A 15-Year Stratified Historical Review of the Midwest College District, Campus, and Program Resource Allocation Variables to Student Retention and Graduation Rates

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Abstract

This study focused on finding the relationships between student retention and graduation rates and Midwest College District's (MCD) resource allocation practices. The institutional levels were the MCD (N=1), campuses (N=5), and programs (N=3). The descriptive three-level, 15-year stratified quantitative study used archival data from years 2001 to 2015 to explore three purposes. The first purpose of this study was to find what combination of the MCD's resource allocation variables best predicts retention and graduation rates for the community college district. The second purpose of this study was to find what combination of enrollment, expense, and staffing variables best predicts retention and graduation rates for the individual campuses. The third and final purpose of this study was to find what combination of enrollment, expense, and staffing variables best predicts retention and graduation rates for the selected programs. A multiple stepwise regression analysis was utilized to analyze the data. Results from this study discovered multiple correlations between resource allocation variables, retention, and graduation rates. Investments in student services and instruction expense will yield higher retention and graduation rates. An increase in student aid funds will show a growth in graduation rates. Investments in institutional support will yield higher retention rates. Growth in online enrollments, instruction-related expenses, and administrators will positively influence retention rates for Campus #2. Additional part-time enrollments and operational expenses will boost graduation rates for Program #2, while an increase in local tax revenue will also boost retention rates at the entire institution.

Dedication

This study is dedicated to my family, who encouraged me through this research process. This study is also dedicated to my deceased parents, who gave me birth, raised me to know right from wrong, and instilled in me the importance of higher education and social responsibility. I also dedicate this study to my younger brother, who is no longer with us in person but lives in our thoughts and dreams. He was an extremely hard-working man who died while earning an honest living to provide for his family. I always treated him like a younger brother, but now I try to follow in his footsteps.

I especially dedicate this to my wife and kids, who believed in me and offered their never-ending support, love, and patience to inspire me to continue. They never complained about all of the hours I spent doing homework and writing. This dissertation is also dedicated to my friends, colleagues, and students, from whom I continue to learn.

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Chapter One

Introduction

A review of institutional resource allocation variables and whether or not they make a difference in retention and graduation rates is the focal point of this study. Attis, Rosch, Jin, and Ho (2014) found that resource allocations are the single indicator of what a college or university is committed to doing and that beyond simply allocating revenue and costs, budgets can reinforce and even define an institution's priorities and commitments. Attis et al (2014) suggested redesigning the budget processes, also known as resource allocation, to incentivize growth and fund strategic priorities because no single budget model provides a complete solution to all of an institution's financial challenges (p. 28). Underlying the resource allocation model is a set of institutional strategic priorities that specify how to allocate revenues, how to distribute costs, and how to define and operationalize institutional priorities (Attis et al, 2014, p. 5). Over the last 15 years, the Midwest College District (MCD), located in the United States, has tried and tested different resource allocation models, such as Contingency Budgeting, Performance Based Budgeting, Zero-Based Budgeting, and Incremental Budgeting[1] all used by higher educational institutions (Barr, 2002); however, none of these models has produced a positive impact on retention and graduation rates. Increasing retention and graduation rates has been a strategic priority for this institution ("Completion," 2016). While the retention and graduation rates have not significantly improved, the college has seen a steady decline in all revenue streams.

Mortenson (2012) predicted that if current trends hold, states will reduce funding for colleges and universities to zero by 2059. While community colleges are more

[1] Model definitions on pages 12 and 13.

affordable when compared to four-year colleges and universities, tuition has been on the rise during the last decade. State funding has been on the decline since the early 2000s, and the recent recession impacted local tax revenue (Mortenson, 2012). The Obama administration also tightened financial aid regulations by tethering award amounts to academic completion. During these tough economic times, community college leaders had only a handful of ways to fix the shortfall. A temporary quick fix was to increase tuition, which was followed by hiring freezes and early retirements. Reallocation of resources occurred over time to survive the impact of the reduction in revenue, but retention and graduation rates remained unchanged (MCC, 2015, “Budget Overview”).

According to Hughes and Venezia (2014), America’s community colleges recognize the pressure to increase student completion rates despite the dwindling resources. Although the ability to track students’ progress has improved, supporting those students who are increasingly underprepared has become of national concern. Years of budget cutting at federal, state, and local levels are forcing postsecondary institutions to do more with less.

Among the strategies to improve college completion, reforms to course curricula and pedagogy may be the most challenging to implement (Hughes and Venezia, 2014). Hughes and Venezia (2010) also found that long-held norms in higher education encourage faculty autonomy and independence in ways that stymie collaboration efforts to improve curriculum and pedagogy. This situation is further complicated by the reduction in resources that led to massive layoffs and retirements of full-time faculty members. Refining classroom practices take a back seat when the majority of courses are being taught by part-time faculty members. Nationally, approximately 60% of incoming community college students place into developmental mathematics courses, but only about one-third ever move on to college-level mathematics (Bailey, Jeong, & Cho, 2010), a phenomenon that makes it difficult for community colleges to produce graduates.

Background

The MCD, one of the largest community college systems in Missouri, has been a leader in innovation, but has been unable to increase retention and graduation rates. Access to the MCD's bank of archival data, including resource allocation practices for the last 15 years, has provided a unique opportunity to conduct research based upon primary source materials. The MCD has had low graduation rates as compared to the national averages (*Community College Week*, [CCW], *28*(2)).

The MCD has served approximately 18,000 students each year at five unique campuses in a Midwestern metropolitan area. The largest campus of the five, the MCD-Campus # 1, located in a suburb, touts its Automotive Technology program. The MCD-Campus #2, located in the mid-town area, focuses on career and technical education programs concentrated around health sciences. The MCD-Campus # 3 houses the Midwest's finest veterinary technology program. The MCD-Campus #4 serves as headquarters to many technical training and computer science certificates. The MCD-Campus #5 offers the Public Safety Institute and Firefighter Training, in addition to strong general education programs. The three programs of focus in this study were Program #1 (Automotive Technology, located on Campus #1), Program #2 (Registered Nursing, located on Campus #2), and Program #3 (Veterinary Technology, located on Campus #3). (MCC, 2016, "Who We Are").

According to information published by the MCD's Office of Institutional Research and Assessment, the MCD has been unsuccessful in retaining and graduating a higher percentage of its student population (MCC, 2015, "Research Fact Books"). "In the past, the focus was on access—getting students through the door," says Kate Hetherington, president of Howard Community College in Maryland. "But we want to get them through the door and back out with a degree. That's the main difference between now and 10 years ago" (as cited in Zalaznick, 2015, p. 43). The MCD's low retention and graduation rates have also been evident by the study conducted by *Community College Week* magazine. The MCD ranked no higher than No. 59 on a September 2015 ranking of the top 100 colleges producing associate degrees (*Community College Week*, [CCW], *28*(2).

Federal and state-level funding cuts started in the early 2000s, but the recent financial crises added an unexpected twist in the funding model for most community colleges. The MCD responded to these changes by reducing employee benefits, the number of full-time employees, professional development, and at times implementing a soft hiring freeze. The establishment of Zero-Based Budgeting (ZBB) in 2010 caused the college to terminate some academic programs (MCC Budget Resource Team, 2013). The college adjusted almost all the expense categories to face the challenge of decreasing resources. Massive retirements and budget cuts created a sense of uncertainty and caused morale to decline (MCC, 2014, "Budget Overview"). Higher education culture clashed with the bottom-line approach, and full-time faculty voted to unionize (MCC HLC Steering Committee, 2015, p. 1). The MCD has not been successful in developing a resource allocation model that accounts for reductions in revenue, yet focuses on strategic priorities (R. Weglarz, personal communication, December 17, 2015). According to Barr (2002), the institutional budget reflects the plans, priorities, goals, and aspirations that drive the institution. In the early 2000s, the MCD used a formula-based resource allocation model. Each campus received funding based on the number of total credit hours generated by that campus with adjustments for lab and program fees generated by specific programs located on that particular campus. Each campus's president and deans were then in charge of distributing those funds at the program levels. During this time, most programs and divisions operated under the incremental budgeting mindset. Department chairs and program directors asked for increased amounts each year, and funding new faculty and staff positions became unrealistic under these conditions (MCC, n.d, p. B-12).

In contrast, as the state moved to a performance-based funding model for the community colleges (Coordinating Board for Higher Education, 2012), the MCD decided to adopt the ZBB model, which centralized decision-making at the district level (M. James, personal communication, November 12, 2015). As a result, the programs struggled to find sufficient funding for lab supplies and technology upgrades. Contingency budgets were established to manage unexpected expenditures; however, those budgets were eliminated as the revenue further declined, creating a disarray of resources. Divisions, programs, faculty, and staff had to do more with less. Over time, this process created confusion without proper alignment between the institutional strategic plan and the resource allocation process. Higher Learning Commission (HLC), also cited the MCD in its final accreditation report for presenting minimal evidence of how the strategic plan filters to the campus level. HLC directed the MCD to align campus plans with the overall district strategic plan and closely align budgeting with strategic planning (2016, p. 43-44).

Barr (2002) argued that in order for colleges to reach goals and objectives, needed human and fiscal resources must be in place, resulting in mastering budgeting and financial issues. Barr further stated that the broader fiscal context of higher education sets very real constraints on what institutions of higher education can and cannot accomplish. These broader fiscal issues included growing competition for funds in public and private sectors, concerns about the rising costs of higher education, increased regulations, increased competition for a skilled workforce from business and industry, the growth of technology, and the rising costs for the purchase of goods and services. Retention and completion often competed with these priorities. Increased desire for funds within the institution and increased expectations from the government for higher completion rates have put higher education institutions at a dire stage to change their resource allocation practices. The MCD is currently at this juncture but unable to distinguish how to align the resource allocation model with increased expectations for higher retention and graduation rates.

It is difficult to accomplish goals when not knowing which allocation model or funding priority will have the greatest impact on the educational purpose, which, at the MCD, is to increase retention and graduation rates ("Completion," 2016). In addition, Mayhew (1979) stated that budgets are really a statement of educational purpose phrased in fiscal terms. This study will explore revenue, expense, staffing, and enrollment categories at the MCD for the last 15 years to discern any correlation between these categories and retention and graduation rates.

Kelly and Schneider (2012) also noted that, on many dimensions, America's 40-year commitment to expanding college access is a success story. College enrollment has risen steadily since the 1970s. In 1980, about half the nation's high school graduates enrolled in college, a percentage that jumped to 69% by 2008.

In accordance with this shift, enrollment in community colleges has risen over the past few decades, but the completion rate has stayed the same, therefore not contributing to the current education agenda of increased graduation rates. As a result, community colleges need to rethink their policies and overall reorganization to focus on increasing retention and graduation rates. Subsequently, this researcher examined the probability of a combination of independent variables that best assist in the fundamental reorganization of the resource allocation model to support the efforts of increasing retention and graduation rates.

For the purpose of this study, there were eight expense categories: Institutional Support, Instruction, Community Service, Student Services, Plant Operations, Academic Support, Student Aid, and Staffing. Exploring the independent variables of the MCD's resource allocation models and their relationship with retention and graduation rates will be the focus of this study. Operationalizing the information gleaned from the research may assist colleges in maximizing retention and graduation rates.

Statement of the Problem

Graduation and retention rates have been below federal, state, and local expectations in the MCD (M. James, personal communication, November 12, 2015). Specifically, graduation rates at two-year degreegranting institutions in the U.S. from 2006 to 2013 averaged 20% (National Center for Education Statistics), while MCD graduation rates averaged 7.19% (MCC, 2015, “Completion”). Also, retention rates at two-year degree-granting institutions in the U.S. from 2006 to 2013 were 43% (National Center for Education Statistics), while MCD retention rates averaged 40.67% (MCC, 2015, “Completion”). At the same time, increasing retention and graduation rates has been a priority for the MCD (“Completion,” 2016). Although Barr (2002) suggests that institutional resource allocations reflect the plans, priorities, goals, and aspirations that drive the institution, the MCD has not undertaken a historical review to find a credible link among resource allocation variables, retention, and graduation rates. Therefore, this study is an effort to fill the gaps in that knowledge. Furthermore, this study seeks out data about student retention and graduation rates in relation to the MCD’s resource allocation practices to inform potential future adjustments to those practices.

Purpose of the Study

The researcher designed a descriptive three-level, 15-year study to explore three purposes. The institutional levels were the MCD (N=1), campuses (N=5), and programs (N=3). The first purpose of this study was to find what combination of the MCD’s resource allocation variables, as shown in Table 1, best predicts graduation and retention rates for the community college district.

Table 1

Longitudinal Allocation Variables Used in the Midwest College District Analysis

Academic Support	District Staffing	Revenue
Institutional Support	Officers	County Property Tax
Instruction	Administrators	Student Tuition
Community Service	Full-Time Faculty	State Appropriations
Student Services	Part-Time Faculty	
Plant Operations	Full-Time Exempt	
Academic Support	Full-Time Hourly	
Student Aid	Part-Time Staff	
	Contract Trainers	
	Consultants	

The second purpose of this study was to find what combination of variables shown in Table 2 best predicts graduation and retention rates for the individual campuses.

Table 2

Longitudinal Allocation Variables Used in the Campus Analysis

Student Enrollment	Academic Support	Campus Staffing
Total Enrollment	Institutional Support	Officers
Full-Time Enrollment	Instruction	Administrators
Part-Time Enrollment	Community Service	Full-Time Faculty
Online Enrollment	Student Services	Part-Time Faculty
	Plant Operations	Full-Time Exempt
	Academic Support	Full-Time Hourly
	Student Aid	Part-Time Staff
		Contract Trainers
		Consultants

The third and final purpose of this study was to find what combination of variables shown in Table 3 best predicts graduation and retention rates for the selected programs.

Table 3

Longitudinal Allocation Variables Used in the Program Analysis

Student Enrollment	Academic Support	Program Staffing
Total Enrollment	Faculty Allocation	Administrators
Full-Time Enrollment	Staff Allocation	Full-Time Faculty
Part-Time Enrollment	Operational Expenses	Full-Time Staff
Online Enrollment	Equipment Budget	
	Professional Development	

Significance of the Study

This descriptive study will provide a historical perspective on resource allocation variables, retention, and graduation rates in the MCD. In particular, the study will analyze the relationships between student retention and graduation rates and the MCD's resource allocation practices for the past 15 years. In turn, findings will support the need for future budget allocation adjustments regarding retention and graduation rates. Furthermore, the results from this study will guide administrators in developing long-range strategic plans that are student success driven and focused on improving retention and graduation rates. Finally, the findings will inform MCD administrators in predicting the impact of resource allocation reorganization on retention and graduation rates.

Delimitations

This study was delimited to general fund revenues, expenses, staffing, and enrollment in the MCD. Expenses related to the Campus Life and Leadership department and student clubs and organizations were omitted from the calculations. Institutional scholarship funds were also excluded, along with expenditures on sports teams. The researcher conducted the study using data, programs, and personnel-related expenditures that were archived from July 1, 2001 to June 30, 2015.

Assumptions

The first assumption made for this study was that all revenues, expenditures, staffing, and enrollment figures were correctly recorded. The second assumption was that relevant variables are similar in nature at all community colleges in Missouri. The third assumption was that all data conversions and entries were completed correctly. A final assumption was that Institutional Research employees provided information truthfully and without self-serving motivations.

Research Questions

Following Roberts' (2004) advice, the researcher developed the following questions to provide structure and to guide this study. The researcher first performed a descriptive analysis to describe each variable and then performed the regression analysis on variables for the community college district, the five different campuses, and finally the three different programs.

RQ1. What are the summary statistics of all variables for the MCD?

RQ2. What combination of the MCD's selected resource allocation variables best predict retention and graduation rates over a 15-year period?

RQ2 (a) What combination of district longitudinal revenue variables?

RQ2 (b) What combination of district longitudinal expense variables?

RQ2 (c) What combination of district longitudinal staffing variables?

RQ3. What combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) resource allocation variables best predict retention and graduation rates over a 15-year period?

RQ3 (a) What combination of campus longitudinal enrollment variables?

RQ3 (b) What combination of campus longitudinal expense variables?

RQ3 (c) What combination of campus longitudinal staffing variables?

RQ4. What combination of the MCD's selected program (Program #1, #2, and #3) resource allocation variables best predict retention and graduation rates over a 15-year period?

RQ4 (a) What combination of program longitudinal enrollment variables?

RQ4 (b) What combination of program longitudinal expense variables?

RQ4 (c) What combination of program longitudinal staffing variables?

Definition of Terms

This section of the work identified and defined the key terms used throughout the study.

Short-Term Financial Planning: Short-term financial planning is planning for less than or up to 12 months.

Long-Term Financial Planning: Long-term financial planning focuses on long-term goals, typically five-to-ten years or more.

Contingency Budgeting: Contingency budgeting is often used when historical data are not available. Lack of detail is compensated by a contingency budget to cover essential expenses when needed.

Performance Based Budgeting: The aim of this type of budgeting is to connect performance information with the allocation and management of resources. This type of budgeting improves accountability by linking spending decisions with organizational objectives.

Zero-Based Budgeting: Zero-based budgeting in its purest form is the preparation of operating budgets from zero. Even in the presence of historical data, the process assumes that the budget is starting anew (Barr, 2002, p. 39).

Incremental Budgeting: With this traditional budget model, institutions base budget proposals and allocations upon the funding levels of the previous year. They make budget cuts as a percentage of the institution's historical budget and are typically across the board (Barr, 2002, p. 37).

Resource Allocation: Resource allocation is an effective institutional budget process that assures that the general funds of the institution are used to support the highest priorities and the greatest needs of the entire institution (Barr, 2002, p. 32).

Overview of the Methodology

Non-experimental archival data-mining methods were applied to determine if regression models based on resource allocation variables as predictors of desired student outcomes were viable. Archival data-mining methods allow identification of valid and useful patterns to analyze a large amount of data (ASCE, 2002). The researcher also examined expense, revenue, staffing, and enrollment variables. All data used were collected by MCD personnel. Also, all data used in this study are available for public consumption with the Missouri Department of Higher Education at the Integrated Postsecondary Education Data Systems (IPEDS). Revenue and expenditure data were retrieved from the budget books kept and maintained by the accounting office at the MCD. The Institutional Research Office personnel at the MCD compiled retention and graduation rates. All other information related to personnel was gathered by the Human Resources office at the MCD and found in the budget books and the staffing tables. The researcher then compiled the data onto one spreadsheet, stored on a universal serial bus (USB) flash drive and safely kept at his residence for the purposes of this study.

Organization of the Study

This study is presented in five chapters. Chapter One contains an introduction to this study and thoroughly addresses the background of the study, statement of the problem, the purpose of the study, significance, delimitations, assumptions, research questions, definition of terms, overview of methods, and organization of the study. Chapter Two contains a systematic review of the literature related to shift in revenue, expenditures, retention, and graduation rates in higher education. Chapter Three describes the methodology used in the study and includes a description of the research design; population and sample; sampling procedures; instrumentation; measurement, validity, and reliability; data collection procedures; data analysis and hypothesis testing; and limitations of the study. Chapter Four presents the results of the analysis of the data, including the descriptive statistics and hypothesis testing. To finish, Chapter Five provides a study summary that includes an overview of the problem, purpose statement and research questions, and review of methodology. Chapter Five culminates in findings related to the literature and conclusions, which include implications for action, recommendations for future research, and concluding remarks.

Chapter Two

Review of the Literature

As stated in the Introduction, this study looked at the reorganization of specific resource allocation variables to boost retention and graduation rates in the MCD. The importance of resource allocation can be assessed by the single fact that the postsecondary education industry spent $497 billion in the 2009-2010 year and conferred a total of 4.3 million degrees (Snyder & Dillow, 2012). The reviewed literature also looked at how resources are changing at higher education institutions and how those changes have affected staffing as well as students. Furthermore, the literature compares student populations at community colleges versus four-year universities and suggests how community colleges can help students succeed. Because the editors and authors of these works have been faculty members and administrators who have been directly affected by operational challenges on various levels, they have worked to make a difference in the future of higher education and what it means to today's students; thus, their work informs this study and will reflect in the outcome of the research.

History of Community Colleges and Their Funding in the U.S.

F. King Alexander (2006) related an anecdote from an article in *The Economist* on the subject of worldwide higher education:

> If more and more governments are embracing massification, few of them are willing to draw the appropriate conclusion from their enthusiasm: that they should either provide the requisite funds or allow universities (public) to charge realistic fees. Many governments have tried to square the circle through tighter management, but management cannot make up for the lack of resources. (p. 337)

The MCD's five-campus system is not alone in finding itself short of funding to continue programs it has held dear in the past. Changes—not all popular with faculty and staff—have been required due to the steady decline in resources, but the impact of those changes on student retention and graduation rates has not been studied.

A significant expansion in enrollments at postsecondary education institutions occurred with the introduction of The Servicemen's Readjustment Act of 1947 (Cohen, 1998). By 1950, for public higher education, the number of institutions expanded to include 66 land-grant colleges, 259 other undergraduate institutions, and 330 community colleges (Mullin & Honeyman, 2008). By expanding the two-year public community college, states took action to assist in meeting the increased demand for higher education participation (Longanecker, 2007). Between 1960 and 1970, the number of community colleges grew from 412 to 909, an increase of 497 institutions or 121% (American Association of Community Colleges, n.d.). The increased number of community colleges allowed undergraduate public institutions to expand in areas commensurate with increased status, such as graduate education, research, and research funding (McKeown-Moak & Mullin, 2014). These undergraduate institutions could also redirect less-qualified students to community colleges by increasing admission standards (Cohen, 1998). Community colleges accepted their role as providers of postsecondary opportunity to those who were of lesser income, geographically bound, or older (Carnegie Commission on Higher Education, 1970a).

For decades, community colleges expanded their offerings and provided degrees, transfers, and short-term certificates. Federal and state governments awarded the colleges by adequately funding priorities and new programs; however, the collapse of the dot-com bubble in 2000 and the recent recession of 2008 forced several large reductions in the federal and state appropriations. These large funding cuts led to both steep tuition increases and spending cuts that may have diminished the quality of education available to students at a time when a highly educated workforce was more crucial than ever to the nation's economic future (CBPP). Later, public colleges and universities across the country increased tuition to compensate for declining state funding and rising costs. Table 4 shows these trends of increased tuition and fees and the decline in federal and state funding.

Table 4

Revenue Percentages of Postsecondary Institutions, 1910 to 2010

Year	Tuition & Fees	Federal	State
1910	24%	6%	3%
1920	21%	6%	31%
1930	26%	4%	27%
1940	28%	5%	21%
1950	17%	22%	21%
1960	20%	18%	24%
1970	21%	19%	27%
1980	20%	15%	31%
1990	24%	12%	27%
2000	22%	10%	20%
2010	27%	6%	15%

Note: Descriptive note. Adapted from *Higher Education Finance Research: Policy, Politics, and Practice* (pp. 20-21), by M. P. McKeown-Moak and C. M. Mullin, 2014, Charlotte, NC: Information Age Publishing, Inc. Copyright © 2014 IAP-Information Age Publishing, Inc.

A detailed look, further in this chapter, shows how federal and state funding cuts, as well as resources allocation, impacted different programs, staffing, and culture not only in the MCD but also in the area of public higher education.

Although the demand for a college education has tended to increase in time of economic downturn (Turner, 2015), when government funding has decreased, institutions of higher education have been less able to afford the programs and staffing that students and their families were accustomed to in past decades. Research has shown that college enrollment rates have often increased as the unemployment rate grows during recession (Long 2004a) due to a lack of employment opportunities (Bell and Blanchflower 2011). Turner (2015) described this "extended shock" as a funding crisis that may have a greater impact on institutions receiving substantial government funding compared to institutions with large endowments. The former relied heavily on tuition revenues and, with a decrease in government funding, began to increase tuition. This action, however, did not provide a sustainable solution because the families who relied on such institutions for higher education often felt the pinch of salary loss and were unable to continue to pay the higher tuition rate. Thus, the gap widened between public institutions, which heavily relied on tuition, and the private institutions, which had an endowment to soften the economic setback. According to Long (2015), there was a 24% increase in tuition and fees at public two-year institutions from 2007-08 to 2011-12. For private institutions, the rate was about half that amount. As a result, families of college students impacted by these increases applied for aid in higher numbers than before. The first line of financial aid has generally been the federal Pell grant, which is the largest need-based aid program and foundation for other aid:

> The majority of Pell recipients come from families with incomes in the lowest economic quartile … about three-quarters of Pell grant recipients during 2008-09 had family incomes at or below $30,000 … [and] approximately 786,000 more students received a Pell grant in 2008-09 than the previous year. (Long, 2015)

Although Congress has sometimes provided funding for increased aid, families also turned to student loans to cover increased education costs. According to Long (2015), the increase in education cost coupled with a decrease in family wealth that resulted from the Great Recession has made some families question the worth of a college education, and community colleges have suffered, as a result.

According to Barr and McClellan (2011), "Politics, people, publicity, and problem areas can all influence the development of institutional budget allocations" (p. 67). Although the fiscal stimulus of the American Recovery and Reinvestment Act (ARRA) of 2009 breathed new life into the nation's college budgets, the act had a major effect on community colleges like the MCD. With unemployment rising and families struggling to cover the costs of higher education, shorter-term certificate programs saw enrollment growth (Long, 2015). For example, the MCD's Health Sciences Institute (HSI) received a grant from the MoHealthWins program, which was funded by federal grant money. Bettinger and Williams (2015) discussed how this act, along with the 2010 Student Aid and Fiscal Responsibility Act, served to increase Pell grant funding, which in turn increased enrollment at public and private institutions alike. Dinerstein, Hoxby, Meer, and Villaneuva (2015) noted that "postsecondary institutions were important recipients of stimulus funds" and that those funds came "mainly in two forms: research-related funds (in the form of grants and contracts) and student aid (p. 127)." HSI would have fallen under both categories. Although the MCD's HSI received these funds, the money was earmarked toward only certain CTE certificate programs. A vast majority of the programs did not benefit from these federal grants and, thus, faced budgetary challenges.

Ehrenberg (2006) pointed to various results stemming from budgetary challenges at colleges, ranging from public to private and four-year to two-year. Specifically, salaries have been lowered, faculty positions have gone unfilled, and colleges have more often utilized adjunct professors in classes that had been previously taught by tenured and tenure-track faculty. This latter practice, which has taken hold at institutions across the country, has led to heated debates among faculty regarding how it affects student outcomes. Bettinger and Long (2006) conceded that adjuncts are inexpensive, relative to full-time faculty, and are not convinced that the use of such teaching staff has had an adverse effect on the long-term success of students. They pointed to the Modern Language Association and the National Institute of Education, which claimed adjunct use has been the cause of the lack of quality in higher education; other studies, however, have found adjunct use to have had both positive and negative effects. Their research found that success is dependent on the timing of adjunct use in a student's university career. For example, first-semester adjunct use has been found to be detrimental to student retention due to an adjunct's general lack of engagement into a specific campus community because of the position's temporary nature. Also, adjuncts often teach at more than one campus and are frequently without an office on any one campus, therefore, preventing them from properly connecting with and supporting students. Although these conditions are usually not characteristic of full-time faculty, ensuring these provisions for adjuncts has come at a financial cost that some colleges have found to be burdensome.

In addition, Bettinger & Long (2006) admitted that the results of studies can be biased based on the institution being reviewed. For instance, non-selective institutions have been more likely than selective institutions to use adjuncts. According to the American Association of University Professors (AAUP), the impact of a long-term fiscal crisis that has produced fluctuating funding patterns has contributed to this issue. Many institutions increasingly relied upon non-tenure-track faculty as a way to staff classes without having to make long-range commitments to faculty (2015). Non-selective institutions, however, have been more likely than selective institutions to enroll students who have had poorer academic performance in high school. The results of their study also indicated that an institution's use of adjuncts has less impact on student retention past the first semester than student willingness to enroll in a class taught by an adjunct. They noted that, although adjuncts can be knowledgeable in their specialty, a full-time faculty member who is immersed in the culture of the campus has a long-term effect on a student's engagement at the institution, thus, leading to higher rates of retention and graduation.

MCD Funding Models and Strategies

The MCD used at least three different funding models in the past 15 years. The incremental funding model was used from the late nineties to early 2001. During this time period, retention and graduation rates were, on average, at 38.70% and 6.25% correspondingly (MCC, 2015, "Graduation Rates"). This traditional budget model bases budget proposals and allocations upon the funding levels of the previous year. Thus, budget cuts are made as a percentage of the institution's historical budget and are typically across the board (Barr, 2002, p. 37). This model worked well while enrollment and federal and state support were on the rise. Departments and programs requested an increased amount of funding each year but returned a large portion of those funds at the end of the year without making any programmatic improvements. Overall, students did not directly benefit from this approach because requests for additional funds were not aligned with the institutional strategic plan (MCC, 2015, "Resource Prioritization").

The formula-based funding model, which was introduced to replace the incremental funding model, provides equity funding based on credit hour generation and enrollment numbers for each program. In turn, faculty and staff positions were calculated based on the number of students in each program. Staff positions on the student services and enrollment side were calculated based on the total student population of the college. While this model worked well for a few years, it later created some stability and efficiency issues. For example, some of the general education programs, such as History and English, generated the highest number of credit hours but did not receive all the proceeds. Profits from these general education programs subsidized more expensive CTE programs, such as Automotive, Nursing, and Physical Therapy. Also, this practice of uneven distribution created concerns among existing programs, calling for a new funding model. On average, retention and graduation rates while using this model were on average at 40.27% and 7.69% correspondingly (MCC, 2015, "Graduation Rates").

During the recession of 2008, federal and state funding cuts, along with calls for a new funding model, forced the MCD to explore Zero-Based Budgeting (ZBB), which was implemented in 2010, just after the boost received by funds from the ARRA. Since those funds were mostly earmarked for specific programs, other areas of the institution's budget weakened. Schloss and Cragg (2013) noted that while "no aspect of the management of postsecondary institutions is as important as planning and budgeting," the "extreme version of zero-based budgeting is seldom used because few organizations are so dynamic as to require a full overhaul of all line-item distributions" (p. 26). The MCD, however, took on such a task, ignoring Schloss and Cragg's (2013) advice that "it is seldom rational to expect a full defense of every line in a budget" because "in most educational institutions, tenure and employee loyalty create very stable employment patterns" (p. 73). As revenues were falling, expenditures were cut, sometimes with what Breslawski (2013) referred to as "a wholesale retreat." Some programs, such as Academic Bridges to Learning Effectiveness (ABLE) at the MCD's campus #1, were cut completely; others, such as Network User Support (NUS) staffing, were drastically reduced; and bookstores were outsourced. During this time period in which ZBB was implemented, retention and graduation rates were, on average, at 41.94% and 8.01% correspondingly (MCC, 2015, "Graduation Rates").

Current Focus on Retention and Graduation Rates

Community colleges fill a niche. Many students leave high school without the fundamental skills to tackle higher learning and then attend college unprepared or underprepared for the level of work they are required to do. Bailey (2012) noted, "nearly 60 percent of recent high school graduates who enter higher education through community colleges are referred to at least one remedial course." At the same time, Morales and Trotman (2004) claimed, "in contemporary America, lifetime academic and professional success is usually based on exceptional academic performance at the postsecondary level"; therefore, the remedial courses offered by community colleges like the MCD are an important part of that success. While Morales and Trotman (2004) focused on students who are ethnic minorities, much of their research can be applied to any college student who finds higher education to be more challenging than he or she is capable of handling. In addition, their study on "resilience" supports what the MCD has tried to do with every student who enters a campus admissions office in terms of retention through graduation. For example, to ensure retention, a student must feel as though success is within reach; however, students must learn what it takes to be successful, and community colleges can provide this niche to offer students the opportunity to excel. Plus, because community colleges are usually smaller than four-year universities, they furnish a more personal educational experience. For a student to be successful, he or she must feel a sense of community. Morales and Trotman (2004) described three characteristics of communities that foster this resilience that can transform into retention: availability of social organizations that provide an array of resources, consistent expressions of social norms that provide an understanding of what constitutes desirable behavior, and opportunities to participate in the life of the community as a valued member. The MCD's first-year seminar program, College 100, is an example of a program that can foster resilience and lead to retention. College 100 was instituted in 2012 to assist incoming freshmen with the transition to college, whether they were recent high school graduates or were nontraditional students who had been out of the educational arena for some time. The coursework has helped students make a connection at the MCD while focusing on how to be successful as a college student, how the MCD can help them in that process, and how they can help the MCD be a better place.

Overall, community colleges are in the spotlight to increase graduation rates. As a result, the MCD's new strategic plan (2016-2017), under student success, calls for increasing persistence, retention, and completion for all students. For instance, Kelly and Schneider (2012) stated, "graduation rates in short-term certificate programs are better than those for associate's degrees, but these types of credentials actually don't 'count' when the Census calculates attainment rates (p. 189)." This statement misrepresents the MCD's claims of success due to its relatively high number of certificate programs. Hauptman (2012) proposed that the United States "tailor policies by type of degree or credential"; however, doing so would validate the MCD's programming in technical certificate areas. Hauptman (2012) clarified that "certificates and apprenticeships [are] equally critical in meeting future labor force needs, [even though they] do not count in traditional measures of attainment rates (p. 211)." Still, community colleges' goals have not been well defined, as evidenced by Bailey (2012), who reviewed degree attainment goals set by the Obama administration, the Bill and Melinda Gates Foundation, and Lumina Foundation for Education—all three having slightly different goals. For example, some goals have included a certain number of graduates by a certain year while others have included a certain number of degrees by another year. Still, other goals have focused on the *type* of student completing the degree. Regardless, according to the Gates Foundation, all agreed that community colleges should be the focus in the completion agenda because "they are flexible, affordable, and accessible institutions that enroll the largest number of low-income students" (Bailey, 2012).

Influence of Faculty and Staff Attitudes on Retention and Graduation Rates

> Community colleges today are navigating turbulent times, squeezed from within and outside by shrinking resources, growing competition, and increasingly complex student populations with diverse needs. . . . Most colleges are also awash in student success pilots, projects, and programs. . . . Some ideas fail to gain traction because they're too costly, impractical, or inherently flawed, but evidence from a range of fields suggests that most failures of innovation are in fact failures of implementation. (Kadlec & Rowlett, 2014, p. 87)

Change is not inherently bad, but it does frighten some people. In fact, change brought about with discussion and understanding can be successful. Furthermore, the institution's reaction to increasing retention and graduation rates with the implementation of the College 100 course has been met with mixed reactions from students, some who think the course is not a worthwhile use of their time.

Turner (2015) argued that policies that do not take into consideration the impact they might have on staff could generate some inefficiency. Furthermore, Bailey (2012) noted some characteristics of colleges with high completion rates are "innovation in teaching and methods for improving student success [and] collaboration across departments." He cited outcome data from the Achieving the Dream initiative, improvements that did not lead to the ambitious degree goals it set out to realize: "most colleges did not emphasize instruction of faculty development and involvement with the initiative, especially for part-time faculty." In an institution that has cut faculty to the point that it also has to cut programs, innovation and collaboration have been difficult to carry out, making the students' road to graduation inefficient, at best.

Another factor in lower retention and graduation rates has been the open admissions policy of community colleges. In his address at the inaugural ceremony, Horace Webster, first head of the City University of New York (CUNY), then named City College of New York (CCNY), called the institution's open admissions program an experiment:

> The experiment is to be tried, whether the highest education can be given to the masses; whether the children of the whole people can be educated; and whether an institution of learning, of the highest grade, can be successfully controlled by the popular will, not by the privileged few, but by the privileged many. (as cited in Lavin & Hyllegard, 2007, p. 102)

Webster's words were "more rhetoric than reality" (Lavin & Hyllegard, 2007) for CCNY because the student body was mainly made up of sons of the era's wealthy. In contrast, Zalaznick (2015) stated that community colleges have now achieved the goal of providing broader and cheaper access to higher education. He advised, however, that they must reduce reliance on remedial education and institute higher advising standards in order to meet completion goals that are now being set.

Insufficient Student Support

Higher level of student support results in higher retention and graduation rates. Zientek, Ozel, Fond, and Griffin (2013) identified instructional strategies to help students be successful in the classroom and to translate into higher retention and graduation rates. Another effective instructional strategy has been having support services for students both in the classroom and outside the classroom (Boylan and Saxon, 2006; Jenkins, 2006). Age has also factored into the retention and graduation rates as some students enter college many years after high school graduation and need help to rebuild or refresh their skills in certain areas (McCabe, 2000; Merisotis & Phipps, 2000). This research is still relevant in light of current trends in academics. In addition, Van Horne (2009) stated that cultural differences and perspectives of non-traditional students have had an adverse effect because of the unwillingness of students to ask for support. Therefore, these students have not received the level of support they have needed to be academically successful. Lack of support, perhaps, has impacted about 42% of non-traditional students each academic year at the MCD (MCC, 2015, "Research Fact Books"). Likewise, The Civil Rights Act of 1964 and the Higher Education Act of 1965 brought another surge of underprepared students to higher education with open admissions policies (Payne & Lyman, 1996). Furthermore, Greene and Winters (2005), who studied graduation rates of all graduating seniors nationally, as well as by state from 1991-2002, found that not all high school graduates were academically prepared for college work. In contrast, a survey published in 2008 stated that most college students believed that they were academically prepared for college (Ashendorf, 2008). As a result, many college freshmen have become discouraged when they realize they are not prepared for college when scoring low results on entrance exams, thus, adding to their frustration and leading them to drop out (Deil-Amen & Rosenbaum, 2002). All these studies and research have shown a positive relationship between student support, retention, and graduation rates. At the same time, declining resources have made providing much needed support services quite challenging.

Summary

The literature focused on the ever-changing landscape for higher education in terms of declining federal and state support, as well as the impact on institutional resource allocation variables. The literature also outlined the need to retain and graduate more students. However, the literature stops short of explaining the impact of resource allocation variables on retention and graduation rates. In the following chapters, this study will relate this literature to the MCD’s resource allocation variables and its students’ retention and graduation rates. The research questions put forth will investigate each of the expense categories in place at the MCD, the changes within those categories, and the effect those changes have had on student retention and graduation rates at the institution over the past 15 years. Chapter Three will detail the methodology for this study.

Chapter Three

Methods

This chapter includes a description of the research design, population and sample, sampling procedures, instrumentation, measurement, validity and reliability, data collection procedures, data analysis and hypothesis testing, and limitations of the study.

Research Design

The researcher designed a descriptive three-level, 15-year stratified study. The dependent variables were the retention and graduation rates for the MCD, five individual campuses, and three campus-specific programs. Three levels of independent variables used in this study were outlined as follows: MCD longitudinal variables, as shown in Table 1 (19 individual variables); individual campus longitudinal variables, as shown in Table 2 (20 individual variables); and campus-based programs' longitudinal variables, as shown in Table 3 (12 individual variables). The study focused on finding the relationships between student retention and graduation rates and the MCD's resource allocation practices.

Instrumentation

No assessment instruments were used in this study. Archival data from the MCD were used for years 2001 to 2015.

Data Collection Procedures

An Institutional Review Board (IRB) application was submitted to Baker University and to the MCD requesting permission to conduct the study (see Appendices A, B, and C). The data were extracted by the institutional research office personnel at the MCD and given to the researcher. The researcher stored the data on a USB storage drive and kept it at his residence for safety. The researcher took the collected data and analyzed them by using the SPSS statistical software in order to analyze the information.

Data Analysis and Hypothesis Testing

Data analyses for testing the hypotheses were conducted using the SPSS statistical software for Windows. The research questions, hypotheses, and data analyses summarized below guided the quantitative study. The level of significance was set at .05.

RQ1. What are the summary statistics of all variables for the MCD?

RQ2. What combination of the MCD's selected allocation variables (a. longitudinal revenue variables, b. longitudinal expense variables, and c. longitudinal staffing variables) best predicts retention and graduation over a 15-year period?

H1. A combination of the MCD’s selected longitudinal revenue variables predicts the retention rates.

A significant regression model was computed for the MCD’s selected longitudinal revenue variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H2. A combination of the MCD’s selected longitudinal revenue variables predicts the graduation rates.

A significant regression model was computed for the MCD’s selected longitudinal revenue variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

H3. A combination of the MCD’s selected longitudinal expense variables predicts the retention rates.

A significant regression model was computed for the MCD's selected longitudinal expense variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H4. A combination of the MCD's selected longitudinal expense variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected longitudinal expense variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

H5. A combination of the MCD's selected longitudinal staffing variables predicts the retention rates.

A significant regression model was computed for the MCD's selected longitudinal staffing variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H6. A combination of the MCD's selected longitudinal staffing variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected longitudinal staffing variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

RQ3. What combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) resource allocation variables (a. longitudinal enrollment variables, b. longitudinal expense variables, and c. longitudinal staffing variables) best predicts retention and graduation rates over a 15-year period?

H1. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal enrollment variables predicts the retention rates.

A significant regression model was computed for the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal enrollment variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H2. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal enrollment variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal enrollment variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

H3. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal expense variables predicts the retention rates.

A significant regression model was computed for the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal expense variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H4. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal expense variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal expense variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

H5. A combination of MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal staffing variables predicts the retention rates.

A significant regression model was computed for the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal staffing variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H6. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal staffing variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal staffing variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

RQ4. What combination of the MCD's selected program (Program #1, #2, and #3) resource allocation variables (a. longitudinal enrollment variables, b. longitudinal expense variables, and c. longitudinal staffing variables) best predicts retention and graduation rates over a 15-year period?

H1. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal enrollment variables predicts the retention rates.

A significant regression model was computed for the MCD's selected program (Program #1, #2, and #3) longitudinal enrollment variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H2. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal enrollment variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected program (Program #1, #2, and #3) longitudinal enrollment variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

H3. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal expense variables predicts the retention rates.

A significant regression model was computed for the MCD's selected program (Program #1, #2, and #3) longitudinal expense variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H4. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal expense variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected program (Program #1, #2, and #3) longitudinal expense variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

H5. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal staffing variables predicts the retention rates.

A significant regression model was computed for the MCD's selected program (Program #1, #2, and #3) longitudinal staffing variables to predict retention rates using Multiple Stepwise Regression. The level of significance was set at .05.

H6. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal staffing variables predicts the graduation rates.

A significant regression model was computed for the MCD's selected program (Program #1, #2, and #3) longitudinal staffing variables to predict graduation rates using Multiple Stepwise Regression. The level of significance was set at .05.

Limitations

Lunenburg and Irby (2008) identified limitations as factors that are beyond the control of the researcher. The limitations of this study include the following:

1) The potential for data input errors exists.
2) The potential for errors during data extraction exists.
3) The data in this study were from one institution in the Midwest; therefore, the results might not be generalized to other institutions.
4) There are potential variables outside the researcher's control, and the scope of this study that may influence student retention and graduation rates.

Summary

The study focused on finding the relationships between student retention and graduation rates and the MCD's resource allocation practices. This chapter described the research design, population and sample, sampling procedures, instrumentation, measurement, validity and reliability, data collection procedures, data analysis and hypotheses testing, and limitations of the study. Next, Chapter Four presents the results of the hypotheses testing.

Chapter Four

Results

The researcher designed a descriptive three-level, 15-year study to explore three purposes. The institutional levels were the MCD (*N*=1), campuses (*N*=5), and programs (*N*=3). The first purpose of this study was to find what combination of the MCD's resource allocation variables best predicts retention and graduation rates for the community college district. The second purpose of this study was to find what combination of enrollment, expense, and staffing variables best predicts retention and graduation rates for the individual campuses. The third and final purpose of this study was to find what combination of enrollment, expense, and staffing variables best predicts retention and graduation rates for the selected programs. This chapter presents the results of the data analysis for each hypothesis associated with the research questions for this study.

Descriptive Statistics

RQ1. What are the summary statistics of all variables for the MCD?

A descriptive analysis was conducted to determine the mean central tendencies and spread of the MCD's revenue sources (dollars are in millions of dollars) as shown in Table 5. The average county tax over the 15-year period was $29.08 million with a standard deviation of $3.03 million. The average student tuition and fees over the 15-year period was $39.94 million with a standard deviation of $7.05 million. Similarly, the average state appropriations revenue over the 15-year period was $31.41 million with a standard deviation of $1.51 million.

Table 5

Summary Descriptive Analysis Results for MCD Revenue

Source	*N*	Min	Max	Mean	*SEM*	*SD*
County Tax	15	$23.68	$32.72	$29.08	$0.78	$3.03
Student Tuition & Fees	15	$27.28	$48.77	$39.94	$1.81	$7.05
State Appropriations	15	$29.43	$34.38	$31.41	$0.39	$1.51

Note. All dollar amounts are in millions.

Table 6 outlines the results for the descriptive analysis that was conducted to determine the mean central tendencies and spread of MCD expenses (dollars are in millions of dollars). The average institutional support over the 15-year period was $20.83 million with a standard deviation of $4.48 million. The average instruction expense over the 15-year period was $39.61 million with a standard deviation of $5.67 million. The average community service over the 15-year period was $0.29 million with a standard deviation of $0.20 million. The average student services expense over the 15-year period was $10.93 million with a standard deviation of $1.75 million. The average plant operations expense over the 15-year period was $11.84 million with a standard deviation of $0.89 million. The average academic support over the 15-year period was $10.74 million with a standard deviation of $1.38 million. The average student aid over the 15-year period was $1.40 million with a standard deviation of $0.18 million.

Table 6

Summary Descriptive Analysis Results for MCD Expenses

Source	*N*	Min	Max	Mean	*SEM*	*SD*
Institutional Support	15	$15.62	$29.69	$20.83	$1.16	$4.48
Instruction	15	$28.75	$48.55	$39.61	$1.46	$5.67
Community Service	15	$0.00	$0.62	$0.29	$0.05	$0.20
Student Services	15	$8.13	$14.34	$10.93	$0.45	$1.75
Plant Operations	15	$10.20	$13.52	$11.84	$0.23	$0.89
Academic Support	15	$8.64	$13.89	$10.74	$0.36	$1.38
Student Aid	15	$1.00	$1.76	$1.40	$0.05	$0.18

Note. All dollar amounts are in millions.

Table 7 outlines the results for the descriptive analysis that was conducted to determine the mean central tendencies and spread of MCD staffing. The average number of officers employed over the 15-year period was 8.33 with a standard deviation of 0.98. The average number of administrators employed over the 15-year period was 55.73 with a standard deviation of 8.79. The average number of full-time faculty members employed over the 15-year period was 284 with a standard deviation of 25.09. The average number of part-time faculty members employed over the 15-year period was 237.40 with a standard deviation of 24.80. The average number of full-time exempt staff who worked in the MCD over the 15-year period was 228.40 with a standard deviation of 15.61. The average number of full-time hourly staff employed over the 15-year period was 405.87 with a standard deviation of 46.91. The average number of part-time staff employed over the 15-year period was 61.27 with a standard deviation of 21.83. The average number of contract trainers employed over the 15-year period was 14.80 with a standard deviation of

12.25. The average number of consultants employed over the 15-year period was 2.40 with a standard deviation of 2.35.

Table 7

Summary Descriptive Analysis Results for MCD Staffing

Source	*N*	Min	Max	Mean	*SEM*	*SD*
Officers	15	7	10	8.33	0.25	0.98
Administrators	15	44	67	55.73	2.27	8.79
Full-Time Faculty	15	247	319	284	6.48	25.09
Part-Time Faculty	15	200	303	237.40	6.40	24.80
Full-Time Exempt Staff	15	206	258	228.40	4.03	15.61
Full-Time Hourly Staff	15	331	479	405.87	12.11	46.91
Part-Time Staff	15	16	85	61.27	5.64	21.83
Contract Trainers	15	1	31	14.80	3.16	12.25
Consultants	15	0	5	2.40	0.61	2.35

Table 8 outlines the results for the descriptive analysis that was conducted to determine the mean central tendencies and spread of MCD credit hours (in thousands). The average number of credit hours generated over the 15-year period was 394,776 with a standard deviation of 31,699.

Table 8

Summary Descriptive Analysis Results for MCD Credit Hours

Source	*N*	Min	Max	Mean	*SEM*	*SD*
Credit Hours Generated	15	353,911	458,885	394,776	8,184	31,699

Table 9 outlines the results for the descriptive analysis that was conducted to determine the mean central tendencies and spread of MCD retention and graduation rates.

The average retention rate over the 15-year period was 40.67% with a standard deviation of 1.45% and the average graduation rate over the 15-year period was 7.19% with a standard deviation of 1.43%.

Table 9

Summary Descriptive Analysis Results for MCD Retention and Graduation Rates

Source	*N*	Min	Max	Mean	*SEM*	*SD*
Retention Rate	15	38.00%	43.00%	40.67%	0.37%	1.45%
Graduation Rate	15	3.00%	9.00%	7.19%	0.37%	1.43%

This completes the summary descriptive analysis results for this study. The next section focuses on the results from the hypothesis testing.

Hypothesis Testing

Presented next are the research questions, hypotheses, and the results from the analysis for each question.

RQ2. What combination of the MCD's selected allocation variables (a. longitudinal revenue variables, b. longitudinal expense variables, and c. longitudinal staffing variables) best predicts retention and graduation over a 15-year period?

H1. A combination of the MCD’s selected longitudinal revenue variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop an MCD revenue model for predicting retention rate percentages from three revenue sources: student tuition, county property tax, and state appropriations for the past 15 years. Two of the three revenue variables were included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 10 and

11. The regression model was significant (p = .000), and the hypothesis was supported. The first predictor variable was County Property Tax (β= 4.183^{E-09}). The second predictor variable was State Appropriations (β = -4.294^{E-09}). The two-predictor model accounted for 72.6% of the variance in retention rate, $F(2, 12) = 15.924$, p = .000, *SEE* = 0.008. The regression equation was Retention Rate = 0.420 + (4.183^{E-09}*County Property Tax) + (-4.294^{E-09}*State Appropriations) +/- 0.008. For every increase of $10 million in county property taxes, an estimated 4.18% increase in the student retention rate would occur. For every increase of $10 million in state appropriations, student retention rate would be reduced by 4.29%. The margin of error is +/- 0.80%. For example, a county property tax of $30 million and state appropriations of $40 million would result in the predicted value of a retention rate of 37.37% plus or minus 0.80%.

Table 10

Summary Descriptive Results for Revenue Variables and Retention Rate for the MCD

Source	*N*	Mean	*SD*
Retention Rate	15	40.70%	1.44%
County Property Tax	15	29.076	30.273
Student Tuition & Fees	15	39.942	70.466
State Appropriations	15	31.411	15.116

Note. County Property Tax, State Appropriations, and Student Tuition & Fee amounts are in millions of dollars.

Table 11

Summary Regression Analysis and Model to Predict Retention Rate from Revenue Variables for the MCD

Model	Beta	*R*	*R2*	*SEE*	*F* (2/12)	*p*-value
Constant	0.420					
County Property Tax	4.183E-9					
State Appropriations	-4.294E-9	.852	.726	0.008	15.924	0.000

Note 1. Retention Rate = 0.420 + (4.183^{E-09}*X_1) + (-4.294^{E-09}*X_2) +/- *SEE*

Note 2. X_1 = County Property Tax

Note 3. X_2 = State Appropriations

H2. A combination of the MCD's selected longitudinal revenue variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop an MCD revenue model for predicting graduation rate percentages from three revenue sources: student tuition, county property tax, and state appropriations for the past 15 years. One of the three revenue variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 12 and 13. The regression model was significant (p = .001), and the hypothesis was supported. The predictor variable was County Property Tax (β= $3.564E^{E-09}$). The predictor model accounted for 56.9% of the variance in retention rate, $F(1, 13) = 17.160$, p = .001, *SEE* = 0.010. The regression equation was Graduation Rate = -0.032 + (3.654^{E-09}*County Property Tax) +/- 0.010. For every increase of $10 million in county property taxes, an estimated 3.56% increase in the student graduation rate would occur. The margin of error is +/- 1.00%. For example, a county property tax of $30 million would result in a predicted value of a graduation rate of 7.49% plus or minus 1.00%.

Table 12

Summary Descriptive Results for Revenue Variables and Graduation Rate for the MCD

Source	*N*	Mean	*SD*
Graduation Rate	15	7.20%	1.43%
County Property Tax	15	29.076	30.273
Student Tuition & Fees	15	39.942	70.466
State Appropriations	15	31.411	15.116

Note. County Property Tax, State Appropriations, and Student Tuition & Fee amounts are in millions of dollars.

Table 13

Summary Regression Analysis and Model to Predict Graduation Rate from Revenue Variables for the MCD

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.032					
County Property Tax	3.564E-9	.754	.569	0.010	17.160	0.001

Note 1. Graduation Rate = -0.032 + (3.564^{E-09}*X_1) +/- *SEE*

Note 2. X_1 = County Property Tax

H3. A combination of the MCD's selected longitudinal expense variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop an MCD expense model for predicting retention rate percentages from six expense sources: institutional support, instruction, student services, plant operations, academic support, and student aid for the past 15 years. One of the six expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 14 and 15. The regression model was significant (p = .000), and the hypothesis was supported. The predictor variable was Institutional Support (β= 2.627^{E-09}). The predictor model accounted for 65.9% of the variance in retention rate, $F(1, 13) = 25.083$, p = .000, *SEE* = 0.009. The regression equation was Retention Rate = 0.352 + (2.627^{E-09}*Institutional Support) +/- 0.009. For every increase of $10 million in institutional support expenses, an estimated 2.63% increase in the student retention rate would occur. The margin of error is +/- 0.90%. For example, institutional support expenses of $30 million would result in a predicted value of a retention rate of 43.08% plus or minus 0.90%.

Table 14

Summary Descriptive Results for Expense Variables and Retention Rate for the MCD

Source	*N*	Mean	*SD*
Retention Rate	15	40.70%	1.45%
Institutional Support	15	20.831	44.764
Instruction	15	39.613	56.692
Student Services	15	10.931	17.544
Plant Operations	15	11.841	0.887
Academic Support	15	10.742	13.810
Student Aid	15	1.395	0.185

Note. Institutional Support, Instruction, Student Services, Plant Operations, Academic Support, and Student Aid amounts are in millions of dollars.

Table 15

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for the MCD

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.352					
Institutional Support	2.627E-9	.812	.659	0.009	25.083	0.000

Note 1. Retention Rate = 0.352 + (2.627^{E-09}*X_1) +/- *SEE*

Note 2. X_1 = Institutional Support

H4. A combination of the MCD's selected longitudinal expense variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop an MCD expense model for predicting graduation rate percentages from six expense sources: institutional support, instruction, student services, plant operations, academic support, and student aid for the past 15 years. Two of the six expense variables were included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 16 and 17. The regression model was significant (p = .000), and the hypothesis was supported. The first predictor variable was Student Aid (β= 1.499^{E-07}). The second predictor variable was Student Services (β= -9.325^{E-09}). The two-predictor model accounted for 78.6% of the variance in graduation rate, $F(2, 12)$ = 22.022, p = .000, *SEE* = 0.007. The regression equation was Graduation Rate = -0.035 + (1.499^{E-07}*Student Aid) + (-9.325^{E-09}*Student Services) +/- 0.007. For every increase of $0.10 million in student aid, an estimated 1.50% increase in the student graduation rate would occur. For every increase of $1.0 million in student services expenses, an estimated 0.93% reduction in the student graduation rate would occur. The margin of error is +/- 0.70%. For example, student aid expenses of $1.0 million and student services expenses of $10 million would result in a predicted value of a graduation rate of 2.17% plus or minus 0.70%.

Table 16

Summary Descriptive Results for Expense Variables and Graduation Rate for the MCD

Source	*N*	Mean	*SD*
Retention Rate	15	40.70%	1.45%
Institutional Support	15	20.831	44.764
Instruction	15	39.613	56.692
Student Services	15	10.931	17.544
Plant Operations	15	11.841	0.887
Academic Support	15	10.742	13.810
Student Aid	15	1.395	0.185

Note. Institutional Support, Instruction, Student Services, Plant Operations, Academic Support, and Student Aid amounts are in millions of dollars.

Table 17

Summary Regression Analysis and Model to Predict Graduation Rate from Expense Variables for the MCD

Model	Beta	*R*	*R2*	*SEE*	*F* (2/12)	*p*-value
Constant	-0.035					
Student Aid	1.499E-7					
Student Services	-9.325E-9	.886	.786	0.007	22.022	0.000

Note 1. Graduation Rate = -0.035 + (1.499^{E-07}*X_1) + (-9.325^{E-09}*X_2) +/- *SEE*

Note 2. X_1 = Student Aid

Note 2. X_2 = Student Services

H5. A combination of the MCD's selected longitudinal staffing variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop an MCD staffing model for predicting retention rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 18 and 19. The regression model was significant (p = .004), and the hypothesis was supported. The predictor variable was Part Time Staff (β= -4.660^{E-04}). The predictor model accounted for 49.2% of the variance in retention rate, F(1, 13) = 12.591, p = .004, SEE = 0.011. The regression equation was Retention Rate = 0.435 + (-4.660^{E-04}*Part Time Staff) +/- 0.011. For every increase of 10 part-time staff employees, an estimated 0.46% decrease in the student retention rate would occur. The margin of error is +/- 1.10%. For example, having 70 part-time staff employees would result in a predicted value of a retention rate of 40.24% plus or minus 1.10%.

Table 18

Summary Descriptive Results for Staffing Variables and Retention Rate for the MCD

Source	*N*	Mean	*SD*
Retention Rate	15	40.70%	1.45%
Officers	15	8.33	0.976
Administrators	15	55.73	8.787
Full-Time Faculty	15	284.60	25.091
Part-Time Faculty	15	237.40	24.804
Full-Time Exempt Staff	15	228.40	15.610
Full-Time Hourly Staff	15	405.87	46.910
Part-Time Staff	15	61.27	21.832
Contract Trainers	15	14.80	12.254
Consultants	15	2.40	2.354

Table 19

Summary Regression Analysis and Model to Predict Retention Rate from Staffing Variables for the MCD

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.435					
Part-Time Staff	-4.660E-4	.701	.492	0.011	12.591	0.004

Note 1. Retention Rate = 0.435 + ($-4.660^{E-04} * X_1$) +/- *SEE*

Note 2. X_1 = Part Time Staff

H6. A combination of the MCD’s selected longitudinal staffing variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop an MCD staffing model for predicting graduation rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 20 and 21. The regression model was significant (p = .027), and the hypothesis was supported. The predictor variable was Part-Time Faculty (β= 3.270^{E-04}). The predictor model accounted for 32.2% of the variance in graduation rate, $F(1, 13) = 6.184$, p = .027, *SEE* = 0.012. The regression equation was Graduation Rate = -0.006 + (3.270^{E-04}*Part Time Faculty) +/- 0.012. For every additional part-time faculty, an estimated 0.03% increase in the student graduation rate would occur. The margin of error is +/- 1.20%. For example, having 200 part-time faculty employees would result in a predicted value of a graduation rate of 5.94% plus or minus 1.20%.

Table 20

Summary Descriptive Results for Staffing Variables and Graduation Rate for the MCD

Source	*N*	Mean	*SD*
Graduation Rate	15	7.19%	1.43%
Officers	15	8.33	0.976
Administrators	15	55.73	8.787
Full-Time Faculty	15	284.60	25.091
Part-Time Faculty	15	237.40	24.804
Full-Time Exempt Staff	15	228.40	15.610
Full-Time Hourly Staff	15	405.87	46.910
Part-Time Staff	15	61.27	21.832
Contract Trainers	15	14.80	12.254
Consultants	15	2.40	2.354

Table 21

Summary Regression Analysis and Model to Predict Graduation Rate from Staffing Variables for the MCD

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.006					
Part Time Faculty	3.270E-4	.568	.322	0.012	6.184	0.027

Note 1. Graduation Rate = -0.006 + (3.270^{E-04}*X_1) +/- *SEE*

Note 2. X_1 = Part Time Faculty

RQ3. What combination of the MCD’s selected campus-based (Campus #1, #2, #3, #4, and #5) resource allocation variables (a. longitudinal enrollment variables, b. longitudinal expense variables, and c. longitudinal staffing variables) best predicts retention and graduation rates over a 15-year period?

H1. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal enrollment variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #1 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 22. The regression model was not significant, and the hypothesis was not supported.

Table 22

Summary Descriptive Results for Campus #1 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	41.20%	1.04%
Total Enrollment	15	8548.33	695.472
Full-Time Enrollment	15	3332.67	493.010
Part-Time Enrollment	15	5215.67	572.251
Online Enrollment	15	1408.13	1128.638

Note. Enrollment numbers represent headcount.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #2 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 23 and 24. The regression model was significant (p = .003), and the hypothesis was supported. The predictor variable was Online Enrollment (β= 4.899^{E-06}). The predictor model accounted for 50.4% of the variance in graduation rate, *F*(1, 13) = 13.213, *p* = .003, *SEE* = 0.016. The regression equation was Retention Rate = 0.408 + (4.899^{E-06}*Online Enrollment) +/- 0.016. For every increase of one thousand online enrollments, an estimated 0.49% increase in the student retention rate would occur. The margin of error is +/- 1.60%. For example, having 4,300 online enrollments would result in a predicted value of a retention rate of 42.91% plus or minus 1.60%.

Table 23

Summary Descriptive Results for Campus #2 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	42.40%	2.13%
Total Enrollment	15	7220.40	574.097
Full-Time Enrollment	15	2363.33	457.849
Part-Time Enrollment	15	4857.07	525.874
Online Enrollment	15	3300.07	3082.914

Note. Enrollment numbers represent headcount.

Table 24

Summary Regression Analysis and Model to Predict Retention Rate from Enrollment Variables for Campus #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.408					
Online Enrollment	4.899E-6	.710	.504	.016	13.213	0.003

Note 1. Retention Rate = 0.408 + (4.899^{E-06}*X_1) +/- *SEE*

Note 2. X_1 = Online Enrollment

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #3 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 25. The regression model was not significant, and the hypothesis was not supported.

Table 25

Summary Descriptive Results for Campus #3 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	39.60%	1.84%
Total Enrollment	15	7039.00	456.591
Full-Time Enrollment	15	2688.80	335.220
Part-Time Enrollment	15	4350.20	433.445
Online Enrollment	15	1250.67	853.539

Note. Enrollment numbers represent headcount.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #4 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 26. The regression model was not significant, and the hypothesis was not supported.

Table 26

Summary Descriptive Results for Campus #4 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	37.50%	5.28%
Total Enrollment	15	1014.33	273.268
Full-Time Enrollment	15	313.33	127.029
Part-Time Enrollment	15	701.00	181.120
Online Enrollment	15	82.53	60.607

Note. Enrollment numbers represent headcount.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #5 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 27 and 28. The regression model was significant (p = .047), and the hypothesis was supported. The predictor variable was Total Enrollment (β= 3.303^{E-05}). The predictor model accounted for 27.0% of the variance in graduation rate, $F(1, 13) = 4.802$, p = .047, *SEE* = 0.028. The regression equation was Retention Rate = 0.253 + (3.303^{E-05}*Total Enrollment) +/- 0.028. For every increase of one thousand total enrollments, an estimated 3.30% increase in the student retention rate would occur. The margin of error is +/- 2.80%. For example, having 3,000 total enrollments would result in a predicted value of a retention rate of 35.21% plus or minus 2.80%.

Table 27

Summary Descriptive Results for Campus #5 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	39.30%	3.20%
Total Enrollment	15	4249.27	498.386
Full-Time Enrollment	15	1659.60	340.459
Part-Time Enrollment	15	2589.67	319.221
Online Enrollment	15	879.27	580.649

Note. Enrollment numbers represent headcount.

Table 28

Summary Regression Analysis and Model to Predict Retention Rate from Enrollment Variables for Campus #5

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.253					
Total Enrollment	3.303E-5	.519	.270	.028	4.802	0.047

Note 1. Retention Rate = 0.253 + (3.303^{E-05}*X_1) +/- *SEE*

Note 2. X_1 = Total Enrollment

H2. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal enrollment variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #1 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 29 and 30. The regression model was significant (*p* = .016), and the hypothesis was supported. The predictor variable was Part-Time Enrollment (β= -9.104^{E-06}). The predictor model accounted for 37.1% of the variance in graduation rate, *F*(1, 13) = 7.672, *p* = .016, *SEE* = 0.007. The regression equation was Graduation Rate = 0.112 + (-9.104^{E-06}*Part Time Enrollment) +/- 0.007. For every increase of one thousand part-time enrollments, an estimated reduction of 0.91% in the student graduation rate would occur. The margin of error is +/- 0.70%. For example, having 5,000 part-time enrollments would result in a predicted value of a graduation rate of 6.65% plus or minus 0.70%.

Table 29

Summary Descriptive Results for Campus #1 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	6.40%	0.90%
Total Enrollment	15	8548.33	695.472
Full-Time Enrollment	15	3332.67	493.010
Part-Time Enrollment	15	5215.67	572.251
Online Enrollment	15	1408.13	1128.638

Note. Enrollment numbers represent headcount.

Table 30

Summary Regression Analysis and Model to Predict Graduation Rate from Enrollment Variables for Campus #1

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.112					
Part-Time Enrollments	-9.104E-6	.609	.371	.007	7.672	0.016

Note 1. Graduation Rate = 0.112 + (-9.104^{E-06}*X_1) +/- *SEE*

Note 2. X_1 = Part-Time Enrollment

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #2 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 31. The regression model was not significant, and the hypothesis was not supported.

Table 31

Summary Descriptive Results for Campus #2 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	7.40%	2.02%
Total Enrollment	15	7220.40	574.097
Full-Time Enrollment	15	2363.33	457.849
Part-Time Enrollment	15	4857.07	525.874
Online Enrollment	15	3300.07	3082.914

Note. Enrollment numbers represent headcount.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #3 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 32. The regression model was not significant, and the hypothesis was not supported.

Table 32

Summary Descriptive Results for Campus #3 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	6.30%	0.97%
Total Enrollment	15	7039.00	456.591
Full-Time Enrollment	15	2688.80	335.220
Part-Time Enrollment	15	4350.20	433.445
Online Enrollment	15	1250.67	853.539

Note. Enrollment numbers represent headcount.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #4 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 33 and 34. The regression model was significant (p = .000), and the hypothesis was supported. The predictor variable was Part-Time Enrollment (β= 2.600^{E-04}). The predictor model accounted for 90.8% of the variance in graduation rate, $F(1, 13)$ = 128.295, p = .000, *SEE* = 0.016. The regression equation was Graduation Rate = -0.043 + (2.600^{E-04}*Part Time Enrollment) +/- 0.016. For every increase of one hundred part-time enrollments, an estimated 2.60% increase in the student graduation rate would occur. The margin of error is +/- 1.60%. For example, having 700 part-time enrollments would result in a predicted value of a graduation rate of 13.90% plus or minus 1.60%.

Table 33

Summary Descriptive Results for Campus #4 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation	15	13.90%	4.94%
Total Enrollment	15	1014.33	273.268
Full Time Enrollment	15	313.33	127.029
Part Time Enrollment	15	701.00	181.120
Online Enrollment	15	82.53	60.607

Note. Enrollment numbers represent headcount.

Table 34

Summary Regression Analysis and Model to Predict Graduation Rate from Enrollment Variables for Campus #4

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.043					
Part-Time Enrollments	2.600E-4	.953	.908	.016	128.295	0.000

Note 1. Graduation Rate = -0.043 + (2.600^{E-04}*X_1) +/- *SEE*

Note 2. X_1 = Part-Time Enrollment

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #5 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 35 and 36. The regression model was significant (p = .010), and the hypothesis was supported. The predictor variable was Full-Time Enrollment (β= 4.295^{E-05}). The predictor model accounted for 36.8% of the variance in graduation rate, *F*(1, 13) = 9.140, *p* = .010, *SEE* = 0.018. The regression equation was Graduation Rate = 0.010 + (4.295^{E-05}*Full Time Enrollment) +/- 0.018. For every increase of 1,000 full-time enrollments, an estimated increase of 4.29% in the student graduation rate would occur. The margin of error is +/- 1.80%. For example, having 1,000 full-time enrollments would result in a predicted value of a graduation rate of 5.30% plus or minus 1.80%.

Table 35

Summary Descriptive Results for Campus #5 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	8.20%	2.28%
Total Enrollment	15	4249.27	498.386
Full-Time Enrollment	15	1659.60	340.459
Part-Time Enrollment	15	2589.67	319.221
Online Enrollment	15	879.27	580.649

Note. Enrollment numbers represent headcount.

Table 36

Summary Regression Analysis and Model to Predict Graduation Rate from Enrollment Variables for Campus #5

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.010					
Full-Time Enrollment	4.295E-5	.643	.368	.018	9.140	0.010

Note 1. Graduation Rate = 0.010 + (4.295^{E-05}*X_1) +/- *SEE*

Note 2. X_1 = Full-Time Enrollment

H3. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal expense variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #1 expense model for predicting retention rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 37 and 38. The regression model was significant (p = .046), and the hypothesis was supported. The predictor variable was Student Services (β= 2.820^{E-08}). The predictor model accounted for 27.3% of the variance in retention rate, $F(1, 13) = 4.877$, $p = .046$, $SEE = 0.009$. The regression equation was Retention Rate = 0.335 + (2.820^{E-08}*Student Services) +/- 0.009. For every increase of $1 million in student services, an estimated increase of 2.82% in the student retention rate would occur. The margin of error is +/- 0.90%. For example, spending $3 million in student services would result in a predicted value of a retention rate of 41.96% plus or minus 0.90%.

Table 37

Summary Descriptive Results for Campus #1 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	41.20%	1.04%
Institutional Support	15	0.859	0.317
Instruction	15	10.265	1.400
Student Services	15	2.752	0.200
Plant Operations	15	1.828	0.138
Academic Support	15	2.270	0.311

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 38

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for Campus #1

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.335					
Student Services	2.820E-8	.522	.273	.009	4.877	0.046

Note 1. Retention Rate = 0.335 + (2.820^{E-08}*X_1) +/- *SEE*

Note 2. X_1 = Student Services

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #2 expense model for predicting retention rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 39 and 40. The regression model was significant (p = .028), and the hypothesis was supported. The predictor variable was Instruction (β= 7.537^{E-09}). The predictor model accounted for 32.0% of the variance in retention rate, F(1, 13) = 6.108, p = .028, *SEE* = 0.018. The regression equation was Retention Rate = 0.333 + (7.537^{E-09}*Instruction) +/- 0.018. For every increase of $1 million in instruction, an estimated increase of 0.75% in the student retention rate would occur. The margin of error is +/- 0.018%. For example, spending $10 million in student services would result in a predicted value of a retention rate of 40.84% plus or minus 1.80%.

Table 39

Summary Descriptive Results for Campus #2 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	42.40%	2.13%
Institutional Support	15	1.400	0.473
Instruction	15	12.087	1.596
Student Services	15	2.623	0.363
Plant Operations	15	2.693	0.191
Academic Support	15	1.910	0.251

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 40

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for Campus #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.333					
Instruction	7.537E-9	.565	.320	.018	6.108	0.028

Note 1. Retention Rate = 0.333 + ($7.537^{E-09} * X_1$) +/- *SEE*

Note 2. X_1 = Instruction

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #3 expense model for predicting retention rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 41 and 42. The regression model was significant (*p* = .018), and the hypothesis was supported. The predictor variable was Institutional Support

(β= -4.426^{E-08}). The predictor model accounted for 36.2% of the variance in retention rate, $F(1, 13) = 7.368$, $p = .018$, *SEE* = 0.015. The regression equation was Retention Rate = 0.442 + (-4.426^{E-08}*Institutional Support) +/- 0.015. For every increase of $1 million in institutional support, an estimated reduction of 4.42% in the student retention rate would occur. The margin of error is +/- 1.50%. For example, spending $2 million in institutional support would result in a predicted value of a retention rate of 35.35% plus or minus 1.50%.

Table 41

Summary Descriptive Results for Campus #3 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	39.60%	1.84%
Institutional Support	15	1.054	0.250
Instruction	15	7.198	0.732
Student Services	15	1.929	0.176
Plant Operations	15	1.405	0.069
Academic Support	15	1.618	0.169

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 42

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for Campus #3

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.442					
Institutional Support	-4.426E-8	.601	.362	.015	7.368	0.018

Note 1. Retention Rate = 0.442 + ($-4.426^{E-08} * X_1$) +/- *SEE*

Note 2. X_1 = Institutional Support

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #4 expense model for predicting retention rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 43 and 44. The regression model was significant (p = .031), and the hypothesis was supported. The predictor variable was Instruction (β= 2.175^{E-08}). The predictor model accounted for 30.9% of the variance in retention rate, $F(1, 13) = 5.815$, $p = .031$, *SEE* = 0.046. The regression equation was Retention Rate = 0.345 + (2.175^{E-08}*Instruction) +/- 0.046. For every increase of $1 million in instruction, an estimated increase of 2.18% in the student retention rate would occur. The margin of error is +/- 4.60%. For example, spending $2 million in instruction would result in a predicted value of a retention rate of 38.85% plus or minus 4.60%.

Table 43

Summary Descriptive Results for Campus #4 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	37.50%	5.28%
Institutional Support	15	0.223	0.235
Instruction	15	1.371	1.350
Student Services	15	0.388	0.403
Plant Operations	15	0.514	0.507
Academic Support	15	0.325	0.321

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 44

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for Campus #4

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.345					
Instruction	2.175E-8	.556	.309	.046	5.815	0.031

Note 1. Retention Rate = 0.345 + 2.175^{E-08}*X_1) +/- *SEE*

Note 2. X_1 = Instruction

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #5 expense model for predicting retention rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 45 and 46. The regression model was significant (p = .011), and the hypothesis was supported. The predictor variable was Instruction (β=

2.382^{E-08}). The predictor model accounted for 40.2% of the variance in retention rate, *F*(1, 13) = 8.736, *p* = .011, *SEE* = 0.025. The regression equation was Retention Rate = 0.291 + (2.382^{E-08}*Instruction) +/- 0.025. For every increase of $1 million in instruction, an estimated increase of 2.38% in the student retention rate would occur. The margin of error is +/- 2.50%. For example, spending $2 million in instruction would result in a predicted value of a retention rate of 29.58% plus or minus 2.50%.

Table 45

Summary Descriptive Results for Campus #5 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	39.30%	3.17%
Institutional Support	15	0.655	0.129
Instruction	15	4.290	0.844
Student Services	15	1.461	0.366
Plant Operations	15	0.930	0.113
Academic Support	15	1.248	0.189

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 46

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for Campus #5

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.291					
Instruction	2.382E-8	.634	.402	.025	8.736	0.011

Note 1. Retention Rate = 0.291 + (2.382^{E-08}*X_1) +/- *SEE*

Note 2. X_1 = Instruction

H4. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal expense variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #1 expense model for predicting graduation rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 47 and 48. The regression model was significant (p = .003), and the hypothesis was supported. The predictor variable was student services (β= 3.156^{E-08}). The predictor model accounted for 50.9% of the variance in graduation rate, $F(1, 13) = 13.488$, $p = .003$, $SEE = 0.006$. The regression equation was Graduation Rate = -0.023 + (3.156^{E-08}*Student Services) +/- 0.006. For every increase of $1 million in student services, an estimated increase of 3.16% in the student graduation rate would occur. The margin of error is +/- 0.60%. For example, spending $3 million in student services would result in a predicted value of a graduation rate of 7.17% plus or minus 0.60%.

Table 47

Summary Descriptive Results for Campus #1 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	6.40%	0.86%
Institutional Support	15	0.859	0.317
Instruction	15	10.265	1.400
Student Services	15	2.752	0.200
Plant Operations	15	1.828	0.138
Academic Support	15	2.270	0.311

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 48

Summary Regression Analysis and Model to Predict Graduation Rate from Expense Variables for Campus #1

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.023					
Student Services	3.156E-8	.714	.509	.006	13.488	0.003

Note 1. Graduation Rate = -0.023 + (3.156^{E-08}*X_1) +/- *SEE*

Note 2. X_1 = Student Services

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #2 expense model for predicting graduation rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 49 and 50. The regression model was significant (p = .007), and the hypothesis was supported. The predictor variable was student services (β=

3.682^{E-08}). The predictor model accounted for 43.7% of the variance in graduation rate, *F*(1, 13) = 10.108, *p* = .007, *SEE* = 0.016. The regression equation was Graduation Rate = -0.023 + (3.682^{E-08}*Student Services) +/- 0.016. For every increase of $1 million in student services, an estimated increase of 3.68% in the student graduation rate would occur. The margin of error is +/- 1.60%. For example, spending $3 million in student services would result in a predicted value of a graduation rate of 8.75% plus or minus 1.60%.

Table 49

Summary Descriptive Results for Campus #2 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	7.40%	2.02%
Institutional Support	15	1.400	0.473
Instruction	15	12.087	1.596
Student Services	15	2.623	0.363
Plant Operations	15	2.693	0.191
Academic Support	15	1.910	0.251

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 50

Summary Regression Analysis and Model to Predict Graduation Rate from Expense Variables for Campus #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.023					
Student Services	3.682E-8	.661	.437	.016	10.108	0.007

Note 1. Graduation Rate = -0.023 + (3.682^{E-08}*X_1) +/- *SEE*

Note 2. X_1 = Student Services

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #3 expense model for predicting graduation rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. Two of the five expense variables were included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 51 and 52. The regression model was significant (p = .015), and the hypothesis was supported. The first predictor variable was Institutional Support (β= -1.853^{E-08}). The second predictor variable was Student Services (β = 2.599^{E-08}). The two-predictor model accounted for 50.5% of the variance in graduation rate, $F(2, 12) = 6.124$, $p = .015$, $SEE = 0.007$. The regression equation was Graduation Rate = 0.032 + (-1.853^{E-08}*Institutional Support) + (2.599^{E-08}*Student Services) +/- 0.007. For every increase of $1 million in institutional support, an estimated decrease of 1.85% in the student graduation rate would occur. For every increase of $1 million in student services, an estimated increase of 2.60% in the student graduation rate would occur. The margin of error is +/- 0.70%. For example, having institutional support of $2 million and student services expenses of $3 million would result in a predicted value of a graduation rate of 7.29% plus or minus 0.70%.

Table 51

Summary Descriptive Results for Campus #3 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	6.30%	0.97%
Institutional Support	15	1.054	0.250
Instruction	15	7.198	0.732
Student Services	15	1.929	0.176
Plant Operations	15	1.405	0.069
Academic Support	15	1.618	0.169

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 52

Summary Regression Analysis and Model to Predict Graduation Rate from Expense Variables for Campus #3

Model	Beta	*R*	*R2*	*SEE*	*F* (2/12)	*p*-value
Constant	0.032					
Institutional Support	-1.853E-8					
Student Services	2.599E-8	.711	.505	0.007	6.124	0.015

Note 1. Graduation Rate = 0.032 + $(-1.853^{E-08} * X_1) + (2.599^{E-08} * X_2)$ +/- *SEE*

Note 2. X_1 = Institutional Support

Note 3. X_2 = Student Services

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #4 expense model for predicting graduation rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 53 and 54. The regression model was significant (p = .003), and the hypothesis was supported. The predictor variable was Instruction (β= 2.625^{E-08}). The predictor model accounted for 51.6% of the variance in graduation rate, $F(1, 13) = 13.849$, $p = .003$, $SEE = 0.036$. The regression equation was Graduation Rate = 0.103 + (2.625^{E-08}*Instruction) +/- 0.036. For every increase of $1 million in instruction, an estimated increase of 2.62% in the student graduation rate would occur. The margin of error is +/- 3.60%. For example, spending $2 million in instruction would result in a predicted value of a graduation rate of 15.55% plus or minus 3.60%.

Table 53

Summary Descriptive Results for Campus #4 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	13.90%	4.94%
Institutional Support	15	0.223	0.235
Instruction	15	1.371	1.350
Student Services	15	0.388	0.403
Plant Operations	15	0.514	0.507
Academic Support	15	0.325	0.321

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

Table 54

Summary Regression Analysis and Model to Predict Graduation Rate from Expense Variables for Campus #4

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.103					
Instruction	2.625E-8	.718	.516	.036	13.849	0.003

Note 1. Graduation Rate = 0.103 + (2.625^{E-08}*X_1) +/- *SEE*

Note 2. X_1 = Instruction

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #5 expense model for predicting graduation rate percentages from five expense variables: institutional support, instruction, student services, plant operations, and academic support for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Tables 55. The regression model was not significant, and the hypothesis was not supported.

Table 55

Summary Descriptive Results for Campus #5 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	8.20%	2.30%
Institutional Support	15	0.655	0.129
Instruction	15	4.290	0.844
Student Services	15	1.461	0.366
Plant Operations	15	0.930	0.113
Academic Support	15	1.248	0.189

Note. Institutional Support, Instruction, Student Services, Plant Operations, and Academic Support amounts are in millions of dollars.

H5. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal staffing variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #1 staffing model for predicting retention rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 56 and 57. The regression model was significant (p = .023), and the hypothesis was supported. The predictor variable was Administrators (β= -7.00^{E-03}). The predictor model accounted for 33.7% of the variance in retention rate, F(1, 13) = 6.607, p = .023, *SEE* = 0.009. The regression equation was Retention Rate = 0.453 + (-7.00^{E-03}*Administrators) +/- 0.009. For every additional administrator, an estimated reduction of 0.70% in the student retention rate would occur. The margin of error is +/- 0.90%. For example: employing seven administrators would result in a predicted value of a retention rate of 40.40% plus or minus 0.90%.

Table 56

Summary Descriptive Results for Staffing Variables and Retention Rate for Campus #1

Source	*N*	Mean	*SD*
Retention Rate	15	41.20%	1.04%
Officers	15	1.00	0.000
Administrators	15	5.60	0.828
Full-Time Faculty	15	81.53	7.791
Part-Time Faculty	15	176.73	15.998
Full-Time Exempt Staff	15	31.47	3.502
Full-Time Hourly Staff	15	78.07	14.033
Part-Time Staff	15	24.07	7.932
Contract Trainers	15	0.00	0.000
Consultants	15	0.00	0.000

Table 57

Summary Regression Analysis and Model to Predict Retention Rate from Staffing Variables for Campus #1

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.453					
Administrators	-7.00E-3	.581	.337	0.009	6.607	0.023

Note 1. Retention Rate = 0.453 + ($-7.00^{E-03} * X_1$) +/- *SEE*

Note 2. X_1 = Administrators

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #2 staffing model for predicting retention rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 58 and 59. The regression model was significant (p = .001), and the hypothesis was supported. The predictor variable was Administrators (β= 8.00^{E-03}). The predictor model accounted for 61.1% of the variance in retention rate, F(1, 13) = 20.398, p = .001, SEE = 0.014. The regression equation was Retention Rate = 0.369 + (8.00^{E-03}*Administrators) +/- 0.014. For every additional administrator, an estimated increase of 0.08% in the student retention rate would occur. The margin of error is +/- 1.40%. For example, employing seven administrators would result in a predicted value of a retention rate of 42.50% plus or minus 1.40%.

Table 58

Summary Descriptive Results for Staffing Variables and Retention Rate for campus #2

Source	*N*	Mean	*SD*
Retention Rate	15	42.40%	2.13%
Officers	15	1.00	0.000
Administrators	15	7.27	2.187
Full-Time Faculty	15	97.80	10.051
Part-Time Faculty	15	185.93	22.799
Full-Time Exempt Staff	15	48.67	4.186
Full-Time Hourly Staff	15	100.53	23.120
Part-Time Staff	15	11.07	5.535
Contract Trainers	15	3.47	2.386
Consultants	15	0.00	0.000

Table 59

Summary Regression Analysis and Model to Predict Retention Rate from Staffing Variables for Campus #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.369					
Administrators	8.00E-03	.782	.611	.014	20.398	0.001

Note 1. Retention Rate = 0.369 + (8.00^{E-03}*X_1) +/- *SEE*

Note 2. X_1 = Administrators

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #3 staffing model for predicting retention rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 60 and 61. The regression model was significant (*p* = .001), and the hypothesis was supported. The predictor variable was Full-Time Hourly Staff (β= -2.00^{E-03}). The predictor model accounted for 59.5% of the variance in retention rate, *F*(1, 13) = 19.093, *p* = .001, *SEE* = 0.012. The regression equation was Retention Rate = 0.494 + (-2.00^{E-03}*Full Time Hourly Staff) +/- 0.012. For every additional full-time hourly staff, an estimated decrease of 0.20% in the student retention rate would occur. The margin of error is +/- 1.20%. For example, employing 50 full-time hourly staff would result in a predicted value of a retention rate of 39.40% plus or minus 1.20%.

Table 60

Summary Descriptive Results for Staffing Variables and Retention Rate for Campus #3

Source	*N*	Mean	*SD*
Retention Rate	15	39.60%	1.84%
Officers	15	1.00	0.000
Administrators	15	4.53	0.743
Full-Time Faculty	15	57.00	3.162
Part-Time Faculty	15	104.80	6.560
Full-Time Exempt Staff	15	22.80	3.098
Full-Time Hourly Staff	15	55.80	8.099
Part-Time Staff	15	13.33	3.867
Contract Trainers	15	0.00	0.00
Consultants	15	0.00	0.000

Table 61

Summary Regression Analysis and Model to Predict Retention Rate from Staffing Variables for Campus #3

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.494					
Full-Time Hourly Staff	-2.00E-03	.771	.595	.012	19.093	0.001

Note 1. Retention Rate = 0.494 + ($-2.00^{E-03} * X_1$) +/- *SEE*

Note 2. X_1 = Full-Time Hourly Staff

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #4 staffing model for predicting retention rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 62 and 63. The regression model was significant (p = .042), and the hypothesis was supported. The predictor variable was Part-Time Faculty (β= 2.00^{E-03}). The predictor model accounted for 28.1% of the variance in retention rate, $F(1, 13) = 5.076$, p = .042, SEE = 0.047. The regression equation was Retention Rate = 0.347 + (2.00^{E-03}*Part Time Faculty) +/- 0.047. For every additional part-time faculty member, an estimated increase of 0.20% in the student retention rate would occur. The margin of error is +/- 4.70%. For example, employing 20 part-time faculty members would result in a predicted value of a retention rate of 38.70% plus or minus 4.70%.

Table 62

Summary Descriptive Results for Staffing Variables and Retention Rate for Campus #4

Source	*N*	Mean	*SD*
Retention Rate	15	37.50%	5.28%
Officers	15	0.53	0.516
Administrators	15	1.53	1.642
Full-Time Faculty	15	9.13	9.054
Part-Time Faculty	15	14.53	14.510
Full-Time Exempt Staff	15	7.80	8.143
Full-Time Hourly Staff	15	17.27	17.649
Part-Time Staff	15	0.20	0.414
Contract Trainers	15	0.00	0.000
Consultants	15	0.00	0.000

Table 63

Summary Regression Analysis and Model to Predict Retention Rate from Staffing Variables for Campus #4

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.347					
Part-Time Faculty	2.00E-3	.530	.281	.047	5.076	0.042

Note 1. Retention Rate = 0.347 + (2.00^{E-03}*X_1) +/- *SEE*

Note 2. X_1 = Part-Time Faculty

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #5 staffing model for predicting retention rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 64. The regression model was not significant, and the hypothesis was not supported.

Table 64

Summary Descriptive Results for Staffing Variables and Retention Rate for Campus #5

Source	*N*	Mean	*SD*
Retention Rate	15	39.30%	3.17%
Officers	15	1.00	0.000
Administrators	15	4.60	0.737
Full-Time Faculty	15	35.13	4.779
Part-Time Faculty	15	55.13	4.015
Full-Time Exempt Staff	15	19.40	2.028
Full-Time Hourly Staff	15	34.47	5.963
Part-Time Staff	15	9.53	3.091
Contract Trainers	15	0.33	0.488
Consultants	15	0.00	0.000

H6. A combination of the MCD's selected campus-based (Campus #1, #2, #3, #4, and #5) longitudinal staffing variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #1 staffing model for predicting graduation rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 65 and 66. The regression model was significant (p = .025), and the hypothesis was supported. The predictor variable was Full-Time Hourly Staff (β= -3.500^{E-04}). The predictor model accounted for 33.0% of the variance in retention rate, $F(1, 13) = 6.404$, p = .025, *SEE* = 0.007. The regression equation was Graduation Rate = 0.092 + (-3.500^{E-}

^{04}*Full Time Hourly Staff) +/- 0.007. For every additional full-time staff employee, an estimated reduction of 0.03% in the student graduation rate would occur. The margin of error is +/- 0.70%. For example, employing 100 full-time staff employees would result in a predicted value of a graduation rate of 5.70% plus or minus 0.70%.

Table 65

Summary Descriptive Results for Staffing Variables and Graduation Rate for Campus #1

Source	*N*	Mean	*SD*
Graduation Rate	15	6.40%	0.86%
Officers	15	1.00	0.000
Administrators	15	5.60	0.828
Full-Time Faculty	15	81.53	7.791
Part-Time Faculty	15	176.73	15.998
Full-Time Exempt Staff	15	31.47	3.502
Full-Time Hourly Staff	15	78.07	14.033
Part-Time Staff	15	24.07	7.932
Contract Trainers	15	0.00	0.000
Consultants	15	0.00	0.000

Table 66

Summary Regression Analysis and Model to Predict Graduation Rate from Staffing Variables for Campus #1

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.092					
Full-Time Hourly Staff	-3.500E-4	.574	.330	0.007	6.404	0.025

Note 1. Graduation Rate = 0.092 + (-3.500^{E-04}*X_1) +/- *SEE*

Note 2. X_1 = Full-Time Hourly Staff

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #2 staffing model for predicting graduation rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 67. The regression model was not significant, and the hypothesis was not supported.

Table 67

Summary Descriptive Results for Staffing Variables and Graduation Rate for Campus #2

Source	*N*	Mean	*SD*
Graduation Rate	15	7.40%	2.02%
Officers	15	1.00	0.000
Administrators	15	7.27	2.187
Full-Time Faculty	15	97.80	10.051
Part-Time Faculty	15	185.93	22.799
Full-Time Exempt Staff	15	48.67	4.186
Full-Time Hourly Staff	15	100.53	23.120
Part-Time Staff	15	11.07	5.535
Contract Trainers	15	3.47	2.386
Consultants	15	0.00	0.000

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #3 staffing model for predicting graduation rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 68 and 69. The regression model was significant (p = .004), and the hypothesis was supported. The predictor variable was Full-Time Hourly Staff (β= -1.00^{E-03}). The predictor model accounted for 48.2% of the variance in graduation rate, F(1, 13) = 12.098, p = .004, *SEE* = 0.007. The regression equation was Graduation Rate = 0.109 + (-1.00^{E-03}*Full Time Hourly Staff) +/- 0.007. For every additional full-time hourly staff position, an estimated reduction of 0.10% in the student graduation rate would occur. The margin of error is +/- 0.70%. For example, employing 50 full-time hourly staff employees would result in the predicted value of a graduation rate of 5.90% plus or minus 0.70%.

Table 68

Summary Descriptive Results for Staffing Variables and Graduation Rate for Campus #3

Source	*N*	Mean	*SD*
Graduation Rate	15	6.30%	0.97%
Officers	15	1.00	0.000
Administrators	15	4.53	0.743
Full-Time Faculty	15	57.00	3.162
Part-Time Faculty	15	104.80	6.560
Full-Time Exempt Staff	15	22.80	3.098
Full-Time Hourly Staff	15	55.80	8.099
Part-Time Staff	15	13.33	3.867
Contract Trainers	15	0.00	0.00
Consultants	15	0.00	0.000

Table 69

Summary Regression Analysis and Model to Predict Graduation Rate from Staffing Variables for Campus #3

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.109					
Full-Time Hourly Staff	-1.00E-3	.694	.482	.007	12.098	0.004

Note 1. Graduation Rate = 0.109 + (-1.00^{E-03}*X_1) +/- *SEE*

Note 2. X_1 = Full-Time Hourly Staff

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #4 staffing model for predicting graduation rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 70 and 71. The regression model was significant (p = .003), and the hypothesis was supported. The predictor variable was Part-Time Faculty (β= 2.00^{E-03}). The predictor model accounted for 49.7% of the variance in graduation rate, $F(1, 13)$ = 12.827, p = .003, *SEE* = 0.036. The regression equation was Graduation Rate = 0.104 + (2.00^{E-03}*Part Time Faculty) +/- 0.036. For every additional part-time faculty position, an estimated increase of 0.20% in the student graduation rate would occur. The margin of error is +/- 3.60%. For example, employing 15 part-time faculty members would result in a predicted value of a graduation rate of 13.40% plus or minus 3.60%.

Table 70

Summary Descriptive Results for Staffing Variables and Graduation Rate for Campus #4

Source	*N*	Mean	*SD*
Graduation Rate	15	13.90%	4.94%
Officers	15	0.53	0.516
Administrators	15	1.53	1.642
Full-Time Faculty	15	9.13	9.054
Part-Time Faculty	15	14.53	14.510
Full-Time Exempt Staff	15	7.80	8.143
Full-Time Hourly Staff	15	17.27	17.649
Part-Time Staff	15	0.20	0.414
Contract Trainers	15	0.00	0.000
Consultants	15	0.00	0.000

Table 71

Summary Regression Analysis and Model to Predict Graduation Rate from Staffing Variables for Campus #4

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.104					
Part-Time Faculty	2.00E-3	.705	.497	.036	12.827	0.003

Note 1. Graduation Rate = 0.104 + (2.00^{E-03}*X_1) +/- *SEE*

Note 2. X_1 = Part-Time Faculty

The summary results from multiple stepwise regression analyses were used to develop a selected Campus #5 staffing model for predicting graduation rate percentages from nine staffing variables: officers, administrators, full-time faculty, part-time faculty, full-time exempt staff, full-time hourly staff, part-time staff, contract trainers, and consultants for the past 15 years. One of the nine staffing variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 72 and 73. The regression model was significant (p = .018), and the hypothesis was supported. The predictor variable was Full-Time Exempt Staff (β= 7.00^{E-03}). The predictor model accounted for 36.1% of the variance in graduation rate, $F(1, 13) = 7.341$, p = .018, *SEE* = 0.019. The regression equation was Graduation Rate = -0.049 + (7.00^{E-03}*Full Time Exempt Staff) +/- 0.019. For every additional full-time exempt staff position, an estimated increase of 0.70% in the student graduation rate would occur. The margin of error is +/- 1.90%. For example, employing 20 full-time exempt staff would result in a predicted value of a graduation rate of 9.10% plus or minus 1.90%.

Table 72

Summary Descriptive Results for Staffing Variables and Graduation Rate for Campus #5

Source	*N*	Mean	*SD*
Graduation Rate	15	8.20%	2.28%
Officers	15	1.00	0.000
Administrators	15	4.60	0.737
Full-Time Faculty	15	35.13	4.779
Part-Time Faculty	15	55.13	4.015
Full-Time Exempt Staff	15	19.40	2.028
Full-Time Hourly Staff	15	34.47	5.963
Part-Time Staff	15	9.53	3.091
Contract Trainers	15	0.33	0.488
Consultants	15	0.00	0.000

Table 73

Summary Regression Analysis and Model to Predict Graduation Rate from Staffing Variables for Campus #5

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.049					
Full-Time Exempt Staff	7.00E-3	.601	.361	.019	7.341	0.018

Note 1. Graduation Rate = -0.049 + (7.00^{E-03}*X_1) +/- *SEE*

Note 2. X_1 = Full-Time Exempt Staff

RQ4. What combination of the MCD's selected program (Program #1, #2, and #3) resource allocation variables (a. longitudinal enrollment variables, b. longitudinal expense variables, and c. longitudinal staffing variables) best predicts retention and graduation rates over a 15-year period?

H1. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal enrollment variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #1 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 74. The regression model was not significant, and the hypothesis was not supported.

Table 74

Summary Descriptive Results for Program #1 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	45.60%	3.96%
Total Enrollment	15	246.33	20.201
Full-Time Enrollment	15	126.13	18.864
Part-Time Enrollment	15	119.80	17.309
Online Enrollment	15	0.00	0.000

Note. Enrollment numbers represent headcount.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #2 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 75 and 76. The regression model was significant (p = .006), and the hypothesis was supported. The predictor variable was Part-Time Enrollment (β= -1.00^{E-03}). The predictor model accounted for 44.9% of the variance in retention rate, $F(1, 13) = 10.608$, p = .006, *SEE* = 0.031. The regression equation was Retention Rate = 1.010 + (-1.00^{E-03}*Part Time Enrollment) +/- 0.031. For every ten part-time enrollments, an estimated reduction of 1.00% in the student retention rate would occur. The margin of error is +/- 3.10%. For example, having 100 part-time enrollments would result in a predicted value of a retention rate of 91.00% plus or minus 3.10%.

Table 75

Summary Descriptive Results for Program #2 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	83.70%	4.03%
Total Enrollment	15	349.87	39.399
Full-Time Enrollment	15	63.33	18.387
Part-Time Enrollment	15	284.67	44.577
Online Enrollment	15	0.00	0.000

Note. Enrollment numbers represent headcount.

Table 76

Summary Regression Analysis and Model to Predict Retention Rate from Enrollment Variables for Program #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	1.010					
Part-Time Enrollment	-1.00E-03	.670	.449	.031	10.608	0.006

Note 1. Retention Rate = 1.010 + ($-1.00^{E-03} * X_1$) +/- *SEE*

Note 2. X_1 = Part-Time Enrollment

The summary results from multiple stepwise regression analyses were used to develop a selected Program #3 enrollment model for predicting retention rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 77. The regression model was not significant, and the hypothesis was not supported.

Table 77

Summary Descriptive Results for Program #3 Enrollment Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	70.10%	5.97%
Total Enrollment	15	53.80	4.313
Full-Time Enrollment	15	37.73	11.708
Part-Time Enrollment	15	15.40	7.854
Online Enrollment	15	0.00	0.000

Note. Enrollment numbers represent headcount.

H2. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal enrollment variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #1 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 78 and 79. The regression model was significant (p = .004), and the hypothesis was supported. The predictor variable was Part-Time Enrollment (β= -1.00^{E-03}). The predictor model accounted for 48.0% of the variance in retention rate, $F(1, 13) = 11.983$, p = .004, *SEE* = 0.022. The regression equation was Graduation Rate = 0.245 + (-1.00^{E-03}*Part Time Enrollment) +/- 0.022. For every ten part-time enrollments, an estimated reduction of 1.00% in the student graduation rate would occur. The margin of error is +/- 2.20%. For example, having 100 part-time enrollments would result in a predicted value of a graduation rate of 14.50% plus or minus 2.20%.

Table 78

Summary Descriptive Results for Program #1 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	10.50%	2.91%
Total Enrollment	15	246.33	20.201
Full-Time Enrollment	15	126.13	18.864
Part-Time Enrollment	15	119.80	17.309
Online Enrollment	15	0.00	0.000

Note. Enrollment numbers represent headcount.

Table 79

Summary Regression Analysis and Model to Predict Graduation Rate from Enrollment Variables for Program #1

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.245					
Part-Time Enrollment	-1.00E-03	.693	.480	.022	11.983	0.004

Note 1. Graduation Rate = 0.245 + ($-1.00^{E-03} * X_1$) +/- *SEE*

Note 2. X_1 = Part-Time Enrollment

The summary results from multiple stepwise regression analyses were used to develop a selected Program #2 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. One of the four enrollment variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 80 and 81. The regression model was significant (p = .000), and the hypothesis was supported. The predictor variable was Part-Time Enrollment ($\beta = 2.00^{E-03}$). The predictor model accounted for 80.90% of the variance in graduation rate, $F(1, 13) = 55.205$, $p = .000$, $SEE = 0.043$. The regression equation was Graduation Rate = -0.223 + (2.00^{E-03}*Part Time Enrollment) +/- 0.043. For every ten part-time enrollments, an estimated increase of 2.00% in the student graduation rate would occur. The margin of error is +/- 4.30%. For example, having 200 part-time enrollments would result in the predicted value of a graduation rate of 17.70% plus or minus 4.30%.

Table 80

Summary Descriptive Results for Program #2 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	32.80%	9.59%
Total Enrollment	15	349.87	39.399
Full-Time Enrollment	15	63.33	18.387
Part-Time Enrollment	15	284.67	44.577
Online Enrollment	15	0.00	0.000

Note. Enrollment numbers represent headcount.

Table 81

Summary Regression Analysis and Model to Predict Graduation Rate from Enrollment Variables for Program #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	-0.223					
Part-Time Enrollment	2.00E-03	.900	.809	.043	55.205	0.000

Note 1. Graduation Rate = -0.223 + (2.00^{E-03}*X_1) +/- *SEE*

Note 2. X_1 = Part-Time Enrollment

The summary results from multiple stepwise regression analyses were used to develop a selected Program #3 enrollment model for predicting graduation rate percentages from four enrollment variables: total enrollment, full-time enrollment, part-time enrollment, and online enrollment for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 82. The regression model was not significant, and the hypothesis was not supported.

Table 82

Summary Descriptive Results for Program #3 Enrollment Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	38.70%	5.10%
Total Enrollment	15	53.80	4.313
Full-Time Enrollment	15	37.73	11.708
Part-Time Enrollment	15	15.40	7.854
Online Enrollment	15	0.00	0.000

Note. Enrollment numbers represent headcount.

H3. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal expense variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #1 expense model for predicting retention rate percentages from five expense variables: faculty allocation, staff allocation, operational expenses, equipment budget, and professional development for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 83. The regression model was not significant, and the hypothesis was not supported.

Table 83

Summary Descriptive Results for Program #1 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	45.50%	3.96%
Faculty Allocation	15	0.429	0.048
Staff Allocation	15	0.166	0.026
Operational Expenses	15	0.072	0.044
Equipment Budget	15	0.035	0.037
Professional Development	15	0.002	0.003

Note. Faculty Allocation, Staff Allocation, Operational Expenses, Equipment Budget, and Professional Development amounts are in millions of dollars.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #2 expense model for predicting retention rate percentages from five expense variables: faculty allocation, staff allocation, operational expenses, equipment budget, and professional development for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 84 and 85. The regression model was significant (p = .001), and the hypothesis was supported. The predictor variable was Faculty Allocation (β= -1.816^{E-07}). The predictor model accounted for 57.90% of the variance in retention rate, $F(1, 13)$ = 17.896, p = .001, *SEE* = 0.027. The regression equation was Retention Rate = 1.011 + (-1.816^{E-07}*Faculty Allocation) +/- 0.027. For every $100,000 in faculty allocation, an estimated decrease of 1.82% in the student retention rate would occur. The margin of error is +/- 2.70%. For example, spending $500,000 in faculty allocation would result in the predicted value of a retention rate of 92.02% plus or minus 2.70%.

Table 84

Summary Descriptive Results for Program #2 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	83.70%	4.03%
Faculty Allocation	15	0.957	0.170
Staff Allocation	15	0.152	0.058
Operational Expenses	15	0.164	0.065
Equipment Budget	15	0.034	0.053
Professional Development	15	0.005	0.006

Note. Faculty Allocation, Staff Allocation, Operational Expenses, Equipment Budget, and Professional Development amounts are in millions of dollars.

Table 85

Summary Regression Analysis and Model to Predict Retention Rate from Expense Variables for Program #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	1.011					
Faculty Allocation	-1.816E-7	.761	.579	.027	17.896	0.001

Note 1. Retention Rate = 1.011 + $(-1.816^{E-07} * X_1)$ +/- *SEE*

Note 2. X_1 = Faculty Allocation

The summary results from multiple stepwise regression analyses were used to develop a selected Program #3 expense model for predicting retention rate percentages from five expense variables: faculty allocation, staff allocation, operational expenses, equipment budget, and professional development for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 86. The regression model was not significant, and the hypothesis was not supported.

Table 86

Summary Descriptive Results for Program #3 Expense Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	70.10%	5.97%
Faculty Allocation	15	0.108	0.013
Staff Allocation	15	0.080	0.012
Operational Expenses	15	0.050	0.013
Equipment Budget	15	0.013	0.019
Professional Development	15	0.000	0.000

Note. Faculty Allocation, Staff Allocation, Operational Expenses, Equipment Budget, and Professional Development amounts are in millions of dollars.

H4. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal expense variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #1 expense model for predicting graduation rate percentages from five expense variables: faculty allocation, staff allocation, operational expenses, equipment budget, and professional development for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 87. The regression model was not significant, and the hypothesis was not supported.

Table 87

Summary Descriptive Results for Program #1 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	10.50%	2.91%
Faculty Allocation	15	0.429	0.048
Staff Allocation	15	0.166	.0261
Operational Expenses	15	0.072	0.044
Equipment Budget	15	0.035	0.037
Professional Development	15	0.002	0.003

Note. Faculty Allocation, Staff Allocation, Operational Expenses, Equipment Budget, and Professional Development amounts are in millions of dollars.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #2 expense model for predicting graduation rate percentages from five expense variables: faculty allocation, staff allocation, operational expenses, equipment budget, and professional development for the past 15 years. One of the five expense variables was included in the final regression model. Basic descriptive statistics and regression coefficients are shown in Tables 88 and 89. The regression model was significant (p = .001), and the hypothesis was supported. The predictor variable was Operational Expenses (β= 1.115^{E-06}). The predictor model accounted for 56.60% of the variance in graduation rate, $F(1, 13) = 16.964$, $p = .001$, $SEE = 0.066$. The regression equation was Graduation Rate = 0.144 + (1.115^{E-06}*Operational Expenses) +/- 0.066. For every $10,000 in Operational Expenses, an estimated increase of 1.12% in the student graduation rate would occur. The margin of error is +/- 6.60%. For example, spending $100,000 in operational expenses would result in the predicted value of a graduation rate of 25.55% plus or minus 6.60%.

Table 88

Summary Descriptive Results for Program #2 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	32.80%	9.59%
Faculty Allocation	15	0.957	0.170
Staff Allocation	15	0.152	0.058
Operational Expenses	15	0.164	0.065
Equipment Budget	15	0.034	0.053
Professional Development	15	0.005	0.006

Note. Faculty Allocation, Staff Allocation, Operational Expenses, Equipment Budget, and Professional Development amounts are in millions of dollars.

Table 89

Summary Regression Analysis and Model to Predict Graduation Rate from Expense Variables for Program #2

Model	Beta	*R*	*R2*	*SEE*	*F* (1/13)	*p*-value
Constant	0.144					
Operational Expenses	1.115E-6	.752	.566	.066	16.964	0.001

Note 1. Graduation Rate = 0.144 + (1.115^{E-06}*X_1) +/- *SEE*

Note 2. X_1 = Operational Expenses

The summary results from multiple stepwise regression analyses were used to develop a selected Program #3 expense model for predicting graduation rate percentages from five expense variables: faculty allocation, staff allocation, operational expenses, equipment budget, and professional development for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 90. The regression model was not significant, and the hypothesis was not supported.

Table 90

Summary Descriptive Results for Program #3 Expense Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	38.70%	5.09%
Faculty Allocation	15	0.108	0.013
Staff Allocation	15	0.080	0.012
Operational Expenses	15	0.050	0.013
Equipment Budget	15	0.013	0.019
Professional Development	15	0.000	0.000

Note. Faculty Allocation, Staff Allocation, Operational Expenses, Equipment Budget, and Professional Development amounts are in millions of dollars.

H5. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal staffing variables predicts the retention rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #1 staffing model for predicting retention rate percentages from three staffing variables: administrators, full-time faculty, and full-time staff for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 91. The regression model was not significant, and the hypothesis was not supported.

Table 91

Summary Descriptive Results for Program #1 Staffing Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	45.60%	3.96%
Administrators	15	0.80	0.414
Full-Time Faculty	15	5.33	0.617
Full-Time Staff	15	2.93	0.258

The summary results from multiple stepwise regression analyses were used to develop a selected Program #2 staffing model for predicting retention rate percentages from three staffing variables: administrators, full-time faculty, and full-time staff for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 92. The regression model was not significant, and the hypothesis was not supported.

Table 92

Summary Descriptive Results for Program #2 Staffing Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	83.70%	4.03%
Administrators	15	0.33	0.617
Full-Time Faculty	15	14.73	1.163
Full-Time Staff	15	2.60	0.507

The summary results from multiple stepwise regression analyses were used to develop a selected Program #3 staffing model for predicting retention rate percentages from three staffing variables: administrators, full-time faculty, and full-time staff for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 93. The regression model was not significant, and the hypothesis was not supported.

Table 93

Summary Descriptive Results for Program #3 Staffing Variables and Retention Rate

Source	*N*	Mean	*SD*
Retention Rate	15	70.10%	5.97%
Administrators	15	0.00	0.000
Full-Time Faculty	15	1.00	0.000
Full-Time Staff	15	2.00	0.000

H6. A combination of the MCD's selected program (Program #1, #2, and #3) longitudinal staffing variables predicts the graduation rates.

The summary results from multiple stepwise regression analyses were used to develop a selected Program #1 staffing model for predicting graduation rate percentages from three staffing variables: administrators, full-time faculty, and full-time staff for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 94. The regression model was not significant, and the hypothesis was not supported.

Table 94

Summary Descriptive Results for Program #1 Staffing Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	10.50%	2.91%
Administrators	15	0.80	0.414
Full-Time Faculty	15	5.33	0.617
Full-Time Staff	15	2.93	0.258

The summary results from multiple stepwise regression analyses were used to develop a selected Program #2 staffing model for predicting graduation rate percentages from three staffing variables: administrators, full-time faculty, and full-time staff for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 95. The regression model was not significant, and the hypothesis was not supported.

Table 95

Summary Descriptive Results for Program #2 Staffing Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	32.80%	9.59%
Administrators	15	0.33	0.617
Full-Time Faculty	15	14.73	1.163
Full-Time Staff	15	2.60	0.507

The summary results from multiple stepwise regression analyses were used to develop a selected Program #3 staffing model for predicting graduation rate percentages from three staffing variables: administrators, full-time faculty, and full-time staff for the past 15 years. Zero variables were included in the final stepwise regression model. Basic descriptive statistics are shown in Table 96. The regression model was not significant, and the hypothesis was not supported.

Table 96

Summary Descriptive Results for Program #3 Staffing Variables and Graduation Rate

Source	*N*	Mean	*SD*
Graduation Rate	15	38.70%	5.09%
Administrators	15	0.00	0.000
Full-Time Faculty	15	1.00	0.000
Full-Time Staff	15	2.00	0.000

Summary

Chapter four explored the research questions and outcomes of hypothesis testing related to resource allocation variables, student retention rate, and student graduation rate. Multiple stepwise regression analyses were completed to analyze each hypothesis. The results that indicate positive impact are outlined as follows:

- For every increase of $10 million in county property taxes, an estimated increase of 4.18% in the student retention rate would occur in the MCD.
- For every increase of $10 million in institutional support expenses, an estimated increase of 2.63% in the student retention rate would occur in the MCD.
- For every increase of $1 million in student services, an estimated increase of 2.82% in the student retention rate would occur at Campus #1 (suburban campus, home of the Automotive Technology program).
- For every additional administrator, an estimated increase of 0.80% in the student retention rate would occur at Campus #2 (urban campus focused on Health Sciences).

- For every increase of $1 million in instruction, an estimated increase of 0.75% in the student retention rate would occur at Campus #2 (urban campus focused on Health Sciences).
- For every increase of 1,000 online enrollments, an estimated increase of 0.49% in the student retention rate would occur at Campus #2 (urban campus, focused on Health Sciences).
- For every increase of $1 million in instruction, an estimated increase of 2.18% in the student retention rate would occur at Campus #4 (headquarters to many technical and computer science certificate programs).
- For every additional part-time faculty member, an estimated increase of 0.20% in the student retention rate would occur at Campus #4 (headquarters to many technical and computer science certificates).
- For every increase of 1,000 total enrollments, an estimated increase of 3.30% in the student retention rate would occur at Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training).
- For every increase of $1 million in instruction, an estimated increase of 2.38% in the student retention rate would occur at Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training).
- For every increase of $10 million in county property taxes, an estimated increase of 3.56% in the student graduation rate would occur in the MCD.
- For every increase of $0.10 million in student aid, an estimated increase of 1.50% in the student graduation rate would occur in the MCD.

- For every additional part-time faculty position, an estimated increase of 0.03% in the student graduation rate would occur in the MCD .
- For every increase of $1 million in student services, an estimated increase of 3.16% in the student graduation rate would occur at Campus #1 (suburban campus, home of the Automotive Technology program).
- For every increase of $1 million in student services, an estimated increase of 3.68% in the student graduation rate would occur at Campus #2 (urban campus, focused on Health Sciences).
- For every increase of $1 million in student services, an estimated increase of 2.60% in the student graduation rate would occur at Campus #3 (houses the Midwest's finest Veterinary Technology program).
- For every increase of $1 million in instruction, an estimated increase of 2.62% in the student graduation rate would occur at Campus #4 (headquarters to many technical and computer science certificates).
- For every additional part-time faculty position, an estimated increase of 0.20% in the student graduation rate would occur at Campus #4 (headquarters to many technical and computer science certificates).
- For every increase of 100 part-time enrollments, an estimated increase of 2.60% in the student graduation rate would occur at Campus #4 (headquarters to many technical and computer science certificates).
- For every increase of 1,000 full-time enrollments, an estimated increase of 4.29% in the student graduation rate would occur at Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training program).

- For every additional full-time exempt staff position, an estimated increase of 0.70% in the student graduation rate would occur at Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training program).
- For every ten part-time enrollments, an estimated increase of 2.00% in the student graduation rate would occur for Program #2 (Registered Nursing).
- For every $10,000 in Operational Expenses, an estimated increase of 1.12% in the student graduation rate would occur for Program #2 (Registered Nursing).

Chapter Five presents interpretation of the results, major findings, conclusions, and recommendations for future research.

Chapter Five

Interpretation and Recommendations

Chapter One of this study focused on the background, purpose of the study, the statement of the problem, significance, delimitations, assumptions, and the research questions. Chapter Two provided the literature review summarizing the resource allocation models in higher education as they relate to student retention and graduation rates. Chapter Three summarized the methodology of this study by describing the research design, population, data analysis, and hypothesis testing. Chapter Four presented the descriptive statistics for dependent and independent variables and provided the results of the hypothesis testing. Chapter Five will provide the review of the methodology, identification of major findings, conclusions, implications for actions, and recommendations for the future research.

Study Summary

Overview of the problem. Graduation and retention rates are below federal, state, and local expectations in the MCD (M. James, personal communication, November 12, 2015). Specifically, graduation rates at two-year degree-granting institutions in the U.S. from 2006 to 2013 averaged 20% (National Center for Education Statistics), while MCD graduation rates averaged 7.19% (MCC, 2015, "Completion"). Also, retention rates at two-year degree-granting institutions in the U.S. from 2006 to 2013 were 43% (National Center for Education Statistics), while MCD retention rates averaged 40.67% (MCC, 2015, "Completion"). At the same time, increasing retention and graduation rates is a priority for the MCD ("Completion," 2016). Although Barr (2002) suggested that the institutional resource allocations reflect the plans, priorities, goals, and aspirations that drive the institution, the MCD has not undertaken a historical review to find a credible link among resource allocation variables, retention, and graduation rates. Therefore, this study was an effort to fill the gaps in that knowledge. Furthermore, the study sought out data about student retention and graduation rates in relation to the MCD's resource allocation practices to inform potential future adjustments to those practices. Higher retention and graduation rates provided assistance in supporting the new priorities in higher education policy, which shifted from access to completion in recent years (Kelly & Schneider, 2012).

Purpose statement and research questions. The researcher designed a descriptive three-level, 15-year study to explore three purposes. The institutional levels were the MCD (N=1), campuses (N=5), and programs (N=3). The first purpose of this study was to find what combination of the MCD's resource allocation variables best predicts retention and graduation rates for the community college district. The second purpose of this study was to find what combination of enrollment, expense, and staffing variables best predicts retention and graduation rates for the individual campuses. The third and final purpose of this study was to find what combination of enrollment, expense, and staffing variables best predicts retention and graduation rates for the selected programs. This study was guided by four main questions and nine sub-questions.

Review of the methodology. Non-experimental archival data mining methods were applied to determine if regression models based on resource allocation variables as predictors of desired student outcomes were viable. Archival data mining methods allow identification of valid and useful patterns to analyze a large amount of data (ASCE, 2002). The researcher also examined expense, revenue, staffing, and enrollment variables. All data used were collected by MCD personnel. All data used in this study are also available for public consumption with the Missouri Department of Higher Education at the Integrated Postsecondary Education Data Systems (IPEDS). Revenue and expenditure data were retrieved from the budget books kept and maintained by the accounting office at the MCD. The Institutional Research Office personnel at the MCD compiled retention and graduation rates. All other information related to personnel was gathered by the Human Resources office at the MCD and found in the budget books and the staffing tables. The researcher then compiled the data onto one spreadsheet, stored on a universal serial bus (USB) flash drive and safely kept at his residence for the purposes of this study. Multiple stepwise regression analyses were conducted to analyze each question.

Major findings. Multiple stepwise regression analyses were conducted to find correlations between independent and dependent variables. The detailed results of the multiple stepwise regression analyses of the research questions and the hypotheses can be found in Chapter Four. A list below outlines the major findings, and Table 97 provides a visual representation of all positive correlations.

- County property tax and institutional support are predictive of retention rate, and county property tax, part-time faculty, and student aid are predictive of graduation rate for the MCD .

- Student services expenses are predictive of both retention and graduation rate for Campus #1 (suburban campus, home of the Automotive Technology program).
- Number of administrators, instruction, and online enrollments are predictive of retention rate, and student services expenses are predictive of graduation rate for Campus #2 (urban campus focused on Health Sciences).
- Student services expenses are predictive of graduation rate for Campus #3 (houses the Midwest’s finest Veterinary Technology program).
- Instruction and part-time faculty are predictive of retention rate, and instruction, part-time faculty, and part-time enrollments are predictive of graduation rate for Campus #4 (headquarters to many technical and computer science certificates).
- Total enrollments and instruction are predictive of retention rate, and full-time enrollments and exempt staff positions are predictive of graduation rate for Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training program).
- Part-time enrollments and operational expenses are predictive of graduation rate for Program #2 (Registered Nursing).

Table 97

Summary of Independent and Dependent Variables with Positive Correlations per Location

Location	Retention Rate	Graduation Rate
MCD	County Property Tax	County Property Tax
	Institutional Support	Student Aid
		Part-time Faculty
Campus #1	Student Services	Student Services
Campus #2	Administrators	Student Services
	Instruction	
	Online Enrollments	
Campus #3		Student Services
Campus #4	Instruction	Instruction
	Part-time Faculty	Part-time Faculty
		Part-time Enrollments
Campus #5	Total Enrollments	Full-time Enrollments
	Instruction	Exempt Staff Positions
Program #2		Part-time Enrollments
		Operational Expenses

Findings Related to the Literature

Attis, Rosch, Jin, and Ho (2014) found that resource allocations are the single indicator of what a college or university is committed to doing, and that beyond simply allocating revenue and costs, budgets can reinforce and even define an institution's priorities and commitments. Increasing retention and graduation rates has been a strategic priority for the MCD ("Completion," 2016). While the retention and graduation rates have not significantly improved, the college has seen a steady decline in the revenue streams, especially in state funding, which has been on the decline since the early 2000s; in addition, the recent recession impacted the local tax revenue (Mortenson, 2012). This study analyzed data about student retention and graduation rates in relation to the MCD's resource allocation practices to inform potential future adjustments that could result in increased retention and graduation rates. This study supports the findings of Attis, Rosch, Jin, and Ho (2014) and highlights the existing relationship between resource allocation variables and the institutional priorities, such as higher retention and graduation rates. Findings from this study could also improve the completion agenda as described by Kelly and Schneider (2012). Higher retention and graduation rates will provide assistance in supporting the new priorities in higher education policy, which shifted from access to completion in recent years (Kelly & Schneider, 2012).

Schloss and Cragg (2013) noted that no aspect of the management of postsecondary institutions is as important as planning and budgeting. According to Barr (2002), the institutional budget reflects the plans, priorities, goals, and aspirations that drive the institution. The MCD's new strategic plan (2016-2017), under student success, also calls for increasing persistence, retention, and completion for all students. The results from this study outline positive correlations between resource allocation variables, retention and graduation rates, thus, supporting the research by Schloss and Cragg (2013) and Barr (2002).

Ehrenberg (2006) pointed to various results stemming from budgetary challenges at colleges, ranging from public to private and four-year to two-year institutions.

Specifically, salaries have been lowered, faculty positions have gone unfilled, and colleges have more often utilized adjunct professors in classes that had been previously taught by tenured and tenure-track faculty. This latter practice, which has taken hold at institutions across the country, has led to heated debates among faculty regarding its effects on student outcomes. Bettinger and Long (2006) conceded that adjuncts are inexpensive, relative to full-time faculty, and are not convinced that the use of such teaching staff has had an adverse effect on the long-term success of students. They pointed to the Modern Language Association and the National Institute of Education, which claimed adjunct use has been the cause of the lack of quality in higher education; other studies, however, have found adjunct use to have had both positive and negative effects. This study confirms both negative and positive effects of part-time faculty. Part-time faculty shows a positive correlation with retention for Campus #4 (headquarters to many technical and computer science certificates) and a positive correlation with graduation rates for the MCD and Campus #4. However, instruction expense that encompasses full-time faculty, shows positive correlation with retention rate for Campus #2 (urban campus, focused on Health Sciences) and Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training program) and a positive correlation with graduation rate for Campus #4 (headquarters to many technical and computer science certificates). This study confirms findings from Ehrengerg, Bettinger and Long (2006).

According to Hughes and Venezia (2014), America's community colleges recognize the pressure to increase student completion rates despite the dwindling resources. At the MCD, reallocation of resources occurred over time to survive the impact of the reduction in revenue, but retention and graduation rates remained unchanged (MCC, 2015, "Budget Overview"). Higher level of student support results in higher retention and graduation rates. Zientek, Ozel, Fond, and Griffin (2013) identified instructional strategies to help students be successful in the classroom and to translate into higher retention and graduation rates. This study confirms that higher level of support in both instructional and student services areas will improve retention and graduation rates and supports Hughes and Venezia, and Zientek, Ozel, Fond, and Griffin (2013). This study showed that retention rates will improve with a higher level of investments in student services and instruction for Campus #1 (suburban campus, home of the Automotive Technology program), Campus #2 (urban campus, focused on Health Sciences), Campus #4 (headquarters to many technical and computer science certificates), and Campus #5 (smallest campus, offers the Public Safety Institute and Firefighter Training). This study also confirmed that greater support in student services and instruction will improve graduation rates for Campus #1 (suburban campus, home of the Automotive Technology program), Campus #2 (urban campus, focused on Health Sciences), Campus #3 (houses the Midwest's finest Veterinary Technology program), and Campus #4 (headquarters to many technical and computer science certificates).

Furthermore, Bailey (2012) noted some characteristics of colleges with high completion rates include "innovation in teaching and methods for improving student success [and] collaboration across departments." Alignment with the strategic plan could perhaps improve both teaching and collaboration across departments at the MCD.

Conclusions

After analyzing the MCD, five different campuses, and three different programs, this study found that the resource allocation model(s) does(do) impact retention and graduation rates in the MCD. Further conclusions are listed below:

- Investments in student services will yield higher retention and graduation rates.
- Investments in expenses related to instruction will produce higher retention and graduation rates.
- An increase in student aid funds will show a growth in graduation rates.
- Investments in institutional support will yield a higher retention rate.
- Growth in online enrollments, instruction-related expenses, and administrators will positively influence retention rates for Campus #2 (urban campus, focused on Health Sciences).
- Additional part-time enrollments and operational expenses will boost graduation rates for Program #2 (Registered Nursing).

Implications for action. The results from this study suggest that administrators and upper-level leadership at the MCD should monitor the periods when county property taxes revenue trends downward. As a result, the leadership may want to adjust the levy to positively influence retention and graduation rates during those periods. Overall expenses in institutional support, instruction, student aid, student services, and enrollment patterns should also be monitored to boost both retention and graduation rates. Administration at the MCD should also prioritize the alignment of resource allocations with the institutional strategic plan.

Recommendations for future research. The following recommendations are offered for consideration:

This study focused on one higher education institution in the Midwest and offered many conclusions to increase retention and graduation rates. Additional research on other institutions to include an assortment of geographical locations and sizes would add to the validity. Additional studies should also focus on institutions that have higher retention and graduation rates as compared to those rates at the MCD.

Examining specific parts of the student services expense would be a topic for another study. This study found that student services expense is positively correlated with both retention and graduation rates. Further exploration of student services expense could isolate certain expenses, departments, and/or positions within student services that have a greater impact on retention and graduation rates.

This study also found that greater investments in instructional expenses will produce higher retention and graduation rates. However, the focus of this study was general instruction, not any particular areas under instruction. Examining more closely the general instruction expense may point to some specific areas that have a greater impact on retention and graduation rates. The study also found that county property tax revenue is positively correlated with retention and graduation rates while state revenue has an opposite effect. A potential topic related to retention and graduation rates could be to explore the reasons behind this relationship.

Concluding remarks. Increasing student retention and graduation rates is not only a priority at the MCD but for all higher education institutions across America. This study focused on student retention rates, graduation rates, and resource allocation variables only at the MCD and resulted in some major findings. The study substantiated existing relationships among resource allocation variables, retention rates, and graduation rates. Results showed that investments in student services and instruction expenses will improve both retention and graduation rates. Administrators and upper-level management have a responsibility to ensure that recommendations are put into action to increase student retention and graduation rates in the MCD. Aligning the resource allocations with the institutional strategic plan should also become a priority to reach the highest educational excellence while serving students.

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Appendices

Appendix A: Baker University IRB Form

BAKER UNIVERSITY

SCHOOL OF EDUCATION
GRADUATE DEPARTMENT

Date:
IRB PROTOCOL NUMBER ______________
(IRB USE ONLY)

IRB REQUEST
Proposal for Research
Submitted to the Baker University Institutional Review Board

I. Research Investigator(s) (Students must list faculty sponsor first)

Department(s) **School of Education Graduate Department**

Name	Signature	
1. Dr. Sally Winship	[signature],	Major Advisor
2. Dr. Phillip Messner	[signature],	Research Analyst
3.		University Committee Member
4.		External Committee Member

Principal Investigator: Gurbhushan Singh ___________________
Phone: 816-517-0454
Email: gurbhushan.singh@mcckc.edu
Mailing address: 3017 SW Lewis Place, Lee's Summit, MO 64081

Faculty sponsor: Dr. Sally Winship
Phone:
Email:

Expected Category of Review: _X__Exempt ___ Expedited ___Full

II: Protocol: (Type the title of your study)

A 15-Year Stratified Historical Review of Midwestern Community College District, Campus, and Program Resource Allocations to Student Retention and Graduation Rates

Summary

In a sentence or two, please describe the background and purpose of the research.

The researcher decided to conduct a descriptive three-level, 15-year study at the Midwest College District (MCD). The MCD is one of the largest community college systems in Missouri and has been a leader in innovation, but is struggling to increase retention and graduation rates and has a bank of archival data needed for this study.

The MCD serves approximately 18,000 students each year at its five unique campuses in a Midwestern metropolitan area. The MCD-Campus #1 is located in the mid-town area and is known for its career technical education programs concentrated around health science. The largest campus of the five, the MCD-Campus # 2, is located in a suburb and is known for its Automotive Technology program. The MCD-Campus #3 serves as headquarters to many technical training and computer science certificates. The MCD-Campus # 4 is known for the Midwest's finest veterinary technology program. The MCD-Campus #5 offers the Public Safety Institute and Firefighter Training in addition to strong general education programs.

The researcher designed a descriptive three-level, 15-year study to explore three purposes. The first purpose of this study was to find what combination of the MCD's resource allocation variables best predicts graduation and retention rates for the community college district. The second purpose of this study was to find what combination of variables best predicts graduation and retention rates for the individual campuses. The third and final purpose of this study was to find what combination of variables best predicts graduation and retention Rates for the selected programs. All data used in this study is also available for public consumption with the Missouri Department of Higher Education at the Integrated Postsecondary Education Data Systems (IPEDS).

Briefly describe each condition or manipulation to be included within the study.

There are no conditions or manipulations in this study.

What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy.

No assessment instruments were used in this study. Archival data from the MCD were used for years 2001 to year 2015. The researcher will acquire permission to retrieve the data from the archival records at the Midwestern Community College.

Will the subjects encounter the risk of psychological, social, physical, or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

Participants will not be subject to any psychological, social, physical, or legal risk.

Will any stress to subjects be involved? If so, please describe.

There will be no stress to the subjects.

Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.
The subjects will not be deceived or misled in any way.

Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.
No request for personal or sensitive information will be made.

Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe.
The subjects will not be presented with materials offensive, threatening, or degrading in nature.

Approximately how much time will be demanded of each subject?
No time commitment is demanded of subjects.

Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.
There are no subjects in this study. All the data to be used are archival and were collected by the MCD. All data to be used in this study is also available for public consumption with the Missouri Department of Higher Education at the Integrated Postsecondary Education Data Systems (IPEDS). Revenue and expenditure data will be retrieved from the budget books kept and maintained by the accounting office at the MCD. Retention and graduation rates are compiled by the Institutional Research Office personnel at the MCD. All other information related to personnel is gathered by the Human Resources office at the MCD and found in the buget books and the staffing tables. The data will then compiled by the researcher onto one spreadsheet for the purposes of this study.

What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?
No inducement will be offered to the subjects. All data used come from a database system.

How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.
An IRB process will be followed to insure organization's participation. Individual subjects will not be contacted.

Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.
There are no subjects in this study. Therefore, there will be no permanent record that can be identified with the subjects.

Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher or employer? If so, explain.
Subjects' participation statistics will not be made part of any permanent record available to a supervisor, teacher or employer.

What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with it after the study is completed?
The researcher stored the data on a USB storage drive and kept it at his residence for safety. All data used in this study is also available for public consumption with the Missouri Department of Higher Education at the Integrated Postsecondary Education Data Systems (IPEDS).

If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?
There are no risks involved in this study.

Will any data from files or archival data be used? If so, please describe.
All the data to be used were collected by the MCD . All data to be used in this study is also available for public consumption with the Missouri Department of Higher Education at the Integrated Postsecondary Education Data Systems (IPEDS). Revenue and expenditure data will be retrieved from the budget books kept and maintained by the accounting office at the MCD. Retention and graduation rates are compiled by the Institutional Research Office personnel at the MCD. All other information related to personnel is gathered by the Human Resources office at the MCD and found in the buget books and the staffing tables. The data will then compiled by the researcher onto one spreadsheet for the purposes of this study.

Appendix B: Baker University IRB Approval Form

Baker University Institutional Review Board

06/04/2016

Dear Gurbhushan Singh and Dr. Winship,

The Baker University IRB has reviewed your research project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at CTodden@BakerU.edu or 785.594.8440.

Sincerely,

Chris Todden EdD
Chair, Baker University IRB

Baker University IRB Committee
Verneda Edwards EdD
Sara Crump PhD
Erin Morris PhD
Scott Crenshaw

Appendix C: Midwest Community College IRB Form

August 5, 2016

Gurbhushan Singh
3017 SW Lewis Place
Lee's Summit, MO 64081

Director of Research & Institutional Assessment
Metropolitan Community College
3200 Broadway
Kansas City, MO 64111

Dear Director of Research & Institutional Assessment

I am completing a doctoral dissertation study at Baker University, Baldwin City, KS 66006. The title of my study is: A 15-Year Stratified Historical Review of Metropolitan Community College District, Campus, and Program Resource Allocations to Student Retention and Graduation Rates. I would like your permission to use archival data from July 1, 2001 to June 30, 2015.

There are no subjects in this study. Therefore, there will be no permanent record that can be identified with the subjects. Due to the use of archival data, participants will not be subject to any psychological, social, physical, or legal risk. Once the data is collected and received, the researcher will store the data on a USB storage drive and keep it at his residence for safety and share with Baker University personnel for analysis.

If these arrangements meet with your approval, please sign this letter where indicated below and return to me via email. Thank you very much.

Yours truly,

Gurbhushan Singh

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Melissa Griesel

Director of Research & Institutional Assessment

Date: 6/16/16