average age of graduates was nearly 25, the range of age at graduation varied from 20 to 61 years old.

Table 2

Frequencies and Percentages of Categorical Student Demographic Variables

Variable	Frequency	Percent
Gender		
Female	909	57.35%
Male	676	42.64%
Residential Status		
Resident	1439	90.78%
Out of State	106	6.68%
Not Reported	40	2.52%
Minority Status		
No (Caucasian)	1345	84.85%
Yes	108	6.81%
Not Reported	132	8.32%
Race/Ethnicity		
Caucasian	1345	84.85%
African American	89	5.61%
American Indian/Alaskan Native	16	1.00%
Hispanic	2	.12%
Asian/Pacific Islander	1	.06%
Other	0	0.00%
Not Reported	132	8.32%

Parental Degree		
No	790	49.84%
Yes	663	41.82%
Not Reported	89	5.61%

Table 3

Descriptive Statistics for Continuous Student Demographic Variables

Independent Variable	M	Minimum	Maximum	SD
Begin Age at UCM	20.35[a]	15[a]	60	5.14
Age at Graduation	24.78	20	61	5.54

[a]Students who participated in dual-credit at UCM have an impact on this number.

College Preparedness Variables

Three different variables were studied in this category. ACT composite score was available for nearly 69% of the study sample and high school GPA was available for almost 55% of the sample. Students who transfer more than 24 credit hours to UCM are not required to provide this information to the university. Less than 3% of the sample studied was participants in the conditional admissions program. Tables 4 and 5 summarize this data.

Table 4

Descriptive Statistics for College Preparedness Variables

Independent Variable	N	M	Min	Max	SD	Missing Cases
ACT Composite Score	1092	22.21	13	34	3.66	493
High School GPA	864	3.41	.55[a]	4.68	.49	721

[a]This may not be a true data element, but may be a data entry error.

Table 5

Frequencies and Percentages of Conditional Admissions Program Participation

Independent Variable	Frequency	Percent
Conditional Admission		
No	1546	97.53%
Yes	39	2.46%

Student Enrollment Pattern Variables

This study included four variables that examined student enrollment patterns. Table 6 displays a descriptive statistics summary for the study sample. Over 76% (N=1,207) of the group studied attempted some transfer work. The number of transfer semesters enrolled ranged from one to 36 and the number of transfer hours earned ranged from zero to 205 credit hours. Over 87% (N=1,382) of the sample enrolled in a summer

semester. Many more students enrolled in summer semesters at UCM compared to transfer institutions, 81% and 37%, respectively.

Table 6

Descriptive Statistics for Student Enrollment Pattern Variables

Independent Variable	N	M	Min	Max	SD
No. of Transfer Institutions	1207	1.63	1	7	.85
No. of Summer Semesters	1382	2.45	1	9	1.52
Avg. FA/SP[a] UCM Hours Earned	1,585	12.83	3.55	26[b]	2.36
Avg. FA/SP[a] UCM Hours Attempted	1,585	13.15	3.55	21.5[b]	2.08

[a]FA refers to fall semesters and SP refers to spring semesters.
[b]Large average hours earned and attempted can occur for students with few semesters at UCM, but large amounts of special credit awarded.

Student Financial Variables

This study examined eight variables in this category. The three variables that were queried using a "yes" or "no" value are summarized in Table 7. The additional five variables are displayed in Table 8. Not all students in the study sample received or applied for financial aid. Also, those who did receive financial aid did not all receive the same types of aid. This is what accounts for the different numbers (N) for each of the variables.

Table 7

Frequencies and Percentages for Categorical Student Financial Variables

Independent Variable	Frequency	Percent
FAFSA on File		
No	413	26.05%
Yes	1172	73.94%
Pell Grant Recipient		
No	1005	63.40%
Yes	580	36.59%
Institutional Aid Recipient		
No	1149	72.49%
Yes	436	27.50%

Table 8

Descriptive Statistics for Numerical Student Financial Variables

Indep. Variable	N	M	Mdn	Min	Max	SD
Expected Family Contribution	1,164	$8,363.30	$4,198.00	$0	$99,999	$11,813
Percentage of Need Met	935	269.04%	100%	0	63,800%	2191%
Percentage of Need Met w/Gift	935	47.22%	32.61%	0	3,614.45%	148%
Gap	1,172	$2,125.30	$100.00	$0	$16,050.00	$3,271
Loan Debt	1,010	$8,377.00	$7,500.00	$0	$27,996.00	$5,251

College Academic Achievement Variables

This category had more variables than any other with 13 different items of study. Five of the 13 variables had data available for every student in the study. The other categories did not apply to all students (see Table 9).

Forty-eight percent of the group studied had repeated at least one course. Thirty-eight percent of the students in the sample enrolled in repeat course work at UCM, while 21% had repeat course work at a transfer institution. Slightly more than 32% of the students failed at least one course. Both courses repeated and courses failed took into account UCM and transfer course work. Withdrawn course work was only reported for UCM course work, as UCM does not transcribe course withdrawals from transfer

institutions. In the sample, over half (51%) of the students dropped at least one course at UCM.

In regards to academic standing almost 15% (N=230) of the study sample was on probation for at least one semester, 5% were suspended from UCM at least once, and just over 1% had been dismissed. Because so few students were affected by a negative academic standing, the median for all three of these variables was zero.

Table 9

Descriptive Statistics for College Academic Achievement Variables

Independent Variable	N	M	Mdn	Min	Max	SD
Transfer GPA	1195	3.09	3.06	.36	4.00	.59
UCM GPA	1,585	3.23	3.27	2.00	4.00	.48
Cumulative GPA	1,585	3.17	3.19	2.03	4.00	.45
Repeated Courses	765	1.62	0	0	23	2.74
UCM Withdrawn Courses	811	1.61	1.00	0	32	2.87
Failed Courses	516	1.04	0	0	23	2.31
Transfer Earned Hours	1207	44.17[a]	39[a]	0	205	35.58
UCM Earned Hours	1,585	106.34	115	30	199.50	30.33
Cumulative Earned Hours	1,585	139.89	134	120	268	19.47
UCM Attempted Hours	1,585	114.48	120.5	30	274	35.86
Semesters on Probation	230	.28	0	0	7	.84
No. of Times Suspended	83	.05	0	0	2	.25
No. of Times Dismissed	18	.01	0	0	3	.17

[a]When considering the entire sample (1,585), the average number of transfer hours earned is 33.55 and the median is 20 credit hours.

Research Questions One, Two, Three, and Four

Research Questions 1, 2, 3, and 4 asked which individual and institutional variables affect time to degree (measured by both semesters enrolled and semesters elapsed) and efficiency to degree (measured by both Graduation Efficiency Index (GEI) and alternative GEI).

Several different statistical analyses were conducted to answer the first four research questions. First, a bivariate correlation analysis was conducted using a two-tailed Pearson correlation coefficient. Results were considered significant at the $p < .01$ significance level. This analysis compared 36 of the independent variables against each of the four dependent variables (semesters enrolled, semesters elapsed, GEI, and alternative GEI). Some of the original independent variables of the study did not lend themselves to the correlation analysis because they were not numeric in nature.

The 36 variables that were included in the correlation analysis represented six of the seven student demographic variables. The ethnicity category was not used because of the categorical nature of the variable. All three of the college preparedness, all four of the student enrollment pattern, all eight of the student financial, and all 13 of the college academic achievement variables were included in the correlation. Of the five variables in the college curriculum category, only two (double major and minor) were included in the correlation. The variables of college, department, and degree type were not included because of the categorical nature of those variables. These variables are later analyzed in Research Questions 5, 6, 7, and 8 using appropriate methods.

After determining which independent variables were significantly correlated to the dependent variables, an analysis utilizing linear, stepwise regression was performed.

Only the variables which proved to have a significant correlation were used in the regression equations. This number of significant correlations varied from 23 to 26 independent variables per dependent variable; however, some of the significant variables were eliminated because of collinearity prior to performing the first regression. After the initial regressions were performed, the data were analyzed to look for signs of collinearity among the variables. Variables that exhibited low levels of tolerance were removed from the models. The regressions models were further defined by removing variables that demonstrated small values of change in the adjusted R^2 and appeared to offer little value to the model.

Research Question One

Research Question 1 posed the question, "What individual and institutional variables affect time to degree (as measured by semesters enrolled) for undergraduate students?" Twenty-five of the 36 independent variables tested proved to be significantly correlated to the number of semesters enrolled. Twenty of these correlated variables were then used in the initial linear regression equation. The results of the correlation and regression analyses will be described in the following section, organized by the six different independent variable types.

Student Demographic Variables

Table 10 reveals the correlation results of the student demographic variables with total semesters enrolled. Of the six student demographic variables tested, three proved to have a significant correlation to total semesters enrolled. Both age variables had a strong positive correlation to the number of semester enrolled. This means that students who begin at UCM or graduate from UCM later in life are more likely to have accumulated

more semesters enrolled. The strongest positive correlation was obtained between age at graduation and semesters enrolled, $r = .585$, $p = .000$. There was a weak negative relationship with parental degree ($r = -.087$, $p = .001$), revealing that students who had a parent with a college degree accumulated fewer semesters enrolled. There was no correlation between gender, minority status, or residency with semesters enrolled.

Of the three significant variables in this category, two of them were included in the initial regression. The one that was excluded was age at first UCM enrollment. This decision was made because of the collinearity between it and graduation age. Graduation age was selected for the regression because it had the stronger relationship to number of semesters enrolled.

Table 10

Correlations between Total Semesters Enrolled and the Student Demographic Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Age Began at UCM	1,585	.453*	.000
Age at Graduation	1,585	.585*	.000
Gender[a]	1,585	.008	.746
Minority Status[b]	1453	.034	.191
Parental Degree[b]	1496	-.087*	.001
Residency[c]	1545	.059	.020

[a]This variable was coded as male = 0, female = 1. [b]This variable was coded no = 0, yes = 1. [c]This variable was coded out of state = 0, in state = 1.
*$p < .01$

College Preparedness Variables

As shown in Table 11, two of the three *College Preparedness* variables showed a significant correlation with total semesters enrolled. Both had a weak negative relationship. As ACT composite score increases, the amount of semesters enrolled decreases. Oddly, being admitted conditionally was correlated with fewer semesters enrolled. Both of these significant variables were included in the initial regression. High school GPA was not correlated with semesters enrolled.

Table 11

Correlations between Total Semesters Enrolled and the College Preparedness Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
ACT Composite Score	1092	-.115*	.000
High School GPA	864	-.063	.065
Conditional Admission[a]	1,585	-.095*	.000

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

Student Enrollment Pattern Variables

All four of the student enrollment pattern variables were strongly correlated to the number of semesters enrolled (see Table 12). As would be expected, the greater the average hours a student attempted or earned during fall and spring semesters, the fewer the number of semesters enrolled. The strength and direction of the relationship was nearly identical for these two variables. The strongest correlation was found between number of summer semesters and total semesters enrolled, $r = .635$, $p = .000$. Since all

four of the variables in this category proved to have strong and significant correlations with the number of semesters enrolled, all were included in the original regression.

Table 12

Correlations between Total Semesters Enrolled and the Student Enrollment Pattern Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
No. of Transfer Institutions	1207	.366*	.000
No. of Summer Semesters	1,585	.635*	.000
UCM Avg. FA/SP[a] Att. Hours	1,585	-.596*	.000
UCM Avg. FA/SP[a] Ern. Hours	1,585	-.594*	.000

[a]FA refers to fall semesters and SP refers to spring semesters.
*$p < .01$

Student Financial Variables

Only half of the student financial variables proved to have a significant correlation with the number of semesters enrolled (see Table 13). All of these relationships were fairly weak. Both estimated family contribution (EFC) and the amount of institutional aid received had slight negative correlations with semesters enrolled, while gap and Pell grants revealed slightly positive correlations. All four of the financial variables with a significant correlation were included in the first regression equation.

Table 13

Correlations between Total Semesters Enrolled and the Student Financial Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Estimated Family Contribution	1164	-.163*	.000
Filed FAFSA[a]	1,585	-.040	.114
Gap	1172	.140*	.000
Institutional Aid[a]	1,585	-.192*	.000
Loan Amount	1,585	-.025	.314
Pell Grant[a]	1,585	.112*	.000
Percentage of Need Met	935	-.034	.299
Percentage of Need Met w/Gift Aid	935	-.020	.543

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

College Academic Achievement Variables

Only one (UCM hours attempted) of the 13 college academic achievement variables did not have statistically significant correlation with the number of semesters enrolled. This was an unexpected finding. One would assume that the number of attempted hours would be strongly positively correlated to semesters enrolled. The other 12 variables range from weak to strong relationships. The strongest positive correlation was obtained between cumulative hours earned and semesters enrolled, $r = .613$, $p = .000$. Table 14 highlights the rest of the results.

Table 14

Correlations between Total Semesters Enrolled and the College Academic Achievement Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Cumulative Hours Earned	1,585	.613*	.000
UCM Hours Earned	1,585	-.196*	.000
Transfer Hours Earned	1,585	.502*	.000
UCM Hours Attempted	1,585	-.022	.377
Cumulative GPA	1,585	-.251*	.000
UCM GPA	1,585	-.161*	.000
Transfer GPA	1195	-.200*	.000
Total Repeats	1,585	.404*	.000
Total Withdrawals	1,585	.332*	.000
Total Failed Courses	1,585	.269*	.000
No. Semesters on Probation	1,585	.258*	.000
No. of Times Suspended	1,585	.172*	.000
No. of Times Dismissed	1,585	.089*	.000

*$p < .01$

While there were 12 variables in this category that proved to be significantly correlated to the number of semesters enrolled, only eight of these variables were included in the initial regression. The four variables that were omitted were UCM hours earned, transfer hours earned, UCM GPA, and transfer GPA. These were excluded because of their collinearity with cumulative hours earned and cumulative GPA. The

cumulative hours earned and cumulative GPA variables were chosen as the best representatives because they had the strongest correlation with total semesters enrolled.

College Curriculum Variables

As Table 15 presents, neither college curriculum variable proved to have a correlation with the number of semesters enrolled. Thus, neither of these variables was included in the regression equation.

Table 15

Correlations between Total Semesters Enrolled and the College Curriculum Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Double Major[a]	1,585	.024	.334
Minor[a]	1,585	-.032	.208

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

Regression Model for Semesters Enrolled

Stepwise linear regression was used to determine the fit of the independent variables as predictors of total semesters enrolled. Twenty independent variables were used in the initial regression equation to determine which variables impact semesters enrolled. The final model included seven variables (see Table 16) and accounted for 79% of the variance in total semesters enrolled.

Table 16

Standardized Coefficients and Collinearity Statistics for Linear Stepwise Regression of Independent Variables and Total Semesters Enrolled (N = 1,585)

Independent Variables	Beta	t	Sig.	Tolerance	VIF
(Constant)		10.125	.000		
Total Summer Semesters	.278	18.587	.000	.779	1.284
Cumulative Earned Hours	.399	26.318	.000	.762	1.312
UCM Avg. Earned FA/SP[a]	-.358	-22.187	.000	.671	1.490
Age at Graduation	.168	10.646	.000	.703	1.422
No. of Transfer Institutions	.138	9.800	.000	.880	1.137
Total Repeats	.097	6.433	.000	.771	1.297
Institutional Aid	.035	2.546	.011	.908	1.101

[a]FA refers to fall semesters and SP refers to spring semesters.
Note. R = .889, R^2 = .790, R^{adj} = .789, SE_{est} = 1.721.

Research Question Two

Research Question 2 asked, "What individual and institutional variables affect time to degree (as measured by semesters elapsed) for undergraduate students?" Twenty-four of the 36 independent variables tested proved to be significantly correlated to the number of semesters elapsed. Twenty of these correlated variables were used in the linear regression equation. The results of the correlation and regression analyses will be described in the following section organized by the six different variable types.

Student Demographic Variables

As presented in Table 17, only the two age variables and parental degree had a correlation with the number of semesters elapsed. Of the three variables that were revealed to be statistically significant, only two were used in the initial regression equation. Age began at UCM was not included because of its collinearity with age at graduation. Age at graduation was chosen because it had the stronger relationship of the two.

Table 17

Correlations between Total Semesters Elapsed and the Student Demographic Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Age Began at UCM	1,585	.713*	.000
Age at Graduation	1,585	.878*	.000
Gender[a]	1,585	.004	.871
Minority Status[b]	1453	.041	.119
Parental Degree[b]	1496	-.114*	.000
Residency[c]	1545	.048	.061

[a]This variable was coded as male = 0, female = 1. [b]This variable was coded no = 0, yes = 1. [c]This variable was coded out of state = 0, in state = 1.
*$p < .01$

College Preparedness Variables

As described earlier for semesters enrolled, semesters elapsed also had a weak negative correlation with ACT composite score and conditional admission status (see Table 18). Both of these significant variables were included in the first regression.

Table 18

Correlations between Total Semesters Elapsed and the College Preparedness Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
ACT Composite Score	1092	-.081*	.008
High School GPA	864	-.037	.281
Conditional Admission[a]	1,585	-.075*	.003

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

Student Enrollment Pattern Variables

All four of the *Student Enrollment Pattern* variables were correlated with semesters elapsed (see Table 19). The strongest negative correlation was discovered between average UCM fall/spring attempted hours and semesters elapsed, $r = -.452$, $p = .000$. For all of the variables, their correlation to semesters elapsed was weaker than their correlation with semesters enrolled. All four of the variables were included in the first regression because all were shown to be significant in the correlation.

Table 19

Correlations between Total Semesters Elapsed and the Student Enrollment Pattern Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
No. of Transfer Institutions	1207	.300*	.000
No. of Summer Semesters	1,585	.360*	.000
UCM Avg. FA/SP[a] Att. Hours	1,585	-.452*	.000
UCM Avg. FA/SP[a] Ern. Hours	1,585	-.391*	.000

[a]FA refers to fall semesters and SP refers to spring semesters.
*$p < .01$

Student Financial Variables

As displayed in Table 20, the same four *Student Financial* variables that proved to be correlated with semesters enrolled are also correlated in the same manner with semester elapsed. Though significant, none of the relationships are strong. All four of the statistically significant variables were included in the initial regression equation.

Table 20

Correlations between Total Semesters Elapsed and the Student Financial Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Estimated Family Contribution	1164	-.167*	.000
Filed FAFSA[a]	1,585	-.019	.458
Gap	1172	.125*	.000
Institutional Aid[a]	1,585	-.163*	.000
Loan Amount	1,585	-.020	.426
Pell Grant[a]	1,585	.109*	.000
Percentage of Need Met	935	-.028	.393
Percentage of Need Met w/Gift Aid	935	-.030	.357

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

College Academic Achievement Variables

Table 21 presents the results for the correlation between semesters elapsed and the college academic achievement variables. Of the 13 variables tested, eleven were statistically significantly correlated. The strongest correlations were discovered between cumulative hours earned and transfer hours earned with semesters elapsed, both at $r = -.419$, $p = .000$.

Unlike the results for semesters enrolled which did not show a significant correlation, UCM hours attempted did prove to have a weak negative relationship with semesters elapsed. The negative direction of the relationship is not what one would

expect. It would seem logical that as a student attempted more credit hours, their semesters elapsed should increase instead of decrease. The two variables that did not show a significant correlation to semesters elapsed (though they did to semesters enrolled) were UCM GPA and the number of times a student was dismissed.

While there were eleven variables in this category that proved to be significantly correlated to the number of semesters elapsed, only eight of these variables were included in the initial regression. The ones that were omitted were transfer hours earned, UCM hours earned, and transfer GPA. These were excluded because of their collinearity with cumulative hours earned and cumulative GPA. Cumulative GPA was chosen as the best representative of the three because it had the strongest correlation.

Table 21

Correlations between Total Semesters Elapsed and the College Academic Achievement Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Cumulative Hours Earned	1,585	.419*	.000
UCM Hours Earned	1,585	-.223*	.000
Transfer Hours Earned	1,585	.419*	.000
UCM Hours Attempted	1,585	-.131*	.000
Cumulative GPA	1,585	-.132*	.000
UCM GPA	1,585	-.018	.477
Transfer GPA	1195	-.174*	.000
Total Repeats	1,585	.190*	.000
Total Withdrawals	1,585	.200*	.000
Total Failed Courses	1,585	.116*	.000
No. Semesters on Probation	1,585	.128*	.000
No. of Times Suspended	1,585	.065*	.009
No. of Times Dismissed	1,585	.044	.083

*$p < .01$

College Curriculum Variables

As Table 22 shows, neither college curriculum variable proved to have a correlation with the number of semesters enrolled. Thus, neither of these variables was included in the regression equation.

Table 22

Correlations between Total Semesters Elapsed and the College Curriculum Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Double Major[a]	1,585	-.049	.053
Minor[a]	1,585	-.055	.029

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

Regression Model for Semesters Elapsed

Stepwise linear regression was used to determine the fit of the independent variables as predictors of total semesters elapsed. Twenty independent variables were used in the initial regression equation to determine which variables impact semesters enrolled. The final model included six variables (see Table 23) and accounted for 82% of the variance in total semesters elapsed.

Table 23

Standardized Coefficients and Collinearity Statistics for Linear Stepwise Regression of Independent Variables and Total Semesters Elapsed (N = 1,585)

Independent Variables	Beta	t	Sig.	Tolerance	VIF
(Constant)		-18.701	.000		
Age at Graduation	.830	34.852	.000	.610	1.639
No. of Transfer Institutions	.107	5.509	.000	.911	1.098
ACT Composite Score	.116	5.925	.000	.897	1.114
UCM Avg. Earned FA/SP[a]	-.090	-4.099	.000	.712	1.405
Cumulative Hours Earned	.072	3.464	.001	.796	1.257
No. of Times Suspended	-.048	-2.395	.017	.863	1.159

[a]FA refers to fall semesters and SP refers to spring semesters.
Note. $R = .907$, $R^2 = .822$, $R^{adj} = .820$, $SE_{est} = 2.978$.

Research Question Three

Research Question 3 posed the question, "What individual and institutional variables affect the Graduation Efficiency Index (GEI) for undergraduate students?" Twenty-five of the 36 independent variables tested proved to be significantly correlated to GEI. Twenty of these significantly correlated variables were used in the linear regression equation. The results of the correlation and regression analyses will be described in the following section organized by the six different variable types.

Student Demographic Variables

Table 24 displays the results of the correlations between GEI and the student demographic variables. Of the three significant variables in this category, only two of

them were included in the initial regression. The one that was excluded was age at first UCM enrollment. This decision was made because of the collinearity between it and graduation age. Graduation age was selected for the regression because it has a stronger relationship to GEI.

Table 24

Correlations between GEI and the Student Demographic Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Age Began at UCM	1,585	-.395*	.000
Age at Graduation	1,585	-.416*	.000
Gender[a]	1,585	.035	.163
Minority Status[b]	1453	-.052	.049
Parental Degree[b]	1496	.077*	.003
Residency[c]	1545	-.019	.449

[a]This variable was coded as male = 0, female = 1. [b]This variable was coded no = 0, yes = 1. [c]This variable was coded out of state = 0, in state = 1.
*$p < .01$

College Preparedness Variables

All of the variables in this category showed a correlation with GEI (see Table 25). While high school GPA was not correlated with either measure of time to degree, it did have a positive relationship with both measures of efficiency to degree. As expected, the greater a student's GPA, the more efficiently they earned their degree. A similar relationship was discovered with ACT composite score. Not expected was the positive

direction of the relationship with conditional admission. It would be easy to assume that students admitted conditionally would graduate with less efficiency; however, this did not prove to be the case. All three of the variables in the college preparedness category were included in the first regression due to their significance with GEI.

Table 25

Correlations between GEI and the College Preparedness Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
ACT Composite Score	1092	.110*	.000
High School GPA	864	.180*	.000
Conditional Admission[a]	1,585	.072*	.004

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

Student Enrollment Pattern Variables

Table 26 displays the results for the correlation between GEI and the student enrollment pattern variables. Both number of transfer institutions and number of summer semesters had significant negative correlations with the GEI, indicating that the more transfer institutions a student attended and the greater number of summer semester enrolled led to decreased efficiency towards degree. As expected, both the attempted and earned average fall/spring hours at UCM had a significant positive correlation to the GEI, revealing that the more hours a student attempts and completes each term, the greater their efficiency. Due to their significant correlations, all of the student enrollment pattern variables were included in the original regression equation.

Table 26

Correlations between GEI and the Student Enrollment Pattern Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
No. of Transfer Institutions	1207	-.370*	.000
No. of Summer Semesters	1,585	-.346*	.000
UCM Avg. FA/SP[a] Att. Hours	1,585	.284*	.000
UCM Avg. FA/SP[a] Ern. Hours	1,585	.257*	.000

[a]FA refers to fall semesters and SP refers to spring semesters.
*$p < .01$

Student Financial Variables

The same financial variables that were significantly correlated with the other three dependent variables were also correlated with GEI, with exception of *Gap* (see Table 27). Gap is the amount of money that remains to be paid by the student after their financial aid is subtracted from their total cost of attendance. The three significantly correlated variables were included in the primary regression.

Table 27

Correlations between GEI and the Student Financial Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Estimated Family Contribution	1164	.155*	.000
Filed FAFSA[a]	1,585	-.027	.274
Gap	1172	-.065	.026
Institutional Aid[a]	1,585	.169*	.000
Loan Amount	1,585	-.050	.046
Pell Grant[a]	1,585	-.141*	.000
Percentage of Need Met	935	.025	.445
Percentage of Need Met w/Gift Aid	935	.039	.237

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

College Academic Achievement Variables

Of the 13 college academic achievement variables tested in the correlation, all but one had a statistically significant relationship with GEI (see Table 28). The one outlier was the number of times dismissed. Like the other two dependent variables reviewed, semesters enrolled and semesters elapsed, the GEI was strongly correlated to both cumulative hours earned, $r = -.788$, $p = .000$, and transfer hours earned, $r = -.697$, $p = .000$.

While there were 12 variables in this category that proved to be significantly correlated to GEI, only eight of these variables were included in the initial regression. The four that were omitted were transfer and UCM hours earned, and transfer and UCM

GPA. These were excluded because of their collinearity with cumulative hours earned and cumulative GPA. Cumulative hours earned and cumulative GPA were chosen as the best representatives because they had the strongest correlation to GEI.

Table 28

Correlations between GEI and the College Academic Achievement Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Cumulative Hours Earned	1,585	-.788*	.000
UCM Hours Earned	1,585	.311*	.000
Transfer Hours Earned	1,585	-.697*	.000
UCM Hours Attempted	1,585	.189*	.000
Cumulative GPA	1,585	.209*	.000
UCM GPA	1,585	.103*	.000
Transfer GPA	1195	.152*	.000
Total Repeats	1,585	-.246*	.000
Total Withdrawals	1,585	-.185*	.000
Total Failed Courses	1,585	-.183*	.000
No. Semesters on Probation	1,585	-.151*	.000
No. of Times Suspended	1,585	-.082*	.001
No. of Times Dismissed	1,585	-.052	.040

*$p < .01$

College Curriculum Variables

As was true for the prior two dependent variables, neither college curriculum variable (double major or minor) proved to have a correlation with the number of semesters enrolled (see Table 29). Thus, neither of these variables was included in the regression equation.

Table 29

Correlations between GEI and the College Curriculum Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Double Major[a]	1,585	-.012	.627
Minor[a]	1,585	.017	.488

*$p < .01$
[a]This variable was coded no = 0, yes = 1.

Regression Model for GEI

Stepwise linear regression was used to determine the fit of the independent variables as predictors of GEI. Twenty independent variables were used in the initial regression equation to determine which variables impact semesters enrolled. The final model included eight variables (see Table 30) and accounted for nearly 91% of the variance in total GEI.

Table 30

Standardized Coefficients and Collinearity Statistics for Linear Stepwise Regression of Independent Variables and GEI (N = 1,585)

Independent Variables	Beta	t	Sig.	Tolerance	VIF
(Constant)		36.031	.000		
Cumulative Hours Earned	-.832	-44.206	.000	.737	1.357
Total Withdrawals	-.363	-17.428	.000	.600	1.666
Total Repeats	-.197	-8.541	.000	.493	2.028
UCM Hours Attempted	.317	15.279	.000	.605	1.653
Total Failed Courses	-.134	-5.610	.000	.455	2.196
Cumulative GPA	.067	3.194	.002	.601	1.665
Age at Graduation	-.051	-2.483	.013	.630	1.586
No. of Semesters on Probation	-.039	-2.030	.043	.720	1.389

Note. R = .953, R^2 = .908, R^{adj} = .906, SE_{est} = 3.72%

Research Question Four

The analysis of the alternative GEI posed the question, "What individual and institutional variables affect the alternative Graduation Efficiency Index (GEI) for undergraduate students?" Twenty-eight of the 36 independent variables tested proved to be significantly correlated to alternative GEI. Twenty-one of these correlated variables were used in the linear regression equation. The results of the correlation and regression analyses will be described in the following section organized by the six different variable types.

Student Demographic Variables

Like the three other dependent variables, the alternative GEI was also significantly correlated to parental degree and both age categories (see Table 31). However, this was the only dependent variable to show a significant relationship with minority status. The weak negative relationship reveals that minority students are slightly more likely to have a lower alternative GEI.

Table 31

Correlations between Alternative GEI and the Student Demographic Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Age Began at UCM	1,585	-.223*	.000
Age at Graduation	1,585	-.389*	.000
Gender[a]	1,585	.058	.021
Minority Status[b]	1453	-.069*	.009
Parental Degree[b]	1496	.080*	.002
Residency[c]	1545	-.027	.284

[a]This variable was coded as male = 0, female = 1. [b]This variable was coded no = 0, yes = 1. [c]This variable was coded out of state = 0, in state = 1.
*$p < .01$

Of the four significant variables in this category, only three of them were included in the initial regression. The one that was excluded was age at first UCM enrollment. This decision was made because of the collinearity between it and graduation age.

Graduation age was selected for the regression because it has a stronger relationship to the alternative GEI.

College Preparedness Variables

The alternative GEI was the only variable that was not significantly correlated with Conditional Admission (see Table 32). The other two college preparedness variables proved to be significantly correlated to the alternative GEI and were included in the preliminary regression.

Table 32

Correlations between Alternative GEI and the College Preparedness Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
ACT Composite Score	1092	.079*	.009
High School GPA	864	.225*	.000
Conditional Admission[a]	1,585	.062	.013

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

Student Enrollment Pattern Variables

Like all of the other dependent variables, the alternative GEI showed significant correlations with all of the variables in this category (see Table 33). Due to their significance, all four of the student enrollment pattern variables were included in the primary regression equation.

Table 33

Correlations between Alternative GEI and the Student Enrollment Pattern Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
No. of Transfer Institutions	1207	-.206*	.000
No. of Summer Semesters	1,585	-.399*	.000
UCM Avg. FA/SP[a] Att. Hours	1,585	.289*	.000
UCM Avg. FA/SP[a] Ern. Hours	1,585	.379*	.000

[a]FA refers to fall semesters and SP refers to spring semesters.
*$p < .01$

Student Financial Variables

Table 34 shows the correlation results of alternate GEI with the eight variables in this category. Like the two measures of time to degree, the alternative GEI is also significantly correlated to the same four student financial variables. In all, the results had weak correlations. All four significant student financial variables were included in the regression.

Table 34

Correlations between Alternative GEI and the Student Financial Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Estimated Family Contribution	1164	.203*	.000
Filed FAFSA[a]	1,585	-.045	.075
Gap	1172	-.081*	.006
Institutional Aid[a]	1,585	.214*	.000
Loan Amount	1,585	-.048	.055
Pell Grant[a]	1,585	-.213*	.000
Percentage of Need Met	935	.027	.418
Percentage of Need Met w/Gift Aid	935	.019	.556

[a]This variable was coded no = 0, yes = 1.
*$p < .01$

College Academic Achievement Variables

The alternative GEI proved to be significantly correlated to the same 12 variables as the traditional GEI (see Table 35). Similar to the other dependent variables, the strongest relationship with the alternative GEI among the college academic achievement variables was with cumulative hours earned, $r = -.787$, $p = .000$. The strength of the correlation between the alternative GEI and both total repeats ($r = -.505$, $p = .000$) and withdrawals ($r = -.508$, $p = .000$) was much stronger than they had been with the other three dependent variables.

One item of note was the direction of the relationship between the alternative GEI and UCM hours earned is negative, whereas it was a positive relationship with the traditional GEI. This was unexpected because the direction of the relationship for the measures of efficiency should normally be the opposite of the measures of time to degree.

Table 35

Correlations between Alternative GEI and the College Academic Achievement Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Cumulative Hours Earned	1,585	-.787*	.000
UCM Hours Earned	1,585	-.101*	.000
Transfer Hours Earned	1,585	-.345*	.000
UCM Hours Attempted	1,585	.189*	.000
Cumulative GPA	1,585	.347*	.000
UCM GPA	1,585	.307*	.000
Transfer GPA	1195	.211*	.000
Total Repeats	1,585	-.505*	.000
Total Withdrawals	1,585	-.508*	.000
Total Failed Courses	1,585	-.489*	.000
No. Semesters on Probation	1,585	-.332*	.000
No. of Times Suspended	1,585	-.235*	.000
No. of Times Dismissed	1,585	-.135*	.000

*$p < .01$

While there were 12 variables in this category that proved to be significantly correlated to the alternative GEI, only ten of these variables were included in the initial regression. The two that were omitted were transfer GPA and UCM GPA. These were excluded because of the collinearity with cumulative GPA. Cumulative GPA was chosen as the best representative of the three because it had the strongest correlation.

College Curriculum Variables

As Table 36 displays, the alternative GEI was the only dependent variable that proved to have a correlation with either of the college curriculum variables. There was a weak negative (r = -.082, p = .001) correlation with double major. This indicates that students who have a double major are slightly less efficient in earning their degree. Only the variable double major was included in the regression equation.

Table 36

Correlations between Alternative GEI and the College Curriculum Independent Variables

Independent Variable	N	Pearson's *r*	Sig. (2-tailed)
Double Major[a]	1,585	-.082*	.001
Minor[a]	1,585	-.053	.037

[a]This variable was coded no = 0, yes = 1.
*p < .01

Regression Model for Alternative GEI

Stepwise linear regression was used to determine the fit of the independent variables as predictors of the alternative GEI. Twenty-one independent variables were used in the initial regression equation to determine which variables impact semesters enrolled. The final model included seven variables (see Table 37) and accounted for nearly 93% of the variance in total alternative GEI.

Table 37

Standardized Coefficients and Collinearity Statistics for Linear Stepwise Regression of Independent Variables and Alternative GEI (N = 1,585)

Independent Variables	Beta	t	Sig.	Tolerance	VIF
(Constant)		82.993	.000		
Cumulative Hours Earned	-.722	-48.058	.000	.969	1.032
Total Withdrawals	-.345	-19.883	.000	.726	1.377
Total Repeats	-.161	-7.671	.000	.498	2.006
Total Failed Courses	-.162	-7.647	.000	.486	2.058
Cumulative GPA	.091	4.313	.000	.490	2.040
Minority Status	-.046	-2.976	.003	.905	1.105
ACT Composite Score	-.043	-2.496	.013	.724	1.382

Note. R = .963, R^2 = .927, R^{adj} = .926 , SE_{est} = 2.54%

Research Questions Five, Six, Seven, and Eight

Research Questions 5, 6, 7, and 8 examined if any of the dependent variables differ among UCM graduates by college, degree, and department. To answer these questions, means comparisons tables are provided for each of the dependent variables compared by college, degree, and department. Also, one-way analysis of variance (ANOVA) was performed to determine if the differences between colleges, departments, and degree types were significant. When a significant relationship was determined within a comparison group, a post-hoc Tukey HSD test was used to compare all possible pairs of group means. A $p < .05$ level of significance was used to evaluate these three research questions.

Tables 38 and 39 show the distribution of the students in the sample by college, degree type, and department. During the semesters studied, UCM had five academic colleges: the College of Arts, Humanities, and Social Sciences; The College of Education; the College of Health and Human Services; The Harmon College of Business Administration; and the College of Science and Technology. For this research a sixth college category, "Other", was created to house those students in the General Studies major. Over a quarter (26%) of the students in the sample graduated from a program in the College of Health and Human Services, while less than 4% of the students gradated with a General Studies degree.

UCM offers eight different types of bachelor's degrees. The eight different bachelor's degrees offered at UCM are the Bachelor of Arts (B.A.), the Bachelor of Fine Arts (B.F.A.), the Bachelor of Music (B.M.), the Bachelor of Music Education (B.M.E.), the Bachelor of Science (B.S.), the Bachelor of Science in Business Administration

(B.S.B.A.), the Bachelor of Science in Education (B.S.Ed.), and the Bachelor of Social Work (B.S.W.). The most common degree type earned is the Bachelor of Science (B.S.). Fifty-seven percent of the sample studied earned a B.S. degree. Three of the degree types (B.M., B.M.E., and B.S.W.) combined account for less than 8% of the degrees earned by the sample.

During the semesters studied there were 34 departments, schools, or institutes at UCM that offered majors. An additional category was created for the General Studies majors. All 35 of the areas had at least one graduate in the sample. The area with the largest number of graduates in the sample was the School of Technology. This school is comprised of many different majors. The major with the most graduates (125) was the Criminal Justice major, housed in the Criminal Justice department. The Women's Studies program had the smallest number of graduates with only one graduate in the sample. The average number of graduates over the 35 different areas was 45 students.

Table 38

Frequencies and Percentages for College Curriculum Variables (N = 1,585)

Independent Variable	Frequency	Percent
College		
Health & Human Services	415	26.18%
Arts, Humanities, & Social Sciences	360	22.71%
Science & Technology	288	18.17%
Business Administration	251	15.83%
Education	216	13.62%
Other	55	3.47%
Degree		
Bachelor of Science (B.S.)	904	57.03%
Bachelor of Sciences in Business Administration (B.S.BA)	244	15.39%
Bachelor of Science in Education (B.S.E)	236	14.88%
Bachelor of Fine Arts (B.F.A.)	79	4.98%
Bachelor of Arts (BA)	62	3.91%
Bachelor of Social Work (B.S.W)	34	2.14%
Bachelor of Music Education (BME)	14	.88%
Bachelor of Music (BM)	12	.75%
Double Major		
No	1502	94.76%
Yes	83	5.23%
Minor		
No	1088	68.64%
Yes	497	31.35%

Table 39

Frequencies and Percentages for Departments, grouped by college (N = 1,585)

Independent Variable	Frequency	Percent
Departments by College		
Health & Human Services		
Criminal Justice	125	7.89%
Nursing	75	4.73%
Kinesiology	67	4.23%
Sociology & Social Work	47	2.97%
Nutrition	35	2.21%
Safety Sciences	34	2.15%
Communication Disorders	22	1.39%
Arts, Humanities, & Social Sciences		
Art & Design	82	5.17%
Communication	62	3.91%
Psychology	60	3.79%
History & Anthropology	42	2.65%
English & Philosophy	29	1.83%
Music	29	1.83%
Political Science	26	1.64%
Theatre	14	.88%
Modern Languages	8	.50%
Geography	7	.44%

Science & Technology		
School of Technology	134	8.45%
Biology & Earth Science	70	4.41%
Aviation	30	1.89%
Mathematics & Computer Science	27	1.70%
Agriculture	14	.88%
Biochemistry, Chemistry, & Physics	13	.82%
Business Administration		
Management & Business Communication	71	4.48%
School of Accountancy	59	3.72%
Economics & Finance	51	3.22%
Marketing & Business Law	49	3.09%
Computer Information Systems	21	1.32%
Education		
Elementary & Early Childhood Education	117	7.38%
Educ. Leadership & Human Development	69	4.35%
Career & Technology Education	15	.95%
Educational Foundations & Literacy	15	.95%
Other		
General Studies	55	3.47%
Crisis & Disaster Management	10	.63%
Women's Studies Individualized	1	.06%

College of Enrollment

Table 40 displays the results of the ANOVA of the four dependent variables and the student's college of enrollment. All of the variables had significant differences by college of enrollment. Tables 41 through 44 show the results of the Tukey HSD post-hoc test between the four dependent variables and college of enrollment.

Table 40

One-Way ANOVA, College of Enrollment, Dependent Variables (N=1,585)

Dependent Variable	Groups	Sum of Squares	*df*	Mean Square	F	*Sig.*
Semesters Enrolled	Between Groups	721.833	5	144.367	10.844	.000
	Within Groups	21020.807	1579	13.313		
	Total	21742.640	1584			
Semesters Elapsed	Between Groups	14840.305	5	2968.061	16.026	.000
	Within Groups	292442.858	1579	185.208		
	Total	307283.163	1584			
GEI	Between Groups	50052.511	5	10010.502	13.748	.000
	Within Groups	1149723.066	1579	728.134		
	Total	1199775.577	1584			
GEI (alternative)	Between Groups	8736.055	5	1747.211	13.672	.000
	Within Groups	201793.987	1579	127.799	13.672	.000
	Total	210530.042	1584			

*$p < .01$

Table 41

Tukey HSD Post Hoc Test, Significance and Mean Differences of Semesters Enrolled between Colleges of Enrollment (N=1,585)

		Health & Human Services	Arts, Hum., & Social Sciences	Science & Tech.	Business Admin.	Education	Other
Health & Human Services	Mean Diff.	N/A	.355	.392	.116	-.630	-3.145
	Sig.		.755	.726	.999	.311	.000
Arts, Hum., & Social Sciences	Mean Diff.	-.355	N/A	.037	-.239	-.985*	-3.500*
	Sig.	.755		1.000	.968	.021	.000
Science & Tech.	Mean Diff.	-.392	-.037	N/A	-.276	-1.022*	-3.537
	Sig.	.726	1.000		.952	.023	.000
Business Admin.	Mean Diff.	-.116	.239	.276	N/A	-.746	-3.261
	Sig.	.999	.968	.952		.237	.000
Education	Mean Diff.	.630	.985*	1.022*	.746	N/A	-2.515
	Sig.	.311	.021	.023	.237		.000
Other	Mean Diff.	3.145*	3.500*	3.537*	3.261*	2.515*	N/A
	Sig.	.000	.000	.000	.000	.000	

*$p < .05$

Table 42

Tukey HSD Post Hoc Test, Significance and Mean Differences of Semesters Elapsed between Colleges of Enrollment (N=1,585)

		Health & Human Services	Arts, Hum., & Social Sciences	Science & Tech.	Business Admin.	Education	Other
Health & Human Services	Mean Diff.	N/A	1.302	1.192	2.077	-1.060	-15.101*
	Sig.		.770	.864	.397	.939	.000
Arts, Hum., & Social Sciences	Mean Diff.	-1.302	N/A	-.110	.776	-2.362	-16.403*
	Sig.	.770		1.000	.983	.333	.000
Science & Tech.	Mean Diff.	-1.192	.110	N/A	.885	-2.252	-16.293
	Sig.	.864	1.000		.975	.441	.000
Business Admin.	Mean Diff.	-2.077	-.776	-.885	N/A	-3.138	-17.178*
	Sig.	.397	.983	.975		.129	.000
Education	Mean Diff.	1.060	2.362	2.252	3.138	N/A	-14.041*
	Sig.	.939	.333	.441	.129		.000
Other	Mean Diff.	15.101*	16.403*	16.293*	17.178*	14.041*	N/A
	Sig.	.000	.000	.000	.000	.000	

*$p < .05$

Table 43

Tukey HSD Post Hoc Test, Significance and Mean Differences of GEI between Colleges of Enrollment (N=1,585)

		Health & Human Services	Arts, Hum., & Social Sciences	Science & Tech.	Business Admin.	Education	Other
Health & Human Services	Mean Diff.	N/A	-3.45%	-3.35%	-5.90%	-1.51%	26.10%*
	Sig.		.480	.586	.069	.985	.000
Arts, Hum., & Social Sciences	Mean Diff.	3.45%	N/A	.10%	-2.44%	1.94%	29.55%*
	Sig.	.480		1.000	.880	.961	.000
Science & Tech.	Mean Diff.	3.35%	-.10%	N/A	-2.55%	1.83%	29.45%*
	Sig.	.586	1.000		.883	.974	.000
Business Admin.	Mean Diff.	5.90%	2.44%	2.55%	N/A	4.39%	32.00%*
	Sig.	.069	.880	.883		.496	.000
Education	Mean Diff.	1.51%	-1.94%	-1.83%	-4.39%	N/A	27.61%*
	Sig.	.985	.961	.974	.496		.000
Other	Mean Diff.	-26.10%*	-29.55%*	-29.45%*	32.00%*	-27.61%*	N/A
	Sig.	.000	.000	.000	.000	.000	

*$p < .05$

Table 44

Tukey HSD Post Hoc Test, Significance and Mean Differences of Alternative GEI between Colleges of Enrollment (N=1,585)

		Health & Human Services	Arts, Hum., & Social Sciences	Science & Tech.	Business Admin.	Education	Other
Health & Human Services	Mean Diff.	N/A	1.04%	.61%	-1.56%	2.44%	11.63%*
	Sig.		.794	.981	.513	.104	.000
Arts, Hum., & Social Sciences	Mean Diff.	-1.04%	N/A	-.43%	-2.60%	1.39%	10.58%*
	Sig.	.794		.997	.057	.706	.000
Science & Tech.	Mean Diff.	-.611%	.43%	N/A	-2.17%	1.83%	11.02%*
	Sig.	.981	.997		.226	.467	.000
Business Admin.	Mean Diff.	1.56%	2.60%	2.17%	N/A	4.00%*	13.19%*
	Sig.	.513	.057	.226		.002	.000
Education	Mean Diff.	-2.44%	-1.39%	-1.83%	-4.00%*	N/A	9.19%*
	Sig.	.104	.706	.467	.002		.000
Other	Mean Diff.	-11.63%*	-10.58%*	-11.02%*	-13.19%*	-9.19%*	N/A
	Sig.	.000	.000	.000	.000	.000	

*$p < .05$

Degree Type

Table 45 shows the results of the ANOVA of the four dependent variables and the student's degree type. All of the dependent variables, except for GEI, had significant differences by type of degree. Tables 46 through 49 show the results of the Tukey HSD post-hoc test between the four dependent variables and degree type.

Table 45

One-Way ANOVA, Type of Degree, Dependent Variables (N=1,585)

Dependent Variable	Groups	Sum of Squares	*df*	Mean Square	F	*Sig.*
Semesters Enrolled	Between Groups	362.965	7	51.852	3.825	.000
	Within Groups	21379.675	1577	13.557		
	Total	21742.640	1584			
Semesters Elapsed	Between Groups	4683.198	7	669.028	3.487	.001
	Within Groups	302599.966	1577	191.883		
	Total	307283.163	1584			
GEI	Between Groups	11178.027	7	1596.861	2.119	.039
	Within Groups	1188597.550	1577	753.708		
	Total	1199775.577	1584			
GEI (alternative)	Between Groups	6487.935	7	926.848	7.163	.000
	Within Groups	204042.107	1577	129.386		
	Total	210530.042	1584			

*$p < .01$

Table 46

Tukey HSD Post Hoc Test, Significance and Mean Differences of Semesters Enrolled between Types of Degree (N=1,585)

		B.A.	B.F.A.	B.M.	B.M.E.	B.S.	B.S.B.A.	B.S.E.	B.S.W.
B.A.	Mean Diff.	N/A	.835	.124	-2.710	.132	.081	-.659	-1.592
	Sig.		.885	1.000	.202	1.000	1.000	.915	.464
B.F.A.	Mean Diff.	-.835	N/A	-.711	-3.544*	-.702	-.753	-1.493*	-2.427*
	Sig.	.885		.999	.021	.734	.762	.039	.029
B.M.	Mean Diff.	-.124	.711	N/A	-2.833	.008	-.042	-.782	-1.716
	Sig.	1.000	.999		.512	1.000	1.000	.996	.863
B.M.E.	Mean Diff.	2.710	3.544*	2.833	N/A	2.842	2.791	2.051	1.118
	Sig.	.202	.021	.512		.080	.107	.465	.980
B.S.	Mean Diff.	-.132	.702	-.008	-2.842	N/A	-.051	-.791	-1.724
	Sig.	1.000	.734	1.000	.080		1.000	.066	.129
B.S.B.A.	Mean Diff.	-.081	.753	.042	-2.791	.051	N/A	-.740	-1.673
	Sig.	1.000	.762	1.000	.107	1.000		.351	.204
B.S.E.	Mean Diff.	.659	1.493*	.782	-2.051	.791	.740	N/A	-.933
	Sig.	.915	.039	.996	.465	.066	.351		.866
B.S.W.	Mean Diff.	1.592	2.427*	1.716	-1.118	1.724	1.673	.933	N/A
	Sig.	.464	.029	.863	.980	.129	.204	.866	

*$p < .05$

Table 47

Tukey HSD Post Hoc Test, Significance and Mean Differences of Semesters Elapsed between Types of Degree (N=1,585)

		B.A.	B.F.A.	B.M.	B.M.E.	B.S.	B.S.B.A.	B.S.E.	B.S.W.
B.A.	Mean Diff.	N/A	2.322	.602	-4.922	-1.239	.813	-2.687	-8.653
	Sig.		.976	1.000	.932	.997	1.000	.875	.068
B.F.A.	Mean Diff.	-2.322	N/A	-1.719	-7.243	-3.561	-1.509	-5.009	-10.974*
	Sig.	.976		1.000	.618	.358	.991	.100	.003
B.M.	Mean Diff.	-.602	1.719	N/A	-5.524	-1.841	.210	-3.290	-9.255
	Sig.	1.000	1.000		.972	1.000	1.000	.993	.489
B.M.E.	Mean Diff.	4.922	7.243	5.524	N/A	3.682	5.734	2.234	-.-3.731
	Sig.	.932	.618	.972		.976	.804	.999	.990
B.S.	Mean Diff.	1.239	3.561	1.841	-3.682	N/A	2.052	-1.448	-7.413*
	Sig.	.997	.358	1.000	.976		.446	.843	.046
B.S.B.A.	Mean Diff.	-.813	1.509	-.210	-5.734	-2.052	N/A	-3.500	-9.465*
	Sig.	1.000	.991	1.000	.804	.446		.104	.005
B.S.E.	Mean Diff.	2.687	5.009	3.290	-2.234	1.448	3.500	N/A	-5.965
	Sig.	.875	.100	.993	.999	.843	.104		.268
B.S.W.	Mean Diff.	8.653	10.974*	9.255	3.731	7.413*	9.465*	5.965	N/A
	Sig.	.068	.003	.489	.990	.046	.005	.268	

*$p < .05$

Table 48

Tukey HSD Post Hoc Test, Significance and Mean Differences of GEI between Types of Degree (N=1,585)

		B.A.	B.F.A.	B.M.	B.M.E.	B.S.	B.S.B.A.	B.S.E.	B.S.W.
B.A.	Mean Diff.	N/A	-7.16%	2.38%	11.42%	-1.29%	-6.07%	.47%	.09%
	Sig.		.787	1.000	.854	1.000	.776	1.000	1.000
B.F.A.	Mean Diff.	7.16%	N/A	9.55%	18.59%	5.87%	1.08%	7.64%	7.25%
	Sig.	.787		.952	.275	.604	1.000	.389	.903
B.M.	Mean Diff.	-2.38%	-9.55%	N/A	9.03%	-3.67%	-8.46%	-1.90%	-2.29%
	Sig.	1.000	.952		.991	1.000	.968	1.000	1.000
B.M.E.	Mean Diff.	-11.42%	-18.59%	-9.03%	N/A	-12.71%	-17.50%	-10.94%	-11.33%
	Sig.	.854	.275	.991		.674	.283	.834	.899
B.S.	Mean Diff.	1.29%	-5.87%	3.67%	12.71%	N/A	-4.78	1.77%	1.38%
	Sig.	1.000	.604	1.000	.674		.234	.988	1.000
B.S.B.A.	Mean Diff.	6.07%	-1.08%	8.46%	17.50%	4.78%	N/A	6.55%	6.17%
	Sig.	.776	1.000	.968	.283	.234		.151	.923
B.S.E.	Mean Diff.	-.47%	-7.64%	1.90%	10.94%	-1.77%	-6.55%	N/A	-.38%
	Sig.	1.000	.389	1.000	.834	.988	.151		1.000
B.S.W.	Mean Diff.	-.09%	-7.25%	2.29%	11.33%	-1.38%	-6.17%	.38%	N/A
	Sig.	1.000	.903	1.000	.899	1.000	.923	1.000	

*$p < .05$

Table 49

Tukey HSD Post Hoc Test, Significance and Mean Differences of Alternative GEI between Types of Degree (N=1,585)

		B.A.	B.F.A.	B.M.	B.M.E.	B.S.	B.S.B.A.	B.S.E.	B.S.W.
B.A.	Mean Diff.	N/A	-3.66%	2.16%	9.24%	-2.82%	-5.00%*	.27%	-5.70%
	Sig.		.552	.999	.109	.556	.042	1.000	.268
B.F.A.	Mean Diff.	3.66%	N/A	5.83%	12.91%*	.83%	-1.34%	3.94%	-2.03%
	Sig.	.552		.716	.002	.999	.985	.133	.988
B.M.	Mean Diff.	-2.16%	-5.83%	N/A	7.08%	-4.99%	7.17%	-1.88%	-7.86%
	Sig.	.999	.716		.761	.802	.394	.999	.441
B.M.E.	Mean Diff.	-9.24%	-12.91%*	-7.08	N/A	-12.07%*	-14.25%*	-8.97%	-14.95%*
	Sig.	.109	.002	.761		.002	.000	.080	.001
B.S.	Mean Diff.	2.82%	-.83%	4.99%	12.07%*	N/A	-2.17%	3.10%*	-2.87%
	Sig.	.556	.999	.802	.002		.137	.005	.836
B.S.B.A.	Mean Diff.	5.00%*	1.34%	7.17%	14.25%*	2.17%	N/A	5.28%*	-.69%
	Sig.	.042	.985	.394	.000	.137		.000	1.000
B.S.E.	Mean Diff.	-.27%	-3.94%	1.88%	8.97%	-3.10%*	-5.28%*	N/A	-5.98%
	Sig.	1.000	.133	.999	.080	.005	.000		.080
B.S.W.	Mean Diff.	5.70%	2.03%	7.86%	14.95%*	2.87%	.69%	5.98%	N/A
	Sig.	.268	.988	.441	.001	.836	1.000	.080	

*$p < .05$

Department of Enrollment

Table 50 presents the results of the ANOVA of the four dependent variables and the student's department of enrollment. None of the variables showed any significant differences between departments of enrollment. No further analysis was performed by department.

Table 50

One-Way ANOVA, Department of Enrollment, Dependent Variables (N=1,585)

Dependent Variable	Groups	Sum of Squares	*df*	Mean Square	F	*Sig.*
Semesters Enrolled	Between Groups	468.402	34	13.777	1.004	.463
	Within Groups	21274.238	1550	13.725		
	Total	21742.640	1584			
Semesters Elapsed	Between Groups	6209.507	34	182.633	.940	.568
	Within Groups	301073.656	1550	194.241		
	Total	307283.163	1584			
GEI	Between Groups	27256.942	34	801.675	1.060	.376
	Within Groups	1172518.635	1550	756.464		
	Total	1199775.577	1584			
GEI (alternative)	Between Groups	3772.011	34	110.942	.832	.742
	Within Groups	206758.031	1550	133.392		
	Total	210530.042	1584			

*$p < .01$

Research Question Five

Research Question 5 asked, "How does time to degree (as measured by semesters enrolled) differ among graduates by college, degree, and department?" Table 51 shows the average semesters enrolled by college and degree type. Table 52 displays the average semesters enrolled by department.

As discussed earlier, the ANOVA results revealed a significant difference among the colleges in regards to semesters enrolled. The average number of semesters enrolled over the entire study sample was 13.32 semesters. The College of Science and Technology had the lowest average semesters enrolled with 12.90 semesters. The graduates with the most semesters enrolled, with an average of 16.44 semesters, were those in the General Studies major. Students in the College of Health and Human Services had the greatest range of semesters enrolled from a low of seven semesters to a high of 44 semesters. All other colleges had a minimum of eight semesters of enrollments for their graduates and no more than 35 semesters.

There was greater disparity in semesters enrolled between degree types than college of enrollment. The B.F.A. degree had the lowest average semesters enrolled (12.46 semesters) and the B.M.E. degree had the highest average semesters enrolled (16 semesters). The B.S. degree had the lowest minimum number of semesters enrolled at seven semesters, while the lowest number in the B.M.E degree was 12 semesters. The degree with the greatest range of semesters enrolled (9 to 44) was the B.S.W. degree.

While there were no significant differences between department of enrollment and semesters enrolled in the ANOVA, the means ranged from a low of 11.07 semesters (Department of Theatre) to a high of 17 semesters (Department of Geography).

Table 51

Semesters Enrolled Means for the College Curriculum Variables, College of Enrollment and Degree Type

	N	M	Mdn	Min	Max	SD
Total	1,585	13.32	13.00	7	44	3.705
College						
Health & Human Services	415	13.29	12.00	7	44	3.865
Arts, Humanities, & Social Sciences	360	12.94	12.00	8	29	3.28
Science & Technology	288	12.90	12.00	8	29	3.42
Business Administration	251	13.18	12.00	8	29	3.64
Education	216	13.92	13.00	8	31	3.61
Other	55	16.44	15.00	8	35	5.22
Degree						
Bachelor of Science (B.S.)	904	13.16	12.00	7	36	3.68
Bachelor of Sciences in Business Administration (B.S.BA)	244	13.21	12.00	8	29	3.64
Bachelor of Science in Education (B.S.E.)	236	13.95	13.00	8	31	3.25
Bachelor of Fine Arts (B.F.A.)	79	12.46	12.00	8	27	2.85
Bachelor of Arts (B.A.)	62	13.29	12.50	8	29	4.11
Bachelor of Social Work (B.S.W.)	34	14.88	14.00	9	44	6.36
Bachelor of Music Education (B.M.E.)	14	16.00	14.00	12	25	4.18
Bachelor of Music (B.M.)	12	13.17	12.50	9	23	3.95
Double Major						
No	1502	13.29	13.00	7	44	3.73
Yes	83	13.70	13.00	8	29	3.10
Minor						
No	1088	13.40	13.00	7	44	3.82
Yes	497	13.14	12.00	8	31	3.43

Table 52

Semesters Enrolled Means for the College Curriculum Variable, Department of Enrollment

	N	M	Mdn	Min	Max	SD
Total	1,585	13.32	13.00	7	44	3.705
Departments by College						
Health & Human Services						
Criminal Justice	125	12.01	11.00	7	25	3.29
Nursing	75	14.63	14.00	9	27	3.81
Kinesiology	67	13.55	14.00	9	23	2.61
Sociology & Social Work	47	14.64	13.00	8	44	6.53
Nutrition	35	14.23	14.00	10	27	3.63
Safety Sciences	34	12.50	12.00	9	17	2.15
Communication Disorders	22	12.14	12.00	8	18	2.31
Arts, Humanities, & Social Sciences						
Art & Design	82	12.89	13.00	9	27	2.85
Communication	62	12.52	12.00	8	20	2.85
Psychology	60	12.62	12.00	8	20	2.82
History & Anthropology	42	12.21	12.00	9	18	2.28
English & Philosophy	29	13.41	13.00	9	21	2.77
Music	29	14.76	14.00	9	25	4.03
Political Science	26	12.77	11.50	8	26	4.29
Theatre	14	11.07	11.00	8	15	2.05
Modern Languages	8	14.88	14.50	11	21	3.27
Geography	7	17.00	13.00	10	29	8.34

Science & Technology						
School of Technology	134	12.93	12.00	8	29	3.75
Biology & Earth Science	70	13.19	13.00	8	24	3.26
Aviation	30	12.43	11.50	8	19	3.059
Mathematics & Computer Sci.	27	12.78	12.00	9	18	2.69
Agriculture	14	12.29	11.50	8	18	3.02
Biochemistry, Chem., & Physics	13	13.00	12.00	8	22	3.71
Business Administration						
Management & Business Comm.	71	12.90	12.00	8	27	3.87
School of Accountancy	59	13.19	12.00	9	26	3.30
Economics & Finance	51	13.00	13.00	8	23	3.40
Marketing & Business Law	49	12.65	12.00	8	21	2.37
Computer Information Systems	21	15.71	14.00	9	29	5.57
Education						
Elem. & Early Childhood Edu.	117	14.06	14.00	9	31	3.10
Edu. Leadership & Human Dev.	69	13.29	12.00	8	30	3.92
Career & Technology Education	15	14.33	13.00	8	26	4.38
Educational Foundations & Lit.	15	15.33	14.00	10	27	4.76
Other						
General Studies	55	16.44	15.00	8	35	5.22
Crisis & Disaster Management	10	13.20	12.50	8	19	3.61
Women’s Studies Individualized	1	12.00				

Research Question Six

The sixth research question asked, "How does time to degree (as measured by semesters elapsed) differ among graduates by college, degree, and department?" Table 53 displays the average semesters elapsed by college and degree type. Table 54 shows the average semesters elapsed by department.

As discussed earlier, the ANOVA results revealed a significant difference among the colleges in regards to semesters elapsed. The average number of semesters elapsed over the entire study sample was 20.53 semesters. The Harmon College of Business Administration had the lowest average semesters elapsed with 18.62 semesters. The graduates who had the most semesters enrolled also had the most semesters elapsed, with an average of 35.80 semesters, were those in the General Studies major. Students in the College of Arts, Humanities, and Social Sciences had the greatest range of semesters elapsed from a low of ten semesters to a high of 133 semesters. All other colleges had a minimum of nine semesters elapsed for their graduates while the maximum semester elapsed was as low as 77 for the Harmon College of Business Administration.

There was less disparity in semesters elapsed between degree types than college of enrollment. In addition to having the lowest number of semesters enrolled, the B.F.A. degree also had the lowest average semesters elapsed (17.11 semesters). The B.S.W. degree had the highest average semesters elapsed (28.09 semesters). The B.S. degree had the greatest range of semesters elapsed (9 to 133).

There were no statistically significant differences between department of enrollment and semesters elapsed. The medians ranged from a low of 15.73 semesters (Department of Communication Disorders) to a high of 35.80 semesters (General Studies

majors). The Department of Communication Disorders and the Department of Agriculture had the smallest range (11 to 22) of semesters enrolled. The department with the greatest range was the Department of Political Science with a range of semesters elapsed from 11 to 133.

Table 53

Semesters Elapsed Means for the College Curriculum Variables, College of Enrollment and Degree Type

	N	M	Mdn	Min	Max	SD
Total	1,585	20.53	16.00	9	133	13.92
College						
Health & Human Services	415	20.70	16.00	9	103	13.62
Arts, Humanities, & Social Sciences	360	19.40	16.00	10	133	12.39
Science & Technology	288	19.51	16.00	10	89	12.24
Business Administration	251	18.62	16.00	10	77	10.38
Education	216	21.76	16.50	10	121	16.33
Other	55	35.80	26.00	11	112	24.75
Degree						
Bachelor of Science (B.S.)	904	20.67	16.00	9	133	14.31
Bachelor of Sciences in Business Administration (B.S.B.A.)	244	18.62	16.00	10	77	10.42
Bachelor of Science in Education (B.S.E.)	236	22.12	17.00	11	104	15.55
Bachelor of Fine Arts (B.F.A.)	79	17.11	16.00	11	65	7.27
Bachelor of Arts (B.A.)	62	19.44	17.00	11	62	9.54
Bachelor of Social Work (B.S.W.)	34	28.09	18.50	11	93	22.44
Bachelor of Music Education (B.M.E.)	14	24.36	17.00	11	103	23.20
Bachelor of Music (B.M.)	12	18.83	16.50	12	46	9.20
Double Major						
No	1502	20.69	16.00	9	133	14.22
Yes	83	17.65	17.00	11	47	5.72
Minor						
No	1088	21.04	16.00	9	133	14.92
Yes	497	19.39	16.00	9	104	11.37

Table 54

Semesters Elapsed Means for the College Curriculum Variable, Department of Enrollment

	N	M	Mdn	Min	Max	SD
Total	1,585	20.53	16.00	9	133	13.92
Departments by College						
Health & Human Services						
Criminal Justice	125	19.47	15.00	9	103	13.86
Nursing	75	22.72	17.00	11	89	14.31
Kinesiology	67	18.63	17.00	11	43	6.23
Sociology & Social Work	47	28.26	19.00	11	93	22.31
Nutrition	35	19.17	16.00	10	68	10.67
Safety Sciences	34	18.00	16.00	11	51	7.20
Communication Disorders	22	15.73	16.00	11	22	3.195
Arts, Humanities, & Social Sciences						
Art & Design	82	18.71	16.00	11	102	12.22
Communication	62	17.85	16.50	11	40	6.558
Psychology	60	18.77	15.00	10	59	10.34
History & Anthropology	42	17.19	14.50	11	48	6.91
English & Philosophy	29	20.97	17.00	12	55	10.10
Music	29	21.59	17.00	11	103	17.07
Political Science	26	22.08	16.50	11	133	23.68
Theatre	14	16.86	16.00	11	44	8.07
Modern Languages	8	25.25	18.00	14	55	14.67
Geography	7	33.14	30.00	14	62	19.10

Science & Technology						
School of Technology	134	19.43	16.00	10	82	12.20
Biology & Earth Science	70	19.94	17.00	11	77	12.67
Aviation	30	18.10	15.00	11	76	11.81
Mathematics & Computer Sci.	27	20.44	17.00	13	89	14.49
Agriculture	14	16.50	16.00	11	22	3.22
Biochemistry, Chem., & Physics	13	22.46	18.00	11	53	13.36
Business Administration						
Management & Business Comm.	71	18.61	16.00	10	71	10.20
School of Accountancy	59	18.88	15.00	10	77	11.98
Economics & Finance	51	17.33	16.00	11	41	7.01
Marketing & Business Law	49	17.47	16.00	10	44	6.42
Computer Information Systems	21	23.76	17.00	11	75	17.60
Education						
Elem. & Early Childhood Edu.	117	20.44	17.00	11	104	12.91
Edu. Leadership & Human Dev.	69	21.55	15.00	10	121	18.52
Career & Technology Education	15	25.13	17.00	11	82	21.41
Educational Foundations & Lit.	15	29.60	19.00	11	88	22.30
Other						
General Studies	55	35.80	26.00	11	112	24.75
Crisis & Disaster Management	10	24.70	18.00	10	54	15.29
Women’s Studies Individualized	1	16.00				

Research Question Seven

The seventh research question asked, "How does Graduation Efficiency Index (GEI) differ among graduates by college, degree, and department?" Table 55 shows the average GEI by college and degree type. Table 56 reveals the average GEI by department.

As discussed earlier, the ANOVA results showed a significant difference among the colleges in regards to GEI. The average GEI over the entire study sample was nearly 79%. As expected, students in the General Studies major had the lowest average GEI at 61%. The graduates with the highest GEI (almost 83%) were those in Harmon College of Business Administration. All of the colleges had at least one graduate with a perfect 100% efficiency index. The minimum GEI values across the colleges ranged from 2.38% to 7.07%.

There was very similar disparity in GEI between degree types as there was for college of enrollment. The B.M.E. degree had the lowest average GEI (62.97%) and the B.S.B.A. degree had the highest average GEI (82.88%). There was great disparity in the lowest minimum number for GEI with 2.38% for the B.S. degree to 38.52% for the B.M. degree. There were three different degree types that did not have any graduates with a perfect 100% GEI. These were the B.F.A, the B.M.E, and the B.M. degrees.

While there were no statistically significant differences between department of enrollment and average GEI, the means ranged from a low of 61% (General Studies majors) to a high of 87% semesters (Department of Communication Disorders). Interestingly, the Department of Modern Languages had both the highest minimum (62.20%) and the lowest maximum (82.27%) in regards to the range of GEI.

Table 55

GEI Means for the College Curriculum Variables, College of Enrollment and Degree Type

	N	M	Mdn	Min	Max	SD
Total	1553	78.98%	83.57%	2.38%	100%	18%
College						
Health & Human Services	399	80.33%	83.95%	2.38%	100%	17.49%
Arts, Humanities, & Social Sciences	357	79.24%	84.41%	4.92%	100%	17.39%
Science & Technology	286	78.65%	84.30%	3.61%	100%	18.62%
Business Administration	246	82.85%	86%	2.87%	100%	16.46%
Education	216	76.11%	79.24%	7.07%	100%	17.20%
Other	49	61.37%	64.55%	3.77%	100%	22.04%
Degree						
Bachelor of Science (B.S.)	880	79.55%	84.04%	2.38%	100%	17.89%
Bachelor of Sciences in Business Administration (B.S.B.A.)	239	82.88%	86.11%	2.87%	100%	16.51%
Bachelor of Science in Education (B.S.E.)	236	73.92%	78.20%	4.92%	100%	18.35%
Bachelor of Fine Arts (B.F.A.)	79	81.56%	86.04%	26.98%	99.23%	14.91%
Bachelor of Arts (B.A.)	61	75.87%	83.68%	7.50%	100%	20.74%
Bachelor of Social Work (B.S.W.)	32	80.88%	85.38%	21.90%	100%	18.57%
Bachelor of Music Education (B.M.E.)	14	62.97%	68.95%	34.36%	86.48%	18.64%
Bachelor of Music (B.M.)	12	72.01%	76.07%	38.52%	97.58%	18.89%
Double Major						
No	1471	79.16%	83.87%	2.38%	100%	18.17%
Yes	82	75.90%	79.21%	27.87%	100%	14.44%
Minor						
No	1060	79.53%	84.09%	2.38%	100%	18.08%
Yes	493	77.80%	82.19%	3.77%	100%	17.80%

Table 56

GEI Means for the College Curriculum Variable, Department of Enrollment

	N	M	Mdn	Min	Max	SD
Total	1553	78.98%	83.57%	2.38%	100%	18%
Departments by College						
Health & Human Services						
Criminal Justice	124	83.35%	89.34%	2.38%	100%	19.05%
Nursing	64	79.59%	81.61%	16.67%	100%	17.03%
Kinesiology	67	74.88%	77.01%	36.97%	100%	15.21%
Sociology & Social Work	44	81.44%	87.70%	21.90%	100%	17.66%
Nutrition	34	76.83%	81.07%	8.11%	100%	19.12%
Safety Sciences	34	77.79%	81.75%	31.11%	98.43%	13.72%
Communication Disorders	22	87.28%	89.63%	51.35%	100%	13.94%
Arts, Humanities, & Social Sciences						
Art & Design	82	80.28%	85.27%	4.92%	99.23%	16.33%
Communication	61	82.80%	86.46%	24.64%	100%	15.65%
Psychology	60	79.79%	85.15%	22.25%	100%	18.89%
History & Anthropology	42	82.84%	86.94%	29.41%	100%	13.39%
English & Philosophy	29	76.53%	82.35%	31.52%	98.91%	17.11%
Music	29	65.25%	69.56%	33.88%	97.58%	19.11%
Political Science	25	82.68%	88.88%	36.92%	100%	16.14%
Theatre	14	81.22%	86.29%	26.98%	96.88%	20.40%
Modern Languages	8	74.17%	77.15%	62.20%	82.27%	7.55%
Geography	6	66.26%	76.89%	30.95%	90.68%	27.04%

Science & Technology						
School of Technology	132	80.86%	85.65%	3.61%	100%	17.33%
Biology & Earth Science	70	79.87%	85.23%	30.06%	100%	17.56%
Aviation	30	77.52%	82.41%	16.98%	100%	17.97%
Mathematics & Computer Sci.	27	70.32%	79.23%	22.44%	98.99%	22.84%
Agriculture	14	76.76%	82.78%	23.81%	100%	20.37%
Biochemistry, Chem., & Physics	13	71.65%	74.83%	29.85%	100%	23.35%
Business Administration						
Management & Business Comm.	68	84.65%	89.73%	27.87%	100%	16.76%
School of Accountancy	59	84.58%	87.64%	28.79%	100%	15%
Economics & Finance	51	82.03%	87.32%	30.28%	100%	16.43%
Marketing & Business Law	49	82.94%	83.84%	40.28%	100%	12.90%
Computer Information Systems	19	73.02%	81.33%	2.87%	99.20%	24.45%
Education						
Elem. & Early Childhood Edu.	117	73.82%	76.47%	15.49%	100%	16.02%
Edu. Leadership & Human Dev.	69	82.05%	86.33%	34.66%	100%	15.01%
Career & Technology Education	15	73.84%	82.99%	7.07%	95.61%	25.29%
Educational Foundations & Lit.	15	68.98%	67.97%	23.38%	93.73%	20.22%
Other						
General Studies	49	61.37%	64.55%	3.77%	100%	22.04%
Crisis & Disaster Management	10	84.42%	93.89%	55.56%	100%	17.47%
Women's Studies Individualized	1	81.04%				

Research Question Eight

Lastly, an analysis was also performed to determine how the alternative Graduation Efficiency Index (GEI) differs among graduates by college, degree, and department. Table 57 presents the average alternate GEI by college and degree type. Table 58 shows the alternative GEI by department.

As discussed earlier, the ANOVA results revealed a significant difference among the colleges in regards to alternative GEI. The average alternative GEI over the entire study sample was 84.63% semesters. Similar to the results for the traditional GEI, students in the General Studies major had the lowest average alternative GEI at almost 74% and the graduates with the highest alternative GEI (87%) were those in Harmon College of Business Administration. All of the colleges had at least one graduate with a perfect 100% alternative efficiency index. The minimum alternative GEI values across the colleges ranged from 44.29% (College of Arts, Humanities, and Social Sciences and the College of Science and Technology) to 51.88% (College of Education).

There was very similar disparity in alternative GEI between degree types as there was for college of enrollment. As with the traditional GEI, the B.M.E. degree had the lowest average alternative GEI (72.83%), but the B.S.W. degree had the highest average alternative GEI (87.78%). Unlike the percentages for the traditional GEI, there was not great disparity was in the lowest minimum number for the alternative GEI. The same three degree types, as with traditional GEI, did not have any graduates with a perfect 100% GEI. These were the B.F.A, the B.M.E, and the B.M. degrees.

While there were no statistically significant differences between department of enrollment and average alternative GEI in the ANOVA analysis, the means ranged from a

low of 71.84% (Department of Geography) to a high of 91.93% (Department of Communication Disorders). This was the second dependent variable where a program other than General Studies had the least desirable score. Similar to the results for the traditional GEI, the Department of Modern Languages had the second highest minimum alternative GEI (74.70%) and the lowest maximum alternative GEI (85.52%).

Table 57

Alternative GEI Means for the College Curriculum Variables, College of Enrollment and Degree Type

	N	M	Mdn	Min	Max	SD
Total	1,585	84.63%	86.74%	44.29%	100%	11.52%
College						
Health & Human Services	415	85.46%	87.76%	44.78%	100%	11.62%
Arts, Humanities, & Social Sciences	360	84.42%	86.95%	44.29%	100%	11.31%
Science & Technology	288	84.85%	86.71%	44.29%	100%	11.51%
Business Administration	251	87.03%	89.20%	46.79%	100%	11.48%
Education	216	83.02%	83.87%	51.88%	100%	9.81%
Other	55	73.83%	75%	45.28%	100%	12.27%
Degree						
Bachelor of Science (BS)	904	84.91%	86.88%	44.29%	100%	11.69%
Bachelor of Sciences in Business Administration (B.S.B.A.)	244	87.09%	89.20%	46.79%	100%	11.48%
Bachelor of Science in Education (B.S.E.)	236	81.80%	82.90%	51.88%	100%	9.69%
Bachelor of Fine Arts (B.F.A.)	79	85.74%	87.75%	47.60%	99.23%	9.69%
Bachelor of Arts (B.A.)	62	82.08%	87.01%	44.29%	100%	13.92%
Bachelor of Social Work (B.S.W.)	34	87.78%	89.88%	58.49%	100%	10.88%
Bachelor of Music Education (B.M.E.)	14	72.83%	74.16%	56.74%	87.21%	9.97%
Bachelor of Music (B.M.)	12	79.91%	79.40%	52.43%	97.64%	13.60%
Double Major						
No	1502	84.85%	86.85%	44.29%	100%	11.59%
Yes	83	80.62%	81.57%	44.29%	100%	9.55%
Minor						
No	1088	85.04%	87.32%	44.29%	100%	11.70%
Yes	497	83.73%	85.13%	46.44%	100%	11.08%

Table 58

Alternative GEI Means for the College Curriculum Variable, Department of Enrollment

	N	M	Mdn	Min	Max	SD
Total	1,585	84.63%	86.74%	44.29%	100%	11.52%
Departments by College						
Health & Human Services						
Criminal Justice	125	89.44%	91.60%	54.55%	100%	10.05%
Nursing	75	81.89%	84.72%	44.78%	100%	13.78%
Kinesiology	67	80.05%	81.57%	53.57%	100%	11.32%
Sociology & Social Work	47	87.46%	89.55%	58.49%	100%	10.69%
Nutrition	35	84.11%	83.91%	63.83%	100%	10.43%
Safety Sciences	34	82.09%	83.89%	58.74%	98.43%	9.16%
Communication Disorders	22	91.93%	92.66%	76.92%	100%	7.54%
Arts, Humanities, & Social Sciences						
Art & Design	82	84.99%	87.16%	47.60%	99.23%	9.76%
Communication	62	87.34%	89.20%	55.61%	100%	9.83%
Psychology	60	86.73%	88.08%	66.31%	100%	9.92%
History & Anthropology	42	85.83%	89.22%	56.07%	100%	10.62%
English & Philosophy	29	82.60%	85.10%	46.44%	99.20%	12.38%
Music	29	74.48%	76.07%	52.43%	97.64%	12.53%
Political Science	26	84.35%	88.24%	50%	100%	13.86%
Theatre	14	87.33%	87.94%	66.67%	96.88%	8.79%
Modern Languages	8	80.37%	81.79%	74.70%	85.52%	3.93%
Geography	7	71.84%	71.26%	44.29%	91.85%	12.27%

Science & Technology						
School of Technology	134	86.13%	88.14%	44.29%	100%	11.05%
Biology & Earth Science	70	85.09%	87.01%	52.88%	100%	12.28%
Aviation	30	82.88%	85.01%	57.69%	100%	12.19%
Mathematics & Computer Sci.	27	81.32%	81.84%	59.62%	99.20%	11.02%
Agriculture	14	85.67%	88.25%	63.68%	100%	10.23%
Biochemistry, Chem., & Physics	13	81.43%	76.07%	65.57%	100%	12.01%
Business Administration						
Management & Business Comm.	71	88.40%	91.17%	46.88%	100%	11.51%
School of Accountancy	59	88.53%	90.51%	46.79%	100%	10.72%
Economics & Finance	51	86.61%	89.20%	51.13%	100%	11.60%
Marketing & Business Law	49	87.18%	87.32%	58.77%	100%	9.63%
Computer Information Systems	21	78.80%	81.57%	51.24%	99.20%	14.36%
Education						
Elem. & Early Childhood Edu.	117	81.24%	81.64%	57.02%	100%	8.79%
Edu. Leadership & Human Dev.	69	86.35%	88.23%	51.88%	100%	10.44%
Career & Technology Education	15	84.84%	87.59%	57.41%	96.12%	11.26%
Educational Foundations & Lit.	15	79.87%	79.37%	64.47%	93.73%	9.30%
Other						
General Studies	55	73.83%	75.00%	45.28%	100%	12.27%
Crisis & Disaster Management	10	91.49%	96.77%	64%	100%	10.96%
Women’s Studies Individualized	1	81.04%				

Summary Data for the Four Dependent Variables

Descriptive summary statistics are provided for the four dependent variables in Table 59. The average number of semesters enrolled was 13.32 and the average number of semesters elapsed from matriculation to graduation was 20.53. The average GEI was 78.98% and the average alternative GEI was 84.63%. As the literature had noted, the alternative GEI results always yield greater percentages than the traditional GEI. Thirty-two cases were not included in the traditional GEI figures because these students had a negative GEI result. This occurred for students whose transfer credit hours exceeded the minimum hours required for their degree at UCM.

When comparing the two methods of the GEI calculation, it was discovered that in general, the original GEI and alternative GEI had increased variance as the number of transfer credits increased. The results for some cases differed by only a few percentage points, but for others the difference between the GEI versus the alternative GEI was up to 72%. After further investigation, it was discovered that 66% of the study sample had a 5% or less difference between the two GEI calculations. Nearly 11% of the sample had a difference of 20% or more.

Median values for semesters enrolled and the alternative GEI were very similar to the means in those areas at 13 semesters and 86.74%, respectively. The median values for semesters elapsed and the traditional GEI were more disparate from their mean values, indicating greater variability in the range, with medians of 16 semesters and 83.57% efficiency, respectively. This is supported by larger standard deviation values for these two variables.

Table 59

Descriptive Statistics for the Dependent Variables

Dependent Variable	M	Minimum	Maximum	SD	Excluded Cases
Semesters Enrolled	13.31	7	44	3.7	0
Semesters Elapsed	20.52	9	133	13.92	0
GEI	78.99%	2.38%	100%	18.01%	32[a]
GEI (alternative)	84.63%	44.28%	100%	11.53%	0

[a]Thirty-two cases were excluded due to negative GEI values.

Summary

This study was based on 1,585 undergraduate degree recipients from three semesters (Summer 2010, Fall 2010, and Spring 2011) at the University of Central Missouri. While there was a total of 1,629 graduates during that year, 44 students were not included the study for various reasons. The original research questions included three dependent variables: semester enrolled, semesters elapsed, and GEI. The researcher decided to include the alternative version of the GEI as an additional dependent variable after discovering some interesting results with the traditional GEI. Many (36) dependent variables were assessed to determine if they had a correlation to the dependent variables. These variables were organized into six categories to guide the analysis: student demographic, college preparedness, student enrollment pattern, student financial, college academic achievement, and college curriculum variables.

Multiple methods of analysis were used to answer the research questions. These included a bivariate correlation analysis using a two-tailed Pearson correlation coefficient. Of the original 36 independent variables tested, there were 21 variables that proved to have statistically significant correlations to all four of the dependent variables. These were: the amount of transfer hours earned; both age at start at UCM and graduation age; whether or not a parent had a college degree; the number of transfer institutions attended; total summer semesters enrolled; both attempted and earned average fall and spring semester hours at UCM; ACT composite score; whether or not the student was a recipient of the Pell grant and institutional aid; estimated family contribution; cumulative and transfer GPAs; number of course repeats, withdrawals, and failures; UCM and cumulative hours earned; and number of semesters on probation and number of times suspended.

The strongest correlations across the board were exhibited by transfer hours earned, age at graduation, cumulative hours attempted, and cumulative hours earned. Other strong relationships were found with age the student began at UCM, total summer semesters enrolled, and the average number of fall/spring hours attempted and earned at UCM.

Although some of the student financial variables were significantly correlated to some of the dependent variables, none of the correlations were strong. This was also the case for the three college preparedness variables. Of the two college curriculum variables, double major and minor, double major was the only one to show any significance and it was only with one of the dependent variables (alternative GEI).

With two exceptions (UCM hours attempted and UCM hours earned) the direction of the significant correlations were the opposite for the time to degree measures (semesters enrolled and elapsed) and the efficiency measures (GEI and alternative GEI). In both exceptions, only the alternative GEI differed and had the same directional relationship as the time to degree measures. This corresponds with other unexpected findings regarding the UCM hours attempted variable.

There were seven variables that were not correlated to any of the four dependent variables. These were: gender, residency, whether or not the student filed a FAFSA, the amount of loans taken in the senior year, the percentage of need met, the percentage of need met with gift aid, and whether or not a student completed a minor. None of these variables were included in the regression equations.

After determining which independent variables were significantly correlated to the dependent variables, an analysis utilizing linear, stepwise regression was performed. This number of significant correlations varied from 23 to 26 independent variables per dependent variable: however, some of the significant variables were eliminated because of collinearity prior to performing the first regression. After the initial regressions were performed, variables that exhibited low levels of tolerance were removed from the models. The four regressions that were performed (one for each of the dependent variables, resulted in final regression models that included between six and eight significant predictor variables. The models developed explained a range of 79% to nearly 93% of the variance in the models. The regression models for the GEI and alternative GEI had much stronger results, R_2 = .908 and R_2 = .927 respectively, compared to the regression models for semesters enrolled (R_2 = .790) and semesters elapsed (R_2 = .822).

To answer Research Questions 5, 6, 7, and 8 means comparisons tables were provided for each of the dependent variables compared by college, degree, and department. One-way analyses of variance (ANOVA) were performed to determine if the differences between colleges, departments, and degree types were significant. When a significant relationship was determined within a comparison group, a post-hoc Tukey HSD test was used to compare all possible pairs of group means. Significant mean differences were discovered by both college of enrollment and type of degree. No significant mean differences were discovered by department of enrollment.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

Chapter 5 provides a discussion of the findings from the statistical analyses outlined in Chapter 4. Limitations of the study are also reviewed. Based on the research findings, implications for practice and suggestions for further research are offered. The chapter concludes with a summary of the study.

Discussion of the Findings and Retention Theory

Many of the theories of student retention reviewed in Chapter 1 noted that student "input" variables such as background characteristics (race, gender, and socioeconomic status) and prior educational experiences (high school grades, standardized test scores) have an impact on success as a college student (Astin, 1984, 1993; Bean 1980, 1982, 1983; Bean & Metzner, 1985; Tinto, 1975, 1993). The results of this study revealed that gender and race were not significant factors for predicting time and efficiency to degree. Gender was not related to any of the dependent variables and minority status was only slightly correlated (r = -.069, p = 009) with the alternative GEI.

In regards to socioeconomic status, this study's findings concurred with retention literature. It was found that students who receive a Pell grant, typically those with the greatest financial need, took longer to graduate and did so with less efficiency than those who did not receive Pell. In addition, students who had a greater expected family contribution, thus coming from families of greater wealth, took less time to graduate and did so more efficiently.

As the retention literature noted, this study also found that students with higher ACT scores graduated in fewer semesters and more efficiently. While high school GPA was not significantly correlated to time to degree for the students in this study, it was positively correlated with efficiency to degree.

Retention theory strongly links academic integration as a predictor of student success. The findings of this study also support that claim. Both cumulative and transfer GPA were significantly correlated to all of the measures of time and efficiency to degree. UCM GPA was significantly correlated on all measures except for semesters elapsed. Three other measures of academic success, course repeats, withdrawals and failures, also had strong correlations with all dependent variables. As expected, the academic standing measures of semesters on probation and number of times suspended had an impact on both time and efficiency to degree, while the number of times dismissed was significant to semesters enrolled and the alternative GEI.

Discussion of the Findings and the Literature

Unlike the vast majority of the literature on time and efficiency to degree, this research did not find any significant correlations between gender, race, or residency and the four dependent variables. The findings regarding age and parental degree, on the other hand, were found to be strongly correlated to both time and efficiency to degree as was also demonstrated in the literature.

The literature on the effect of standardized test scores and time to degree were mixed. Some studies found a relationship, while others did not find a relationship. This study did reveal a significant correlation with ACT composite score and all of the dependent variables. The study did not find high school GPA to be correlated with time

to degree, but did yield a relationship with both GEI measures. The relationship with high school GPA and GEI was stronger than the relationship of ACT scores with GEI. Astin (2006) and Astin, DesJardins, Ahlburg, and McCall (2002) also found that high school GPA was a better predicator than standardized test scores.

The research on summer semester enrollment was mixed. This study found that increased summer semester enrollment increased time to degree and decreased efficiency. This relationship was supported in the literature by Knight (2004), Knight and Arnold (2000), Volkwein and Lorang (2006), and the Wisconsin University System (2002). The research (American Federation of Teachers, 2003; Gillmore & Hoffman, 1996; Gillmore & Hoffman, 1997; Oklahoma State Regents for Higher Education, 1999; U.S. Department of Education, 2011) also found that students who attended multiple transfer institutions also had longer time to degree and decreased efficiency. The findings in this study support these conclusions.

In regards to financial aid, the findings of this study were similar to that of Knight (2004) in that no significant relationship was found between unmet financial need and time to degree. The findings of this study also concurred with finding in the literature (American Federation of Teachers, 2003; Attewell & Lavin, 2007; Cabrera, Burkum, La Nasa, & Steven, 2003; Corrigan, 2003; Gillmore & Hoffman, 1996) regarding socioeconomic status, confirming that students of lower socioeconomic status take longer to earn their degree.

Also consistent with the findings in the literature were the results for college grade point average, hours earned, and hours attempted. As college grade point average increases, time to degree decreases and efficiency increases (Belcheir, 2000; Cabrera,

Burkum, La Nasa, and Steven, 2003; DesJardins, Ahlburg, & McCall, 2002; DesJardins, McCall, Ahlburg, & Moye, 2002). As would be expected, and as the literature noted (Cabrera, Burkum, La Nasa, and Steven, 2003; Knight, 2004; Wisconsin University System, 2002), there was a strong correlation with both hours earned and hours attempted to both time and efficiency to degree.

Research Question One

Research Question 1 asked if the number of total semesters enrolled was affected by any of the individual or institutional independent variables. Across the sample, the average number of semesters enrolled was 13.31 semesters. Twenty-five of the 36 variables studied did have a statistically significant relationship to the number of semesters enrolled. Of these variables, the five strongest correlations, in order, were with the number of summer semesters enrolled, cumulative hours earned, the average hours earned and attempted at UCM during fall and spring semesters, and age at graduation. All of these findings supported what was discovered in the literature review. The fact that the relationship between greater number of summer semesters enrolled and more overall semesters enrolled was a positive relationship, suggests that UCM students are using summer semesters to make up course work that had been previously failed or repeated instead of to get ahead in course work.

An interesting discovery was the nature of the relationship between conditional admission and semesters enrolled. Being admitted conditionally had a negative relationship with semesters enrolled, meaning that these students actually graduated in a timelier manner. While fewer conditional students graduate overall, those that do succeed to graduation appear to do it in fewer semesters than regularly admitted students.

In regards to financial variables, students who received Pell grants were more likely to have more semesters enrolled. This may be influenced by the student not having to repay that financial aid.

Despite significant relationships found in the literature review, gender, minority status, residency, and high school GPA did not have a significant relationship with semesters enrolled. Also, the number of UCM hours attempted did not have a significant relationship with semesters enrolled.

Another interesting finding is the significant negative relationship with UCM hours earned. The more hours earned leads to less semesters enrolled. It would be assumed that the relationship would work in the opposite direction. This might have some relationship to native versus transfer students. Further research would need to be conducted to explore these relationships.

Research Question Two

Research Question 2 was also measuring time to degree, but as semesters elapsed. This examines semesters from the student's first college enrollment through their graduation. The average number of semesters elapsed for the study sample was 20.52. Twenty-four of the 36 variables studied had a significant correlation to semesters elapsed. The five strongest correlations, in order, were with age at graduation, beginning age at UCM, UCM average fall/spring attempted hours, cumulative hours earned, and transfer hours earned. Three of these were also in the strongest five for semesters enrolled (graduation age, UCM average fall/spring attempted hours, and cumulative hours earned).

The correlations for semesters elapsed compared to semesters enrolled were very similar. The two shared 21 of the same correlations. The three differences were all in the college academic achievement variables. Two variables that were significantly correlated to semesters enrolled, but not semesters elapsed were UCM GPA and the number of times dismissed. This is interesting because if someone is dismissed, this would automatically increase their semesters elapsed because they would be required to sit out a year. However, this might be explained if these students were granted early reinstatement. The third difference was in regards to UCM hours attempted. Semesters elapsed did show a weak significant relationship with UCM hours attempted. Oddly, this was a negative relationship and as UCM hours increased, semesters elapsed decreased instead of increasing. A similar relationship was found with UCM hours earned. It would be interesting to see how these vary between UCM native students versus transfer students, or to explore these relationships more by age of the student.

The finding for conditionally admitted students was the same as it was for semesters enrolled; as these students were more likely to have fewer semesters elapsed. While still significant, the strength of the relationships with courses repeated, failed, and withdrawn was weaker than they were for semesters enrolled. So while students who repeat, fail, or withdraw from courses enroll in more semesters, they do not apparently stop-out as much.

Semesters elapsed was the only of the four dependent variables that did not have a significant relationship with UCM GPA. Unlike semester enrolled, semesters elapsed did not have a significant correlation with the number of times a student was dismissed.

Research Question Three

The third research question asked whether or not the individual and institutional variables are related to GEI. Of the 36 variables studied, there was a significant relationship between GEI and 25 of the variables. In order of strength of the relationship, the top five variables were cumulative hours earned, transfer hours earned, age at graduation, beginning age at UCM, and number of transfer institutions. Both age at graduation and cumulative hours earned were also two of the strongest correlations with semesters enrolled and semesters elapsed. Also, beginning age at UCM and transfer hours earned were in the top five correlations for semesters elapsed.

An interesting finding was the positive correlation of UCM hours attempted and UCM hours earned with GEI. It would normally be assumed that the more hours a student attempts, the lower the GEI would be. However, this might be an indication that native UCM students have higher GEIs than students with large numbers of transfer credits. Attempted transfer hours were not considered in the study since UCM does not record withdrawn work from transfer institutions.

GEI was the only dependent variable to not have significant correlation with gap in financial aid. As found with the results for the time to degree measures, efficiency to degree also declined as students enrolled in more summer semesters. Conditional admission was also discovered to have a positive relationship with efficiency and students who received Pell grants were less efficient.

Research Question Four

The alternative GEI had significant correlations with 28 of the 36 variables, more than any other dependent variable. Four of the five strongest correlations were variables

in the college academic achievement area. In order of strength, they were cumulative hours earned, total withdrawals, total repeats, and total failed courses. The fifth strongest relationship was with number of summer semesters enrolled. This is the first dependent variable to not have age at graduation in the top five, though it did rank at number six. Like all of the other dependent variables, cumulative hours earned was included in the top five and like semester enrolled, summer semesters enrolled had a strong correlation. This was the only dependent variable to include courses withdrawn, repeated and failed in the top five variables.

Alternative GEI was the only dependent variable to have a significant correlation with minority status and double major. Both relationships were very weak negative ones, $r = -.069$, $p = .009$ and $r = -.082$, $p = .001$ respectively. It was also the only one to have a significant correlation with all 13 of the college academic achievement variables. It was also the only dependent variable to not have a significant relationship with conditional admission.

While high school GPA was not significantly correlated to either measure of time to degree, it was significantly correlated to both measures of efficiency to degree. As expected, as high school GPA increased, so did graduation efficiency.

Research Question Five

Research Question 5 asked if there were any significant differences in semesters enrolled by college, degree, or department. The results showed that there were significant differences by both college and degree type. No statistically significant differences were found by department of enrollment for semesters enrolled.

Not surprisingly, students in the General Studies major had significantly more semesters enrolled on average (16.44 semesters). This major program was created in 2009 by UCM to cater to students with excessive earned hours who do not meet degree requirements for a prescribed major. It is typical for students in this major to have an abundance of extra earned hours and extended time to degree.

The colleges with the lowest average number of semesters enrolled were the College of Science and Technology (12.90 semesters) and the College of Arts, Humanities, and Social Sciences (12.94). The other three colleges had very similar average numbers of semesters enrolled ranging from 13.18 to 13.92.

In regards to degree type, the B.M.E. degree had the highest average number of semesters enrolled (16). This is not surprising because this degree has a high number of required hours, complicated course prerequisites, and limited course offerings. The B.F.A. degree had the lowest average semesters enrolled (12.46).

Research Question Six

Research Question 6 asked if there were any significant differences in semesters elapsed by college, degree, or department. The results showed that there were significant differences by both college and degree type. Like the first measurement of time to degree, no statistically significant differences were found by department of enrollment for semesters elapsed.

Like the results for semesters enrolled, students in the General Studies major had significantly more semesters elapsed on average (35.80 semesters). The college with the next highest number of semesters elapsed was the College of Education with an average of 21.76 semesters. The college with the lowest was the Harmon College of Business

Administration with an average of 18.62 semesters elapsed. This college also had the smallest range of semesters, from 10 to 77. This is not surprising because the programs in the college of business are very streamlined and fairly uncomplicated.

In terms of degree types, the B.S.W. degree had the highest average semesters elapsed (28.09) and the B.M.E. degree had the second highest with an average of 24.36 semesters. The B.F.A. degree had the lowest number of semesters elapsed (17.11), as it also had for semesters enrolled.

Research Question Seven

Research Question 7 asked if there were any significant differences in GEI by college, degree, or department. The results showed that there were significant differences by both college and degree type. There were no statistically significant differences by department in regards to GEI.

As expected students in the General Studies major had significantly lower average GEIs (61%) compared to students in the other colleges. Students in this major typically declare this major with advanced earned hours. The college with the next lowest GEI was the College of Education with an average GEI of 76%. Students in the Harmon College of Business Administration were the most efficient with an average GEI of 82%. Close behind was the College of Arts, Humanities, and Social Sciences with an average GEI of 80%.

The degree type with the lowest GEI (63%) was the B.M.E. Three of the colleges had average GEIs in the range of 81% to 83%. These included the B.S.B.A at the top of the list, followed by the B.F.A, and then the B.S.W.

Research Question Eight

The results for the analysis of the alternative GEI showed that there were significant differences by both college and degree type. As for the other four dependent variables, there were no statistically significant differences by department in regards to alternative GEI.

The results by college for the alternative GEI were nearly identical to that of the traditional GEI in regards to the order of the averages. However, all of the results for alternative GEI were higher than for the GEI. Students in the General Studies major had significantly lower average alternative GEIs (74%) compared to students in the other colleges. The college with the next lowest GEI was the College of Education with an average alternative GEI of 83%. Students in the Harmon College of Business Administration were the most efficient with an average alternative GEI of 87%. Close behind was the College of Health and Human Services with an average alternative GEI of 85%.

Again, the results by degree for the alternative GEI were very similar to that of the traditional GEI. The degree type with the lowest GEI (73%) was the B.M.E. Three of the colleges had average GEIs above 85%. These included the B.S.W. at the top of the list, followed by the B.S.B.A., and then the B.F.A.

Independent Variables

Student Demographic Variables

Surprisingly, gender and residency were not significantly correlated with any of the four dependent variables. Minority status was only significantly correlated with the alternative GEI, but it was a very weak relationship (r = -.069, p = .009). Both beginning

age at UCM and age at graduation proved to have strong significant relationships to all four dependent variables. In all cases, the relationship was stronger for age at graduation. First generation status (parent degree) was also significant to all variables, but the relationship was weak in all instances.

College Preparedness Variables

ACT composite score was significantly related to all of the dependent variables. High school GPA was only significantly correlated with the two efficiency measures and conditional admission was significantly correlated to all variables except for the alternative GEI. Though there were many significant correlations with the college preparedness variables, none of the relationships were particularly strong.

Student Enrollment Pattern Variables

All four of the student enrollment pattern variables were significantly correlated with all of the dependent variables. Also, all of the relationships were quite strong. As would be expected, the greater the average hours a student attempted or earned during fall and spring semesters, the fewer the number of semesters enrolled and elapsed. For all of the variables, their correlation to semesters elapsed was weaker than their correlation with semesters enrolled. Both number of transfer institutions and number of summer semesters had significant negative correlations with the GEI, indicating that the more transfer institutions a student attended and the greater number of summer semester enrolled led to decreased efficiency towards degree.

Student Financial Variables

Half of the financial aid variables had no significant relationship with any of the dependent variables. These included whether or not a student had a FAFSA on file, the loan amount taken during their senior year, the percentage of need met and the percentage of need met with gift aid. Whether or not a student received a Pell grant, institutional aid, and estimated family contribution were all significantly correlated to all of the dependent variables. The gap between the amount of aid needed and the amount of aid provided was significant for three of the dependent variables. The one it did not correlate with was the traditional GEI.

College Academic Achievement Variables

Both cumulative and transfer GPA were significantly correlated to all four of the dependent variables. UCM GPA was correlated to all except for semesters elapsed. Courses failed, repeated, and withdrawn were all significantly correlated to all of the dependent variables. UCM, transfer, and cumulative hours earned were all significantly correlated with all four of the dependent variables. UCM attempted hours was significantly correlated to all of the dependent variables except for semesters enrolled.

The number of semesters of probation and number of times suspended were both significantly correlated with all four dependent variables. Number of times dismissed was only significantly correlated with semesters enrolled and the alternative GEI.

College Curriculum Variables

Whether or not a student earned a minor was not significantly correlated with any of the dependent variables. Double major was only significantly correlated with the alternative GEI.

Limitations of the Study

The results concerning how the dependent variables varied by college, department/school, and degree type were reviewed based on the academic structure of the university at the time of data analysis (2010 Undergraduate Catalog). Because the university changed from a four-college to five-college structure in 2007, data regarding how the colleges compare may be skewed because some majors changed colleges during that transition. So the services provided to students, particularly academic advising, may have changed during a student's time at the university. It may be difficult to evaluate the efficiency of programs that made a change.

The same holds true for schools/departments. During the time when the graduates attended, departments were created and eliminated and degree programs were moved across departments. Degree programs were also created and eliminated during the time the students studied attended.

Another challenge involves the disparity among colleges in regards to the number of schools/departments and number of degree programs offered. An additional limitation is the number of graduates included in each area for study. Though the Department of Criminal Justice only offers one degree program, they account for a large number of the graduates studied (125), while some degree programs may only have a few graduates from the year studied. It is impossible to draw conclusions based on such small sample sizes.

A final limitation of this study was the inability to distinguish between transfer and UCM credits and dual credits. It is likely that some students in the sample completed dual credit while in high school. It is safe to assume that some students participated in

dual credit at UCM and others at transfer institutions. The problem that this creates is inaccuracies for these students in regards to time to degree, as their first college enrollment, even if while still in high school counts as their first semesters towards semesters enrolled and elapsed. It also creates a problem with the variables for age because it would appear that the students enrolled in college at younger ages. The researcher does not know how many students in sample participated in dual credit.

Implications for Practice

Based on the results from this research, there are many items that universities should consider to potentially positively affect student time and efficiency to degree. While it is not expected, nor possible, for any institution to graduate all students in a four-year time frame with only the minimum required hours, there are many areas where universities could clear obstacles to graduation through enhanced academic advising, directed student interventions, curriculum redesign, and policy and practice revision.

Based on the strong correlations found in this study regarding the average number of earned and attempted hours during fall and spring semesters, institutions should encourage full-time enrollment as much as possible. One way to encourage greater credit hour enrollment is to consider an alternative tuition schedule which charges a flat fee for anything above 12 or even 15 credit hours. This would encourage students to take more than the minimum hours for full-time and instead enroll in more hours because they would be getting the additional hours “free”.

The research has shown that the more credit hours a student is enrolled in during each term will decrease the time to degree. Enrollment managers need to determine campus practices and policies that can lead to this goal. Unfortunately, many federal and

state policies which determine full-time status as 12 or more semester hours do not correspond with the required 15 semester hours per term that are required for graduation within four years. Students need to be educated to better understand how course planning and performance affect overall time to degree.

To encourage greater enrollments and timeliness towards degree, UCM should consider adding more courses to the summer, online, and evening course offerings. Additional course work at the half-term during fall and spring semesters and additional options at the Lee's Summit campus would also help students in meeting their graduation goals. Since summer semester enrollment was correlated with more semesters enrolled and elapsed and lower GEIs, UCM should initiate a campaign to encourage summer semester enrollment as a way to get ahead in curriculum instead of just catching up.

Based on the findings regarding the number of transfer institutions that a student has attended, UCM should identify students upon admission who have attended more than one transfer institution because students who attended a greater number of transfer institutions were associated with longer time to degree and lower efficiency. Great care should be taken with these students to ensure the best application of their transfer credit and long term academic plans should be created early on to eliminate the accumulation of excess credit hours and time to degree.

To better track graduation statistics, universities should develop longitudinal databases specifically designed to study graduation metrics and should conduct studies into student departure and retention. Information should be readily available for staff and faculty to assess graduation metrics and to compare them across colleges, departments, and programs. If academic units to not have an understanding of where they currently

measure, it is difficult to determine improvements or regressions. Best practices from those programs excelling can be shared to improve the campus overall. Programs that are shown to be underperforming can be made aware and provided with assistance for improvement.

Universities should be proactive by targeting traditional students who have not earned at least 30 credit hours after their second semester of enrollment. These students should be encouraged to enroll in make-up work during the summer semester and informed about time to degree issues. Similar programs should be in place to contact second year students who have not earned 60 credit hours after two years, and so on.

In addition to the better tracking of currently enrolled students, universities should expand recruit-back programs and contact non-returners for second semesters and second years (and beyond). The importance of student retention and graduation goals needs to permeate campus the campus culture. These cannot simply be the concerns of the chief enrollment manager or the professional academic advisors. Retention and graduation issues should be ingrained into the values of all staff and faculty.

The university should conduct a comprehensive curriculum review to examine the validity of program requirements and course prerequisites. Course offering schedules and course demand should be reviewed and if necessary, realigned to meet current student needs. Programs that required more than the minimum of 120 credit hours for graduation due to excess free electives or the requirement of a minor should be adjusted to meet the minimum. Programs that require more than 120 hours because of major requirements which are not part of an accreditation obligation should be assessed for a possible reduction in hours to assist students in more timely graduation. Majors that have many

prescribed general education courses or overly complicated and unnecessary prerequisite structures should be reviewed. These rigidly designed programs make it difficult for students to transfer into them from other institutions or for current students with advanced hours to change majors. It should be further examined to see if there is a difference between students who had minors that were required versus those that were optional.

Smaller advisor to student ratios would allow academic advisors to truly manage an advising caseload. Very few students at UCM are currently required to meet with an academic advisor. Many students could potentially go their entire academic career without academic advising. Smaller caseloads would allow for mandatory academic advising, at least for the most needy student populations. Mandatory academic advising would assist in ensuring that students are enrolling in proper courses and taking course loads that lead to timely graduation.

Academic advising should focus more on long-term academic planning and teaching students to think beyond the current term. Institutions must create awareness among students and advising staff that graduation planning is critical to student success. Students need to be provided with the tools necessary to make a plan for graduation (four-year planners, checklists, etc.) and recognize that plans are temporary and need to be continually evaluated. Once commitment is given to a graduation plan, the student and academic advisor should refer back to the plan to see how each semester's plan fits into the overall goal of graduation (Gordon & Kramer, 2003).

Academic advisors should target students with lower GPAs to provide them with extra assistance for timely and efficient graduation. Students who are found to have an

excessive number of course repeats, failures, and withdrawals should be monitored and required to have mandatory advisement prior to future enrollments. Also, mid-semester grades and early alert reports for these students should be monitored for potential problems. Students who have earned more hours than the minimum required for a degree should be required to meet with an academic advisor prior to future enrollment to create plans to finish their degree program in a timely and efficient fashion. Students who are on probation or who have been reinstated after suspension or dismissal should be required to meet with an academic advisor regularly until they are back in good academic standing.

UCM should review its probation, suspension, dismissal policy to encourage continuous enrollment. Currently UCM gives one semester of warning (probation) and then if a student has a second semester with a semester GPA of less than 2.00, the student is suspended from UCM. This two strikes and you are out policy is quite harsh when compared to some other institutions. Under the existing policy, students have the potential to be suspended based on one poor letter grade. An alternative method of determining suspension based on the number of deficiency points earned could be explored.

Lastly, the university should consider a policy which requires remediation course work to be completed during the first two semesters of enrollment and guarantee enough sections of these courses to meet demand. This will assist students in meeting course prerequisites in a more timely fashion.

Recommendations for Further Research

Further investigation into the subjects of time and efficiency to degree is certainly warranted based on the significant relationships found in this study between both

individual and institutional variables and the dependent variables. This study could be easily replicated to include a larger sample of students covering more graduation years to see if the results are different or to compare the results of graduates over time. It would also be interesting to see how the results at UCM compare to similar peer institutions. The study could also be replicated taking into account dual credit students to see how dual credit impacts time and efficiency to degree.

Another method to explore would be tracking this sort of data within majors and to compare efficiency and time to degree between students who started as that major and those who later changed to that major. Some majors may be common back-up choices to primary majors, and thus students may have excess hours earned before even beginning those degree programs.

While this study did not find significant differences in findings among the departments, there were differences. Departments with high levels of efficiency should be further compared to those with low efficiency. The institution should examine characteristics which may delay graduation such as course availability, curriculum design, course prerequisite structure, and advising services. Do programs that require minors extend graduation? Are programs that require more than 120 hours to graduate justified in doing so?

Further research should be conducted comparing native UCM students and transfer students. It would be interesting to see if the results of the dependent variables differ between these two groups. An analysis could be done examining the results of students from UCM's main "feeder" institutions to see which schools provide the most seamless transfer of credits to assist with increasing timeliness and efficiency towards

graduation. These types of analysis may offer insight into transfer articulation or course substitutions and how they differ among programs at UCM and the transfer institutions that students attended. With programs such as "Missouri A+", researchers might find that completing the 42-hour general education core at a community college may be more or less efficient than having completed all four years at UCM.

This study focused solely on students who did earn their degree. Additional study should be devoted to both students in progress towards a degree and those who stop out or drop out. These studies could have an impact on students who are working towards their degree and maybe assist them with doing so in a more timely or efficient manner. Discovering road blocks that deter students from graduation could also help the university's retention and graduation rates.

The university should consider collecting data upon admission regarding a student's intent to graduate from the institution. Collection of student intent data can assist the university in the development and application of retention programs. For example, students who intend to graduate from the institution would be the group to extend the most resources towards helping. However, special programs could be geared towards the groups of students who have the intent on transferring out of the institution in an attempt to convert them to degree-completers at the institution (Howard & Rogers, 1991).

With issues of higher education accountability and dwindling federal and state support for higher education in the national spotlight, additional studies on time and efficiency to degree can help universities to assess where they need improvement and how to best allocate resources.

Summary of the Study

This study analyzed time and efficiency to degree by institutional and individual variables. The results of the dependent variables were also compared across college, degree, and department to look for any significant differences among the groups. After reviewing extensive literature on student retention, graduation rates, and time and efficiency to degree, 36 independent variables and three dependent variables were identified for inclusion in this research. An additional dependent variable, the alternative calculation for the GEI, was also included after initial data for the study were examined.

The study sample included nearly all graduates (N = 1,585) from a one year period at the University of Central Missouri. The researcher used multiple statistical techniques to analyze the data. Findings revealed that of the original 36 independent variables tested, 21 variables proved to have statistically significant correlations to all four of the dependent variables. The strongest correlations were exhibited by transfer hours earned, age at graduation, cumulative hours attempted, and cumulative hours earned. Other strong relationships were found with age the student began at UCM, total summer semesters enrolled, and the average number of fall/spring hours attempted and earned at UCM. There were six variables that were not correlated to any of the four dependent variables. These were gender, whether or not the student filed a FAFSA, the amount of loans taken in the senior year, the percentage of need met, the percentage of need met with gift aid, and whether or not a student completed a minor.

Four stepwise linear regressions were performed (one for each of the dependent variables). These resulted in final regression models that included between six and eight

significant predictor variables. The models developed explained a range of 79% to nearly 93% of the variance in the models.

To answer Research Questions 4, 5, and 6, means comparisons tables were provided for each of the dependent variables compared by college, degree, and department. Significant mean differences were discovered by both college of enrollment and type of degree. No significant mean differences were discovered by department of enrollment.

The results of this research have many potential implications on practice in higher education. The research suggests that students should be provided with proactive, targeted academic advisement. This should be aimed at assisting students who have the most risk factors including non-traditional aged students, students not in good academic standing, and those who have attended many transfer institutions. Universities should create databases to track graduation metrics and consider a curriculum review to determine roadblocks that may inhibit timely graduation.

While this research was comprehensive and included many different independent and dependent variables, it was certainly not exhaustive. There are still many questions about time and efficiency to degree that need further exploration. The researcher recommends more research comparing native versus transfer students to explain some of the correlations found in this research. Further exploration of differences between colleges and departments should be conducted to look for best practices and to find areas that need improvement.

Expanding knowledge in the areas of time and efficiency to degree can provide higher education institutions with information and resources to understand their student

populations and the institutional practices. Having good data to make informed decisions arms an institution with metrics that are relatively easy to compute and distribute to show accountability and viability in a competitive market. The findings from this study may be used to establish a baseline for further research and to improve practice with the ultimate goal of helping students meet their academic goals in a timely and efficient manner that also benefits the institution.

REFERENCES

About our undergraduates. (n.d.). Retrieved February 20, 2011, from http://www.ucmo.edu/about/facts/undergrads.cfm.

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

Adelman, C. (2006). *The tool box revisited: Paths to degree completion from high school through college.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Albright, B. N. (1998). *The transition from business as usual to funding for results: State efforts to integrate performance measures in the higher education budgetary process.* Boulder, CO: State Higher Education Executive Officers Association.

Alon, S., & Tienda, M. (2005). Assessing the "mismatch" hypothesis: Differences in college graduation rates by institutional selectivity. *Sociology of Education, 78*(4), 294-315.

American Federation of Teachers. (2003). *Student persistence in college: More than counting caps and gowns* (Item Number 36-0702). Washington, DC: Author.

Andres, L., & Carpenter, S. (1997). *Today's Higher Education Students: Issues of Admission, Retention, Transfer, and Attrition in Relation to Changing Student Demographics.* Centre for Policy Studies in Education, University of British Columbia.

Astin, A.W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, *25*, 297-308.

Astin, A. W. (1993). *What matters in college? Four critical years revisited.* San Francisco: Jossey-Bass.

Astin, A. W. (1997). How "good" is your institution's retention rate? *Research in Higher Education, 38*(6), 647-658.

Astin, A. W. (2006). Making sense out of degree completion rates. *Journal of College Student Retention, 7*, 5-17.

Astin, A. W., & Oseguera, L. (2002). *Degree Attainment Rates at American Colleges and Universities.* Higher Education Research Institute, UCLA.

Attewell, P., & Lavin, D. E. (2007). Distorted statistics on graduation rates. *Chronicle of Higher Education*, *53*(44), B16.

Barak, R. J., & Kniker, C. R. (2002). Benchmarking by state higher education boards. In B. E. Bender & J. H. Schuh (Eds.), *New directions for higher education: Vol. 118. Using benchmarking to inform practice in higher education* (pp. 93-102). San Francisco: Jossey-Bass.

Bean, J. P. (1980). Dropouts and turnover: The synthesis and test of a casual model of student attrition. *Research in Higher Education, 12*(2), 155-187.

Bean, J. P. (1982a). Conceptual models of student attrition: How theory can help the institutional researcher. In E. Pascarella (Ed.), *New directions for institutional research: No. 36. Studying student attrition* (pp. 17-33). San Francisco: Jossey-Bass.

Bean, J. P. (1982b). Student attrition, intentions, and confidence: Interaction effects in a path model. *Research in Higher Education, 17*(4), 291-320.

Bean, J. P. (1983). The application of a model of turnover in work organizations to the student attrition process. *The Review of Higher Education, 6,* 129-148.

Bean, J. P. (1986). Assessing and reducing attrition. In D. Hossler (Ed.), *New directions for higher education: Vol. 53. Managing college enrollments* (pp. 47-61). San Francisco: Jossey-Bass.

Bean, J. P., & Metzner, B.S. (1985). A conceptual model of non-traditional undergraduate student attrition. *Review of Education Research, 55,* 485-540.

Belcheir, M. J. (2000). *Predicting the probability of graduating after four, six, and ten years* (Research Report). Boise State University.

Bender, B., & Schuh, J. (Eds.) (2002). *New directions for higher education: Vol. 118. Using benchmarking to inform practice in higher education.* San Francisco: Jossey-Bass.

Blose, G. (1999). Modeled retention and graduation rates: Calculating expected retention and graduation rates for multicampus university systems. In G. H. Gaither (Ed.), *New directions for higher education: Vol. 108. Promising practices in recruitment, remediation, and retention* (pp. 69-86). San Francisco: Jossey-Bass.

Bound, J., Lovenheim, M. F., & Turner, S. (2010, April). *Increasing time to baccalaureate degree in the United States.* Cambridge, MA: National Bureau of Economic Research.

Bowles, T. J., McCoy, A. C., & Bates, S. (2008). The effect of supplemental instruction on timely graduation. *College Student Journal, 42*(3), 853-859.

Brotherton, P. (2001). It takes a campus to graduate a student. *Black Issues in Higher Education, 18*(18), 34-43.

Brune, M. A. (1996). An analysis of institutional factors impacting time to graduation for undergraduate students. *Dissertation Abstracts International*. (UMI No. 9703514)

Bryan, T. J. (2006). Pathways to student success at Fayetteville State University. In F. W. Hale Jr. (Ed.), *How black colleges empower black students* (pp. 177-189). Sterling, VA: Stylus.

Burke, J. C. (1998). Performance funding indicators: Concerns, values, and models for state colleges and universities. In J. C. Burke & A. M. Serban (Eds.), *New directions for institutional research: Vol. 97. Performance funding for public higher education: Fad or trend?* (pp. 49-60). San Francisco: Jossey-Bass.

Burke, J. C., & Minassians, H. P. (2002). Reporting indicators: What do they indicate? In J. C. Burke & H. P. Minassians, *New directions for institutional research: Vol. 116. Reporting higher education results: Missing links in the performance chain* (pp. 33-57). San Francisco: Jossey-Bass.

Cabrera, A. F., Burkum, K. R., & La Nasa, S. M. (2003, November). *Pathways to a four-year degree: Determinants of degree completion among socioeconomically disadvantaged students.* Paper presented at the annual meeting of the Association for the Study of Higher Education, Portland, OR.

Cabrera, A. F., Nora, A., & Castaneda, M. B. (1993). College persistence: Structural equation modeling test of an integrated model of student retention. *Journal of Higher Education, 64*(2), 123-139.

California Postsecondary Education Commission. (2006, December). *California Higher Education Accountability: Goal – Student success, Measure: Time-to-Degree* (Commission Report 06-20). Sacramento, CA: Author.

Capaldi, E. D., Lombardi, J. V., & Yellen, V. (2006). Improving graduation rates: A simple method that works. *Change, 38*(4), 44-50.

Carlson, S., & Lipka, S. (2009, June). Colleges offer a degree in 3. *The Chronicle of Higher Education, 55*(39), p. A20.

The Carnegie classification of institutions of higher education. (n.d.). Retrieved February, 20, 2011 from http://classifications.carnegiefoundation.org.

Cohen, H., & Ibrahim, N. (2008). A new accountability metric for a new time: A proposed graduation efficiency measure. *Change, 40*(3), 47-52.

Complete College America. Missouri state data. (n.d.). Retrieved on July 15, 2011 from http://dl.dropbox.com/u/13281059/State%20Website%20Files/Missouri.pdf.

Corrigan, M. E. (2003). Beyond access: Persistence challenges and the diversity of low-income students. In J. E. King, E. L. Anderson, & M. E. Corrigan (Eds.), *New direction for higher education: Vol. 121. Changing student attendance patterns: Challenges for policy and practice* (pp. 25-34). San Francisco: Jossey-Bass.

Dechter, A. (2009). Facilitating timely completion of a college degree with optimization technology. *The Association for the Advancement of Computing in Education Journal, 17*(3), 215-229.

DesJardins, S. L., Ahlburg, D. A., & McCall, B. P. (2002). A temporal investigation of factors related to timely degree completion. *The Journal of Higher Education, 73*(5), 555-581.

DesJardins, S. L., Kim, D., & Rzonca, C. S. (2003). A nested analysis of factors affecting bachelor's degree completion. *The Journal of College Student Retention, 4*(4), 407-435.

DesJardins, S. L., McCall, B. P., & Ahlburg, D. (2002). Adding a timing light to the "tool box". *Research in Higher Education, 43*(1), 83-114.

Education Commission of the States. (n.d.). *Student learning – Accountability (Postsec.).* Retrieved on June 8, 2010 from http://www.ecs.org/html/issue.asp?issueid=202&subissueID=137

Eykamp, P. W. (2006). Using data mining to explore which students use advanced placement to reduce time to degree. *New Directions for Institutional Research, 131,* 83-99.

Fast facts. (n.d.). Retrieved on February 20, 2011 from http://www.ucmo.edu/about/facts/.

Florida Board of Governors. (2004a, March 18). State university system graduation rates: How are we doing? *Information Brief, 1*(1), 1-4. Tallahassee: Planning and Institutional Research Division of College and Universities Florida Department of Education.

Florida Board of Governors. (2004b, October 21). How long do students take to graduate in the state university system? *Information Brief, 1*(4), 1-4. Tallahassee: Planning and Institutional Research Division of College and Universities Florida Department of Education.

Floyd, N. D. (2002). *So How Long Have you Been Here? Using Retrospective Transcript Data to Examine time to completion at a community college* (Report No. JC 030 213). Columbia, SC. (ERIC Document Reproduction Service No. ED474944)

Fraenkel, J. R., & Wallen, N. E. (2003). *How to design and evaluate research in education.* New York: McGraw Hill.

Gansemer-Topf, A. M., & Schuh, J. H. (2003). Instruction and academic support expenditures: An investment in retention and graduation. *Journal of College Student Retention: Research, Theory, & Practice, 5*(2), 135-146.

Gillmore, G. M., & Hoffman, P. H. (1996, December). *Average graduate efficiency indexes for University of Washington undergraduate degree programs.* Office of Educational Assessment University of Washington.

Gillmore, G. M., & Hoffman, P. H. (1997). The graduation efficiency index: Validity and use as an accountability and research measure. *Research in Higher Education, 38*(6), 677-697.

Goenner, C. F., & Snaith, S. M. (2003). Predicting graduation rates: An analysis of student and institutional factors at doctoral universities. *Journal of College Student Retention, 5*(4), 409-420.

Gordon, V. N., & Kramer, G. L. (2003). Supporting student planning. In G. L. Kramer & Associates (Eds.), *Student academic services: An integrated approach.* San Francisco: Jossey-Bass.

Hall, C., Smith, K., & Chia, R. (2008). Cognitive and personality factors in relation to timely completion of a college degree. *College Student Journal, 42*(4), 1087-1098.

Hauptman, A. M. (1997). Financing American higher education in the 1990s. In Daniel T. Layzell (Ed.), *New directions for institutional research: Vol. 93. Forecasting and managing enrollment and revenue: An overview of current trends, issues, and methods* (pp. 19-35). San Francisco: Jossey-Bass.

Hebel, S. (1999, May 28). Virginia board wants to link state aid to colleges to their performance in key areas. *The Chronicle of Higher Education,* A33.

Herzog, S. (2006). Estimating student retention and degree-completion time: Decision trees and neural networks vis-a-vis regression. *New Directions for Institutional Research, 131,* 17-33.

Howard, R. D., & Rogers, B. H. (1991). Tracking academic progress within a complex academic environment. In D. Hossler (Ed.), *New directions for institutional*

research: Vol. 70. Evaluating student recruitment and retention programs (pp. 61-72). San Francisco: Jossey-Bass.

Hoyt, J. E., Howell, S. L., & Young, S. (2009). Impact analysis of an evening program: Perceptions of need, time to degree, and degree completion. *Journal of Continuing Higher Education, 57*(2), 83-91.

Hutley, K. (2001). *Alexander Astin's Theory of Involvement: A summary.* Illinois State University, Center for the Advancement of Teaching. Retrieved on June 19, 2011 from http://sotl.illinoisstate.edu/conf/astin.shtml retrieved on 06/19/2011.

Illinois State Board of Higher Education (1999). *Persistence, graduation, and time-to-degree.* Springfield, IL: Author.

Johnson, G., & Baum, P. (2004). A statistical model to analyze time to graduate. *Journal of Education for Business, 79*(6), 344-347.

Jones-White, D. R., Radcliffe, P. M., Huesman, R. L., Jr., and Kellogg, J. P. (2009). Redefining student success: Applying different multinomial regression techniques for the study of student graduation across institutions of higher education. *Research in Higher Education, 51*(2), 154-174.

King, J. E. (2003). Nontraditional attendance and persistence: The cost of students' choices. In J. E. King, E. L. Anderson, & M. E. Corrigan (Eds.), *New direction for higher education: Vol. 121. Changing student attendance patterns: Challenges for policy and practice* (pp. 69-83). San Francisco: Jossey-Bass.

Knight, W. E. (1994, June). *Why the five-year (or longer) bachelors degree? An exploratory study of time to degree attainment.* Paper presented at the annual forum of the Association for Institutional Research, New Orleans, LA.

Knight, W. E. (2004). Time to bachelor's degree attainment: an application of descriptive, bivariate, and multiple regressions techniques. *IR Applications, 2, pp 1-16.* Tallahassee, FL: Association for Institutional Research.

Knight, W. E., & Arnold, W. (2000, May). *Towards a comprehensive predictive model of time to bachelor's degree attainment.* Paper presented at the annual forum of the Association for Institutional Research, Cincinnati, OH.

Kroc, R., Howard, R., Hull, P., & Woodard, D. (1997, May). *Graduation rates: Do students' academic program choices make a difference?* Paper presented at the annual forum of the Association for Institutional Research, Orlando, FL.

Kuh, G. D., Kinzie, J., Schuh, J. H., Whitt, E. J., & Associates. (2005). *Student success in college: Creating conditions that matter.* San Francisco: Jossey-Bass.

Lam, L. T. (1999, May). *Assessing financial aid impacts on time-to-degree for nontransfer undergraduate students at a large urban public university.* Paper presented at the annual forum of the Association for Institutional Research, Seattle, WA.

Lam, L. T. (2006). Pathways to degree attainment: Enrollment patterns and time-to-degree for baccalaureate degree recipients at Arizona State University. *Dissertation Abstracts International*. (UMI No. 3210160)

Levitz, R. S., Noel, L., & Richter, B. J. (1999). Strategic moves for retention success. In G. H. Gaither (Ed.), *New directions for higher education: Vol. 108. Promising practices in recruitment, remediation, and retention* (pp. 31-49). San Francisco: Jossey-Bass.

Lonabocker, L., & Wager, J. J. (2003). Course planning and registration. In G. L. Kramer & Associates (Eds.), *Student academic services: An integrated approach* (pp. 147-166). San Francisco: Jossey-Bass.

Luan, J. & Zhao, C. (2006, Fall). Data mining: Going beyond traditional statistics. In J. Luan & C. Zhao (Eds.), *New Directions for Institutional Research: Vol. 131. Data mining in action: Case studies of enrollment management* (pp. 7-16). San Francisco: Jossey-Bass.

Mallette, B. I. (1995, Winter). Money Magazine, U.S. News & World Report, and Steve Martin: What do they have in common? In R. D. Walleri & M. K. Moss (Eds.), *New directions for institutional research: Vol. 88. Evaluating and responding to college guidebooks and rankings* (pp. 31-43). San Francisco: Jossey-Bass.

McGuire, M. D. (1995, Winter). Validity issues for reputational studies. In R. D. Walleri & M. K. Moss (Eds.), *New directions for institutional research: Vol. 88. Evaluating and responding to college guidebooks and rankings* (pp. 45-59). San Francisco: Jossey-Bass.

Mertler, C. A., & Vannatta, R. A. (2002). *Advanced and multivariate statistical methods*. (2nd ed.). Los Angeles: Pyrczak.

National Center for Education Statistics (NCES). (1993). *Time To Complete Baccalaureate Degree. Indicator of the Month (Oct.).* Washington, DC: Author.

National Center for Education Statistics (NCES). (2011). *The Condition of Education, Student Effort and Educational Progress.* Retrieved from http://nces.ed.gov/programs/coe/tables/table-pgr-1.asp on 09/10/11.

National Center for Public Policy and Higher Education (NCPPHE). (2006). *State Reports: Missouri 2006.* Retrieved on July 17, 2011 from

http://measuringup.highereducation.org/reports/stateprofilenet.cfm?myyear=2006&stateName=Missouri.

Noel-Levitz, Inc. (2007). *2007 Pilot Research Report. Access alert: How the neediest students can gain access and succeed through strategic financial aid awarding: Key breakpoints and findings.* Coralville, IA: Author.

Office of Institutional Research, Demography, and Assessment (OIRDA). (2003). *Accountability Plan for 2003-2005.* Retrieved on January 22, 2011 on from http://www.hecb.wa.gov/research/issues/accountability/EWU.pdf. Cheney, WA: Eastern Washington University.

Office of Program Policy Analysis & Government Accountability (OPPAGA). (2006, May). *Student Tracking Systems Can Be Used to Enhance Graduation and Retention Rates* (Report No. 06-48). Tallahassee, FL: Author.

Office of Resource Management & Planning (ORMP), UC Davis. (2004, December). *Budgetary and Institutional Impact of Taking Longer to Graduate* (Briefing paper). Davis, CA: Author.

Pascarella, E. T., & Terenzini, P. T. (2005). *How College Affects Students: Volume 2 A third decade of research.* San Francisco: Jossey-Bass.

Poch, S. (1998). *Confusing Time-to-Degree and the Graduation Efficiency Index: What Are the Issues?* Pullman, WA: Washington State University.

Poch, S., & Wolverton, M. (2006). Transfer student graduation efficiency and university administrators: New bedfellows. *Innovative Higher Education, 30*(4), 233-250.

Schuh, J. H. (2003). The interrelationship of student academic services. In G. L. Kramer & Associates (Eds.), *Student academic services: An integrated approach* (pp. 53-75). San Francisco: Jossey-Bass.

Scott, M., Bailey, T. and Kienzl, G. (2006, May). Relative success? Determinants of college graduation rates in public and private colleges in the U.S. *Research in Higher Education, 47*(3), 249-279.

Selingo, J. (2001, November). Colleges and lawmakers push students to graduate in 4 years. *Chronicle of Higher Education, 48*(11), A22-A23.

Spady, W.G. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange, 1*(1), 64-85.

Spady, W.G. (1971). Dropouts from higher education: Toward an empirical model. *Interchange, 2*(3), 38-62.

Taylor, A. L., Lee, D. J., & Doane, D. J. (2001, June). *Attending summer session and time to the degree.* Paper presented at the annual meeting of the Association for Institutional Research, Long Beach, CA.

Tinto, V. (1975). Dropouts from higher education: a theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89-125.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.

Tinto, V. (2004). *Student retention and graduation: Facing the truth, living with the consequences* (Occasional paper). Washington, D.C.: The Pell Institute for the Study of Opportunity in Higher Education.

United States Department of Education. (March 2011.) *College Completion Tool Kit.* Retrieved on June 25, 2011 from http://www.whitehouse.gov/sites/default/files/college_completion_tool_kit.pdf. Washington, D.C.: Author.

University of Central Missouri. (2010). *2010 Undergraduate Catalog.* Retrieved on May 15, 2011 from http://www.ucmo.edu/academics/catalogs/documents/undergrad10.pdf. Warrensburg, MO: Authors.

University of Washington, Provost's Committee on Accountability. (1997). *Appendix D: Defining the Graduation Efficiency Index.* Retrieved on January 22, 2011from http://www.washington.edu/reports/account/appendixd.html. Seattle: Author.

Valentine, J. C., Hirschy, A. S., Bremer, C. D., Novillo, W., Castellano, M., & Banister, A. (2011). Keeping at-risk students in school: A systematic review of college retention programs. *Educational Evaluation and Policy Analysis, 33*(2), 214-234.

Volkwein, J. F., & Lorang, W. G. (1996). Characteristics of extenders: Full-time students who take light credit loads and graduate in more than four years. *Research in Higher Education, 37*(1), 43-68.

Walker, M. A. (2006). Is six the new four-year plan? *Diverse: Issues in Higher Education, 23*(8), 28-31.

Washburn, W. W., & Priday, G. F. (2003). The essential academic record. In G. L. Kramer & Associates (Eds.), *Student academic services: An integrated approach* (pp. 223-246). San Francisco: Jossey-Bass.

Washington State Higher Education Coordinating Board. (2000, March). *Accountability Update.* Olympia, WA: State of Washington Higher Education Coordinating Board.

Weissman, C. A. (1999). *Time-to-degree and Credits-to-degree of Baccalaureate Degree Graduates*. Dissertation Abstracts International. (UMI No. 9935980)

Wellman, J. V. (2003, Summer). Accreditation and the credit hour. In J. V. Wellman & T. Ehrlich (Eds.), *New directions for higher education: Vol. 122. How the student credit hour shapes higher education: The tie that binds* (pp. 57-69). San Francisco: Jossey-Bass.

Wellman, J. V., & Ehrlich, T. (2003, Summer). The credit hour: The tie that binds. In J. V. Wellman & T. Ehrlich (Eds.), *New directions for higher education: Vol. 122. How the student credit hour shapes higher education: The tie that binds* (pp. 119-122). San Francisco: Jossey-Bass.

Wisconsin University System, Office of Policy Analysis and Research. (2002, May). *Institutional efficiency and student success: the relationship between credits-to-degree, time-to-degree and graduation rates* (Occasional research brief, Vol. 2, No. 1). Madison, WI: Authors.

Zhu, L. (2004, May). *Exploring the determinants of time-to-degree in public 4-year colleges*. Paper presented at the annual forum of the Association for Institutional Research, Boston, MA.

VITA

The author, Lisa M. Runyan, was raised in Ashtabula, Ohio and is the only child of Michael, Jr. and Jean Harchalk. After graduating from Edgewood Senior High School in Ashtabula, she attended the Ohio State University (OSU) in Columbus, Ohio and received both her Bachelor of Arts degree in Sociology (1997) and Master of Arts degree in Higher Education and Student Affairs (1999). Lisa is married to Bill Runyan and they reside in Warrensburg, Missouri with their rambunctious Labrador Bailey and their lovable cat Frankie.

After receiving her M.A., Lisa worked as an academic advisor for the College of Arts and Sciences at OSU for one year and then became the first coordinator of the Health Sciences Scholars Program, also at Ohio State. While at Ohio State, she was active in the Ohio Academic Advising Association (OHAAA) and took first place in their Positions in Professionalism, Ethics in Higher Education 2001 paper writing contest, with her entry entitled "Increasingly Selective Admissions at Public Land-Grant Institutions: A growing ethical dilemma in higher education".

In 2003, Lisa relocated to central Missouri and began working as an academic advisor at the University of Central Missouri (UCM). She was later promoted to Interim Director of academic advisement and was very active at the state and regional levels with the Missouri Academic Advising Association (MACADA) and the National Academic

Advising Association (NACADA). Lisa was the conference chair for the very successful 2008 NACADA Region VII annual conference held in Branson, Missouri, titled "Setting the Stage for Student Success: Academic Advising in the Spotlight". During her time in academic advisement at UCM, Lisa was the recipient of both the "Team of the Quarter" and the "Employee of the Quarter" awards.

Lisa currently serves as the Associate Registrar at the University of Central Missouri, a position she has held since July 2007. She has been a presenter at several state and regional conferences and looks forward to getting more involved with the Missouri Association of Collegiate Registrars and Admissions Officers (MACRAO) and the American Association of Collegiate Registrars and Admissions Officers (AACRAO).