The Influence of Resource Allocation on Graduation Rates: An Analysis of Community
College Expenditures

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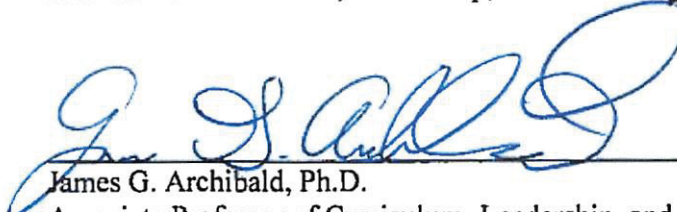
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ABSTRACT

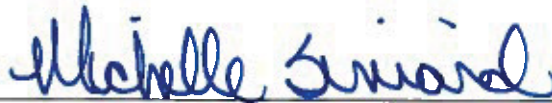Student success and graduation rates are a continuing challenge for higher education institutions. A growing number of states connect funding to learning outcomes such as student progression, retention, and graduation rates (Bureau of Labor Statistics, 2012; Complete College America, 2011; Diamond, 2012). Student attrition and graduation rates measure the efficiency with which students complete college and are a good measure of how well students are persisting towards a degree (College Board, Baum & Ma, 2007).

The distribution of resources, whether for instruction, student services, academic support, or otherwise, may provide useful information to align budgets and resource allocation for expenditures to achieve institutional goals, including improved graduation rates. Decreases in the levels of state and federal funding have made a pay for performance model a concern for all postsecondary institutions (Archibald & Feldman, 2007; Burke & Minassians, 2001; Cragg, 2009; Klien, 2006; Manning, 2008; Reville, 2006; Shin, 2010).

This study, based on Integrated Postsecondary Education Data System finance and graduation rate data, examined the influence of institutional expenditures on three-year graduation rates at 300 public community colleges, primarily certificate and diploma granting institutions, in the southeastern region of the United States. This quantitative research design utilized multiple regression as the statistical technique to explore the relationship. The research questions examined the relationship between institutional expenditures and graduation rate. A significant relationship was found between instruction and graduation rate and academic support and graduation rate.

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ACKNOWLEDGEMENTS

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Chapter I

INTRODUCTION

Student success and graduation rates are a continuing challenge for higher education institutions. A growing number of states connect funding to learning outcomes such as student progression, retention, and graduation rates. Based on projections, about 60 percent of all jobs will require education beyond high school by the year 2020 (Bureau of Labor Statistics, 2012; Complete College America, 2011; Diamond, 2012). Current public higher education leaders face growing competition from for-profits and other public institutions. Leaders must continually reassess educational offerings due to shifting student demographics and expectations. Budgetary constraints, increased demands for greater cost control, new service models, and expanding societal expectations contribute to the demands placed on public higher education leaders (Hamill, 2010; Hignite, 2012).

The Higher Education Act of 1965 (HEA) includes the disclosure and reporting requirements of postsecondary education institutions that provide financial assistance to students under Title IV of the HEA. Under the Student Right-To-Know and Campus Security Act of 1990 (SRTK), institutions eligible for Title IV funding are required to calculate graduation rates of certificate or degree-seeking, full-time students entering institutions and to disclose these rates to all students, including prospective students. The Higher Education Opportunity Act of 2008 (HEOA) amended the HEA to require

postsecondary institutions be more transparent regarding educational cost data and graduation rate requiring disclosure.

Statement of the Problem

Obtaining a college degree has become the minimum requirement for most people to secure entrance into a working class lifestyle (Barrow, Didou-Aupetit, & Mallea, 2003; Braxton, 2010; College Board, Baum, & Ma, 2007; Moretti, 2004; Tinto, 1993). As a result, it is important for individuals to obtain a degree. This has led to the rapid growth of the higher education industry and the large numbers of individuals who fill the classrooms. In the past thirty years, enrollment in colleges and universities has increased from around 50% to nearly 70%; however, the rate at which students who enroll in these institutions are failing to attain a degree is also growing (NCES, 2010). This crisis is often referred to as student attrition (Bean, 1980; Ishitani, 2006; Pedrini & Pedrini, 1978; Schurr, Witting, Ruble & Henriksen, 1993).

Student attrition and graduation rates help to measure the efficiency with which students' complete college and are a good measure of how well students are persisting towards a degree (College Board et al., 2007). People that are college educated have a positive effect on the overall wage earnings, disposable income, and quality of life not only for those who have college degrees, but also those without degrees in the impacted area (Moretti, 2004). At the individual level, college graduates earn more over their working lifetime, marry better educated spouses, and have children that are more likely to do better in school and less likely to engage in delinquent behavior than non-graduates (Des Jardins, McCall, Ahlburg & Moye, 2002).

According to Thomas and Perna (2002), state college is considered an investment in one's own human capital, resulting in increased productivity of the individual. With the increasing number of individuals failing to persist in college, the returns of their human capital investment and their contributions to work and industry are lower (Braxton, 2010; College Board et al., 2007; Moretti, 2004; Tinto, 1993). High attrition casts higher education institutions in a negative light since it leads to questions about the effectiveness of educating students – a central mission of all public higher education institutions (Weisbrod, Ballou, & Asch, 2008).

Schneider and Yin (2012) reported that an increasing number of individuals turn to community colleges for their higher education needs; however, the majority of these students fail to complete their degrees. With community colleges serving approximately thirty percent of all students in higher education due to the relatively low tuition and open enrollment policies, community colleges play a vital role in the postsecondary education system in the United States.

Nationally, only about a quarter of full-time community college students complete their studies within three years (the official measure of a school's graduation rate) (Carey, 2004; Complete College America, 2011). When students do not persist to graduation, not only are they harmed, but taxpayers also lose. Community colleges are subsidized with direct state and local government appropriations and through student grant programs. Each student who fails to complete a degree represents a loss in the taxpayer's investment of the student's uncompleted education (Schneider & Yin, 2012).

Students who complete their degrees earn more money than high school graduates or dropouts (Complete College America, 2011). Taxpayers win when students graduate

because they contribute to society through higher wages, which results in the generation of higher income taxes (Complete College America, 2011; Schneider & Yin, 2012). With the increased pressure on higher education institutions to perform, student retention and persistence is an important concern. In order to pinpoint possible challenges in student retention and persistence, institutions should examine funding provided to several different campus resources, services, structures, processes and practices (Hundrieser, 2008).

Purpose of the Study

The purpose of this study was to examine the relationship between community college education and general (E&G) expenditures, as reported annually to the Integrated Postsecondary Education Data System (IPEDS), and the three-year graduation rates for full-time associate or certificate degree-seeking students in the southeastern region of the United States in order to influence institutional initiatives for the achievement of improved student outcomes. Research exploring these relationships could provide useful information to align budget and resource allocation for expenditures to achieve institutional goals, including improved graduation rates.

The growing call for institutional accountability is not new (Tucker, 1996); however, linking student outcomes, such as graduation rates, to postsecondary funding is a more recent proposal (Klein, 2006; Reville, 2006). Decreases in the levels of state and federal funding have made a pay for performance model a concern for all postsecondary institutions (Archibald & Feldman, 2007; Burke & Minassians, 2001; Cragg, 2009; Klien, 2006; Manning, 2008; Reville, 2006; Shin, 2010). Unfortunately, there is little information about postsecondary fiscal resources and their impact on student outcomes.

As with other organizations, colleges and universities rely on more than one source for funding. The level that any one particular source has an influence on the institution's ability to successfully educate and graduate students has just begun to be explored (Titus, 2006a, 2006b; Winston, 1999; Zhang, 2009).

While there have been several studies analyzing the effect of institutional characteristics on graduation rates, the majority of those studies focus on baccalaureate institutions. Tinto (1975) and Bean (1980) provided models that have been widely used by other researchers. Their models focused on fostering academic and social engagement of students in and with colleges.

Many studies examined the influence of institutional characteristics on college graduation rates at baccalaureate institutions (Astin & Oseguera, 2004; Mortenson, 2005; Porter, 2000; Ryan, 2004; Shin, 2010). Adelman (1999), Cook & Pullaro (2010), and Moltz (2011) researched graduation rates and degree completion at baccalaureate institutions. Others (Cantrell, 2006; Gansemer-Topf, 2004; Hamrick, Schuh, & Shelley, 2004; Harris, 2011; Paulsen & Smart, 2001; Promades, 2012; Titus, 2006a & 2006b) studied resource allocation and degree completion. One study conducted by Bailey, Calcagno, Jenkins, Leinbach, and Kienzl (2006) analyzed the graduation rates at community colleges against institutional characteristics to understand how to improve student outcomes.

Based on current research, potential links exist between institutional expenditures, resource allocation, and graduation rates; however, additional research is needed to explore community college institutions and more specific expenditure components (Adelman, 1999; Astin & Oseguera, 2004; Bailey, Calcagno, Jenkins, Leinbach, &

Kienzl, 2006; Cantrell, 2006; Cook & Pullaro, 2010; Gansemer-Topf, 2004; Hamrick, Schuh, & Shelley, 2004; Harris, 2011; Moltz, 2011; Mortenson, 2005; Paulsen & Smart, 2001; Porter, 2000; Promades, 2012; Ryan, 2004; Titus, 2006a & 2006b). This study could provide a focused approach comparing Community College expenditures to graduation rates and may provide important information and data to expand the existing body of persistence and degree attainment research.

Research Questions

To influence institutional initiatives for the achievement of improved student outcomes, it is essential to examine the relationship between Community College E&G expenditures, as reported annually to IPEDS, and the three-year graduation rates for full-time associate or certificate degree-seeking students in the southeastern region of the United States. To examine this relationship, the following research questions were addressed:

1. Do the funding allocations for instruction, academic support, student services, and institutional support adequately predict the three-year graduation rate at community colleges, primarily certificate and diploma granting institutions, in the southeastern region of the United States?

    1a. What is the accuracy of the prediction model?

    1b. Which variable has the strongest predictive power?

2. Does cross-validation support the prediction model?

Significance of Study

As pressure for accountability from lawmakers and society increases, institutional leaders must be able to determine the best use of funds to improve student outcomes.

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The distribution of institutional funds may affect or influence student outcomes, such as retention and graduation rates. Research exploring these relationships may provide useful information to help align budget and resource allocation for expenditures to achieve institutional goals, including improved graduation rates.

Kurlaender, Howell, and Jackson (2014) state colleges must ensure programs and policies align with students' needs and wants in order for institutional goals to be achieved. A critical step in the process of identifying programs for expansion or removal is a cost-benefit analysis using costs or expenditures to compare alternatives. The real strength of the cost-benefit analysis is that campus leaders may be able to weigh the impact on degree completion rates of an additional dollar spent various different ways (Kurlaender, Howell, & Jackson, 2014). Imagine the power of knowing how an additional dollar invested in freshman orientation, a new advisement process, or a program expansion might be predicted to influence completion or graduation rates.

Community members and institutional leaders could utilize the findings from this study to lobby for additional state allocations to help provide citizens that are more educated. The findings may be used to analyze institutional data and create a set of performance indicators to help "gauge the impact of efforts to produce change" (Offenstein, Moore & Shulock, 2010, p. 1). Findings may provide needed data to facilitate additional financial support for new educational initiatives and may help provide data to be used to procure grant funding.

With the increased pressure from the community for higher education institutions to perform, leaders must seek change for their institutions in order to achieve these expectations (Complete College America, 2011). The need for change is apparent and

institutional leaders must determine strategies to influence spending and educational practices to ensure improved student outcomes. Higher retention and graduation rates will mutually benefit students, institutions, stakeholders, and society as a whole (Klein, 2006; Reville, 2006; Tucker, 1996).

<div align="center">Conceptual Framework</div>

Tinto's (1993) student retention theory and Berger and Milem's (2000) organizational behavior – student outcomes college impact model are the basis for this research. This study built on current research by investigating how organizational behavior such as resource allocation may influence graduation rates. While much of the research on retention has focused on the characteristics or traits of students (Astin, 1993; Bean, 1990; Tinto, 1975; & Tinto, 1993), significantly less research has examined how institutional behavior are related to retention and graduation rates (Berger & Milem, 2000). Berger and Milem found that understanding organizational behavior is important because it has the potential to impact retention and graduation rates of all students of an institution.

Tinto's (1975) theory of student departure paved the way for further research into ways to improve retention rates at higher education institutions. Tinto suggested students were more likely to remain enrolled if an institution made efforts to increase the student's sense of belonging to the institution and involvement with faculty and activities offered by the institution.

Tinto's (1993) study followed the path of a student from their home life to the higher education institution and then the subsequent events which lead to the student's departure from the institution. This path is known as the Model of Institutional Departure

(Tinto, 1975) and is depicted in Figure 1. Tinto's model presents events that occur in a

student's life prior to arriving at an institution. He then proposes events that occur once

the student arrives at the institution. At this point, Tinto (1975) explains that the student

continues to exhibit a determination to succeed. At this same point, the institution sets

goals for the student based upon the requirements of the institution. When the goals and

reality clashes, the determination of the student to succeed begins to falter. Tinto (1975)

suggests this is the point at which the student makes the decision to depart from the

institution.
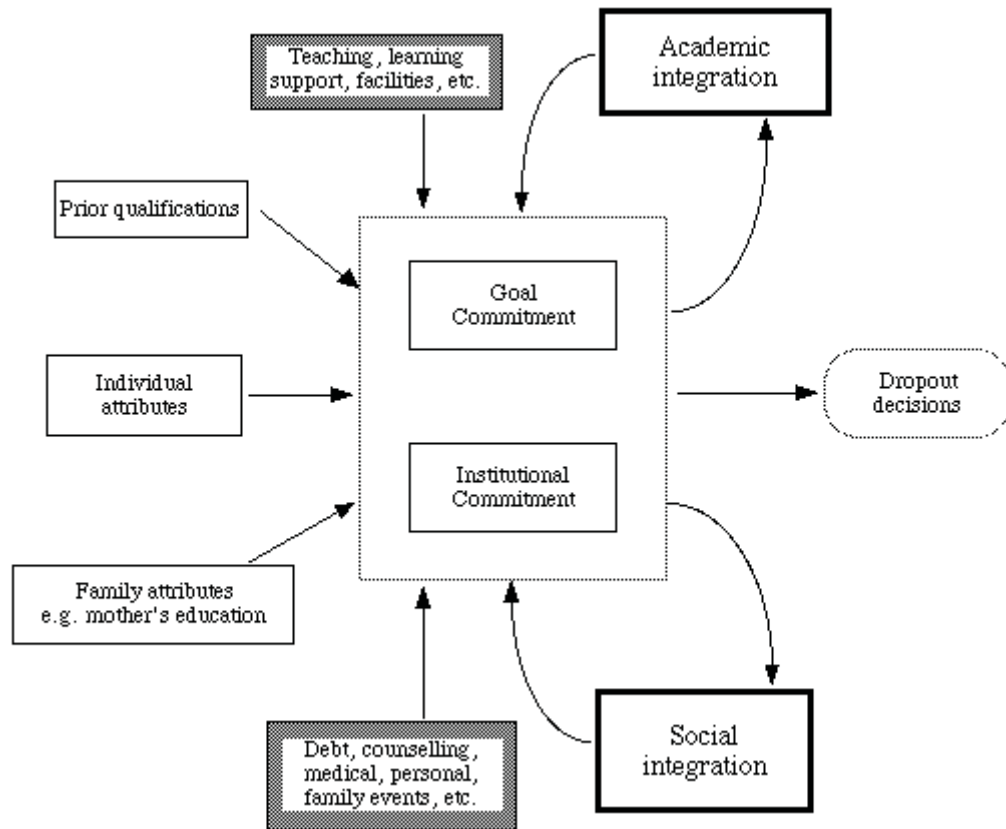
Figure 1. Tinto's Model of Institutional Departure. Adapted from "Dropout from Higher Education: A Theoretical Synthesis of Recent Research," by V. Tinto, 1975, *Review of Educational Research, 45*(1), p. 95. Copyright 1975 by the American Educational Research Association.

Berger and Milem's (2000) organizational behavior – student outcomes college impact model builds on Tinto's (1993) student retention model, but focuses on organizational behavior dimensions to provide an organizational perspective of college departmental impact on student outcomes, such as persistence and graduation rate. The assumption is that institutional effects are more a function of what institutions do rather than what they are. The organizational structures, practices, and policies are more likely to influence student outcomes through the kinds of student experiences and values they promote or discourage (Berger & Milem, 2000).

Berger and Milem's (2000) study showed that colleges can exhibit patterns of behavior, specifically by how resources are allocated, that can influence the retention and graduation rate of students. As institutions align policies and practices in support of student success and build on the strengths of these relationships, students are more likely to persist until graduation.

Recent literature has used institutional expenditures to examine the possible correlation of finances and institutional graduation rate. Layzell (1998, 2001) researched the development of performance indicators to assess and monitor higher education institutions effectiveness. He determined this monitoring is based on society's desire for greater accountability of higher education institutions. Alexander (2000) found higher education institutions have increasing pressure to improve student outcomes and institutional performance, with graduation rates being one of the three student outcome measures requiring disclosure under the Higher Education Opportunity Act of 2008. Kuh (2001) found differences between expenditures and retention rates and the relationship between expenditures and graduation rates. His study found that putting significant

resources towards the first years of college increased retention, but did not necessarily increase graduation rates (Kuh, 2001).

The Higher Education Opportunity Act of 2008 (HEOA) requires postsecondary institutions to be more transparent about educational costs. The act includes disclosure and reporting requirements to make higher education data accessible, understandable, and comparable across institutions (NPEC, 2009). Higher education institutions must improve the graduation rate of their students; whether from accountability required by federal agencies, expectations of society, or a means for fiscal sustainability.

Using data from the National Center for Education Statistics' (NCES) IPEDS, Ryan (2004) identified a positive and significant relationship between expenditures for instruction and academic support and graduation rates at baccalaureate colleges and universities. Cantrell (2006) used IPEDS data on public, four-year or above college and universities, but did not find a strong correlation between graduation rate and expenditures. Gansemer-Topf (2004) used IPEDS data for a multiple regression analysis of admissions selectivity and institutional expenditures, and the influence on first-year retention and six-year graduation rates at private, baccalaureate-level institutions. Gansemer-Topf (2004) found "the percentage of expenditures in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly contributed to 6-year graduation rates" (p. 166). Promades (2012) used IPEDS data to investigate the relationship between private university expenditures and six-year graduation rates and found a relationship exists between the two. Promades found instruction, student services and institutional support variables significantly

contributed to the six-year graduation rates. Academic support variables did not significantly contribute to the six-year graduation rates.

Massy (1996) determined resource allocation is critical to the decision making of higher education institutions and may influence other processes, including organizational behavior or traits, in pursuit of improving graduation rates. Improving graduation rates might emerge as a primary objective in strategic planning and institutional vision. Graduation rates are used for comparing institutional productivity (Massy, 1996) and as a measure of student satisfaction (Levitz et al., 1999).

Wellman (2010) stated higher education leaders are being asked about the relationship between institutional spending and student success. With funding declines, institutions struggle to find innovative ways to restructure costs without affecting productivity measures. Leaders need information to help "focus scarce resources in areas that make the biggest difference in access, attainment, and learning outcomes" (Wellman, 2010, p. 3).

Most measures of the costs in higher education focus on revenues rather than cost-effectiveness, or the measures of how resources are used (Wellman, 2010). Additional research is necessary to "look at spending in relation to different measures of performance" (Wellman, 2010, p. 6). The current study focuses on institutional expenditures (spending) in relation to degree completion (measure of performance). The results of this study may enable leaders in higher education to focus fewer resources into areas that would increase performance measures.

Methodology

This study used a quantitative, correlational research design to assess the predictive power of the independent E&G expenditure variables on the dependent graduation rate variable. An ex post facto design with archived data gathered from the annual IPEDS Finance Survey and Enrollment Survey was used. IPEDS consists of surveys conducted annually by the U.S. Department's National Center for Education Statistics (NCES) (n.d.). Information is gathered from every college, university, and technical and vocational institution participating in federal student financial aid programs. Institutions are required to report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid.

Expenditures by category and graduation rates were gathered from the IPEDS system for public Community Colleges in the southeastern United States. According to NCES (n.d.), the graduation rate data provide information on institutional productivity and help institutions comply with reporting requirements of the Student Right-to-Know Act. The finance data collected by IPEDS conforms to the accounting standards established by the Governmental Accounting Standards Board (GASB). The financial information provides an understanding of the costs required to provide postsecondary education.

Limitations

This study utilized the fact that data included in the sample was obtained from a single national database, the U.S. Department of Education's IPEDS survey tools and data collection system, to ensure uniformity and consistency in definition and data reporting. Limitations include the availability of variables in the dataset and assumptions

that the data has been truthfully reported, accurately collected, and is properly representative of the respective institutions.

Considering schools have no control over the funding provided by federal and state governments, this can be considered another limitation to the study. Institutional expenditure decisions rely heavily on the funding received to ensure a balanced budget and to pay the bills associated with running an educational institution. When funding limits expenditures, institutions must make hard decisions about needed cuts.

Student decisions are another limitation to the study. Many external factors unrelated to institutional expenditure decisions are influenced by student decisions, including student development, student demographics, student engagement, personal life issues, financial issues and institutional differences. Also, the study was limited to the population of full-time associate or certificate degree-seeking students at public institutions in the southeastern region of the United States.

Definition of Key Terms

The following terms are used throughout this study:

Educational and General (E&G) expenditures. Educational and general expenditures include all core operating expenses for private, not-for-profit, and for-profit institutions and includes instruction, research, public service, academic support, student services, institutional support, net grant aid to students, and other expenses. These expenses exclude expenses for auxiliary enterprises (e.g., bookstores, dormitories), hospitals, and independent operations. Expenditures included in this study are: instruction, academic support, student services, and institutional support (NCES, 2011).

Full-time equivalent of students. The full-time equivalent (FTE) of students is a single value providing a meaningful combination of full-time and part-time students. The full-time equivalent of the institution's part-time (PT) enrollment is estimated by multiplying the appropriate factor (0.392857 for PT undergraduate students) times the part-time headcount. These are then added to the full-time enrollment headcounts to obtain an FTE for all students enrolled in the fall (NCES, 2011).

Graduation rate. The graduation rate is the rate required for disclosure and/or reporting purposes under Student Right-to-Know Act. This rate is calculated as the total number of completers within 150% of normal time divided by the revised adjusted cohort (NCES, 2011).

Integrated Postsecondary Education Data System (IPEDS). A data system that collects institution-level data from postsecondary institutions in the United States (50 states and the District of Columbia) and other jurisdictions. IPEDS provides basic statistics on postsecondary institutions regarding tuition and fees, number and types of degrees and awards conferred, number of students enrolled, number of employees, financial statistics, graduation rates, and student financial aid (NCES, 2011).

Postsecondary institution. A postsecondary institution is defined as an organization that is open to the public and has a primary mission of providing postsecondary education or training beyond the high school level. This definition includes institutions that offer academic, vocational, and continuing professional education programs and excludes institutions that offer only vocational (leisure) and adult basic education programs (NCES, 2011).

Retention rate. A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage. For 4-year institutions, this is the percentage of first-time bachelors (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall. For all other institutions, this is the percentage of first-time degree/certificate-seeking students from the previous fall who either reenrolled or successfully completed their program by the current fall (NCES, 2011).

Southeastern region of United States. Based upon the Bureau of Economic Analysis (BEA) regions. Includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia (NCES, 2011).

Student Right-to-Know Act. Also known as the "Student Right-to-Know and Campus Security Act" (P.L. 101-542), which was passed by Congress November 9, 1990. Title I, Section 103, requires institutions eligible for Title IV funding to disclose completion or graduation rates of certificate- or degree-seeking, full-time students entering an institution to all students and prospective students. The Graduation Rate component of IPEDS was developed specifically to help institutions respond to these requirements (NCES, 2011).

Title IV institution. An institution that has a written agreement with the Secretary of Education that allows the institution to participate in any of the Title IV federal student financial assistance programs (NCES, 2011).

Summary

This chapter examined the attention higher education institutions are receiving to improve college graduation rates in the United States. With enrollments growing and budgets being cut, leaders must determine new strategies to increase graduation rates that have relatively remained flat over the last forty years. They are being asked to make this change with decreased funding that must be strategically allocated in order to achieve this lofty goal. The ways that leaders allocate their shrinking funds may influence student satisfaction, student retention, and degree attainment. Leaders must make hard decisions between allocating additional funding to instructional personnel positions, or administrative non-personnel functions in order to improve student retention and graduation rates (Goldstein, 2012).

Organization of Study

Chapter 1 provided an overview of the study. It described the statement of the problem, the purpose of this research study, the research questions, the significance of the study and the conceptual framework for the study. Chapter 2 provides a review of literature on history, retention, attrition and funding at postsecondary institutions and its impact on student outcomes, specifically graduation rates or persistence. Chapter 3 presents the research methodology used in the study, including a description of the research design and methods. Chapter 4 presents the study's findings, and, chapter 5 summarizes the key findings of the study, addresses the limitations of the study, and discusses the theoretical and practical implications. Finally, chapter 5 makes recommendations for future research.

Chapter II

REVIEW OF LITERATURE

This chapter provides a review of relevant literature divided into five sections. Section one is a review of the history of two-year post-secondary education in the United States. Section two focuses on the federal and state funding of two-year post-secondary education in the United States. Section three provides a review of post-secondary funding, retention, and graduation rate. Section four focuses on performance funding and accountability of higher education institutions. And, section five details the relationship of education and general expenditure ratios and graduation rate.

Prior to the 1980s, a majority of the funding for higher education came from the federal government. Changes in policy of education funding resulted in drastic cuts in federal appropriations. These changes resulted in state governments and students having the responsibility of supporting post-secondary education. Since the 1980s, state appropriations have been the largest and most consistent source of funding for public institutions of higher education (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005). Now, with increasing pressure for performance driven funding, there is a threat to this funding source.

History of Two-year Post-Secondary Education in the United States

The earliest movement for post-secondary education was for adults, but not designated as 'postsecondary'; that is, there were no pre-requisite high school completion requirements. The earliest forms of post-secondary education were in the early 1800s in

the larger towns and cities (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005; Scott & Sarkees-Wircenski, 1996). There were a number of mechanic and trade worker societies that developed to meet the technical needs of their members (Scott & Sarkees-Wircenski, 1996). The first mechanics institute in America was in 1820 when the General Society of Mechanics and Tradesmen of the City of New York opened a library and established a mechanics school (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005). Science was a part of the curriculum of this and other early technical schools. This developed into more advanced forms for the application of scientific knowledge in agricultures, mechanic arts, and engineering (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005; Scott & Sarkees-Wircenski, 1996). One of the first of these schools was the Gardiner Lyceum in Maine (Scott & Sarkees-Wircenski, 1996) as a full time scientific and technical school at the college level in 1823.

Another of these early schools was the Rensselaer School in Troy, New York, which began in 1824. Its mission then, as now, was to "apply science to the common purpose of life" (Rensselaer Polytechnic Institute, n.d., p. 3). The school gave instruction to the children of local farmers and mechanics in the application of science to their agricultural and mechanical backgrounds. Several local farms and workshops served as quality examples for the students to experience (Rensselaer Polytechnic Institute, n.d.). The Rensselaer School also attracted college graduates to its research and developmental activities and is recognized as the first graduate school in America (Scott & Sarkees-Wircenski, 1996).

The beginnings of the American community college began just before the Civil War after the Morrill Act was passed by Congress in 1862. In response to an increased

need for higher education in agriculture, engineering, and military science, the Morrill Act provided states with land that could be sold or leased to raise money for establishing at least one college in that state (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005; Scott & Sarkees-Wircenski, 1996).

Mechanical arts and agriculture were important curriculum prescribed in this act and paved the way for technical education across the country (Phillippe & Sullivan, 2005; Scott & Sarkees-Wircenski, 1996). Because of this act, there were more opportunities for post-secondary education to a greater number of potential students than before. The Morrill Act of 1890 and the Nelson Amendments to Morrill Act of 1907 further supported the original funding (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005; Scott & Sarkees-Wircenski, 1996).

Phillippe & Patton (2000) and Phillippe & Sullivan (2005) reported that President William Rainey Harper of the University of Chicago drafted a proposal in 1891 as an experiment in the founding of a real university in the United States. President Harper divided the typical college plan into four classes and recognized that the first two years of college work were merely an extension of the secondary schools. The last two years were more advanced in nature and more specialized. These latter two years were regarded as the junior and senior years. The earlier years were divided not as freshmen or sophomores but as junior college or senior college. In April of 1900, the title of Associate in Arts, Literature, and Science was conferred upon those who completed the work in the Junior Colleges (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005).

Developmentally, many of the early junior colleges were treated as extensions of the high schools. The first permanent junior college department was established in the

Township High School, at Joliet, Illinois, as an experimental postgraduate high school program (Joliet Junior College, n.d.; Phillippe & Patton, 2000; Phillippe & Sullivan, 2005). In 1906, the legal foundations for junior colleges were established initially in California by allowing them to cover two years beyond the ordinary high school (Monroe, 1912). Geography played a large part in this development, as the major universities in California were both in the northern part of the state. From the southern areas of the state, the distance to the major universities was further than from New York to Chicago (Monroe, 1912). Junior colleges would allow students to remain closer to home for a longer period of time, offering job training and other educational opportunities to unemployed people during the Great Depression (Phillippe & Patton, 2000; Phillippe & Sullivan, 2005).

The Smith-Hughes Act of 1917 (Smith-Hughes Act, 1917) created the federal, state, and local partnership that allowed vocational programs in public institutions. Funding was central to the purpose of the Act; teacher and supervisor salaries and teacher preparation in vocational fields were segments funded. This Act also required that vocational training be provided to those who, among other options, have been employed and seek greater efficiency, have selected a vocation and desire preparation, or have a wish to advance to positions or responsibility (Smith-Hughes Act, 1917). Vocational education was to be for those students at the high school level (Scott & Sarkees-Wircenski, 1996).

In 1921, the American Association of Junior Colleges was established in the United States. The organization was later renamed the American Association of Community and Junior Colleges (Phillipe & Sullivan, 2005). The name was changed

again in 1992 to the American Association of Community Colleges (AACC), with the understanding that junior, technical, private, and proprietary two-year institutions could all fit within the term community college (Phillipe & Sullivan, 2005).

Scott and Sarkees-Wircenski (1996) explained the Servicemen's Readjustment Act of 1944 was passed to assist World War II veterans in returning to this country as civilians. Also known as the GI Bill of Rights, it mandated a declaration by the recipients to a particular vocational objective. This encouraged the inclusion of occupationally–oriented programs into adult higher education institutions. A network of vocational-technical schools was developed in each state to handle the number of veterans seeking these educational goals. Korean, Vietnam, and other future veterans would later benefit from the same legislation (Scott & Sarkees-Wircenski, 1996).

Title VII of the National Defense Education Act of 1958 provided funding for postsecondary area schools throughout the country (Scott & Sarkees-Wircenski, 1996). A response to the launching of the Russian satellite Sputnik I, the Act targeted postsecondary students unlike previous legislation that mostly targeted secondary students. Congress' intent was to bring technical/vocational education to areas of the country inadequately served and to encourage the development of postsecondary occupational programs. Public interest in all students' attendance at college was greatly increased because of this act (Scott & Sarkees-Wircenski, 1996).

Five years later, the Vocational Education Act of 1963 took further steps to develop post-secondary area technical schools (Scott & Sarkees-Wircenski, 1996). Although the Act focused funding on vocational education for high school students, there were also provisions for the construction of area vocational schools. In doing so, the Act

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further broadened the definition of vocational education for students in four categories: (a) construction of area facilities, (b) ancillary services and facilities, (c) research and training programs, and (d) work-study programs and residential vocational education schools (Scott & Sarkees-Wircenski, 1996). Under this Act, area schools meant those used for the provision of vocational education for persons who have completed or left high school and entering the job market. The Act defined departments of divisions of junior colleges that provide vocational education in no less than five different occupational fields not leading to a baccalaureate degree.

Several subsequent Acts reinforced funding or redefined previous legislation. The Job Training Partnership Act of 1982 was one of these revisions, in particular the Comprehensive Employment and Training Act (Scott & Sarkees-Wircenski, 1996). One of the great advantages to this legislation was the increased involvement of private industry in the development of educational programs for the training and subsequent employment of unskilled adults. The Act greatly increased the services provided for the unemployed by adding job counseling, job search assistance, and other training (Scott & Sarkees-Wircenski, 1996).

The new landscape of evolving higher education demands that institutions remain innovative and flexible in order to serve the learners of our nation (Tinto, 2006). Secretary of Education Margaret Spellings (2006) found that "of the nation's nearly 14 million undergraduates, more than four in ten attend two-year community colleges; nearly one-third are older than 24 years old; and forty percent are enrolled part-time" (p. xi).

More students than ever have adopted a "cafeteria" approach to education – taking classes at multiple institutions before obtaining a credential. Many adult learners were not seeking a degree, but were trying to acquire new skills to improve career prospects (Spellings, 2006). The Spellings Report (2006) noted,

> Where once the United States led the world in educational attainment, recent data from the Organization for Economic Cooperation and Development indicate that our nation is now ranked 12th among major industrialized countries in higher education attainment. Another half dozen countries are close on our heels. And these global pressures come at a time when data from the U.S. Department of Labor indicate that postsecondary education were ever more important for workers hoping to fill the fastest-growing jobs in our economy. (p. xii)

The recommendations of the Spellings Report (2006) made it abundantly clear that higher education institutions should be required to improve the retention and graduation rates of their students or risk losing valuable financial support from federal and state governments.

Federal and State Support for Higher Education Institutions

Federal Support

The U.S. Department of Education (2015) states the federal government funds higher education primarily through student-based financial aid. Higher education federal aid is targeted to the financially neediest students, although in recent years the federal government has expanded higher education funding to include support for the middle class families (U.S. Department of Education, 2015).

Title IV of the Higher Education Act of 1965 (HEA) established the first federal grant and loan programs (U.S. Department of Education, 2015). The emphasis of the HEA was on expanding college access to low-income students who otherwise would not pursue post-secondary education by providing grant aid. The U.S. Department of Education (2015) states with the increase in college costs, the federal government's support in higher education has shifted to provide increased college affordability with relatively low-interest student loans. Federal aid is given to students utilizing subsidized student loans, grant aid and tax benefits (U.S. Department of Education, 2015).

The largest federal grant program, providing 9.5 million students' access to higher education in 2010-2011, was the Pell Grant program, followed by the Supplemental Education Opportunity Grant (SEOG) program (Baime & Mullin, 2011). Both programs award aid based upon a student's financial status. This aid does not need to be paid back and is generally used for tuition, housing, and other expenses at higher education institutions (Baime & Mullin, 2011; U.S. Department of Education, 2015).

The U.S. Department of Education (2015) states a number of different tax reductions are provided by the federal government to assist in the payment of higher education expenses. These tax benefits are generally targeted to middle and upper income individuals and families (Baime & Mullin, 2011). Tax credits and deductions reduce federal income taxes in relation to tuition costs incurred within a year, which indirectly lowers higher education costs. Tax exemptions help boost savings by enabling individuals and families to accumulate funds in special accounts to pay for higher education costs (Baime & Mullin, 2011).

Another type of federal aid is federally subsidized loans to help pay for tuition, housing, and other costs associated with higher education (U.S. Department of Education, 2015). Since most students have little or no credit and employment history, the federal government guarantees and subsidizes loans to help students obtain financing with more favorable repayment terms than in the private market. All students are eligible for federal student loans. As a result, student loans are the primary method by which the federal government helps support access to higher education (Chen & St. John, 2011).

State Support

State support of 2-year postsecondary colleges can be illustrated by observing the influence of a better-educated workforce and the economic impact regional colleges can have on a state. Federal financial aid programs are administered similarly across states; however, state financial aid programs vary drastically. This variation is due in part to a state's economy and the structure of its higher education system (Doyle & Pinkel, 2016).

State policies differ in how higher education institutions are financed (Lenth, 1993). Some states provide appropriations at a certain level and allow institutions to bring in revenues from other sources as they see fit. The policy makers' hope is that some portion of these appropriations were used by colleges to reduce the tuition and fee costs charged to in-state students (Toutkoushian & Shafiq, 2009). Other states have policies in place to fund a certain number of students or a certain percentage of overall costs. Some other states limit revenues from other sources, particularly tuition (Richardson et al., 1999). "State decisions about the level of funding to provide to higher education and their degree of involvement in the process of collecting revenue translate

into a direct effect of state policy on tuition and financial aid policy" (Doyle & Pingel, 2016, p. 2).

In a report conducted by the Tennessee Higher Education Commission (2012), research revealed some states help students supplement higher education costs by enacting merit-based scholarship programs. Providing financial incentives to students who meet the scholarship requirements broadens access to higher education and increases college completion rates. Eight states use a state lottery to fund these scholarship programs, seven of which are located in the southeastern United States: Arkansas, Florida, Georgia, Kentucky, South Carolina, West Virginia, and Tennessee.

Since higher education institutions are able to raise tuition and fee amounts, some argue that they have a means to offset reductions in state appropriations (Tandberg, 2010). In addition, some institutions can pursue private donations, apply for research funding and engage in entrepreneurial activities. These activities allow institutions to recover a portion of their budget lost to state reductions (Delaney & Dole, 2007). Because of these unique characteristics, state lawmakers may view higher education as a resource to siphon when funds are needed elsewhere (Tandberg, 2010). Further, the federal government and most state governments subsidize higher education expenses through student aid. This subsidy makes increases in tuition more tolerable for students (Delaney and Doyle, 2007; Kane, Orszag, & Gunter, 2003; Tandberg, 2010).

There are a large number of students who are enrolled in college courses and pursuing a full-time job. The National Center for Education Statistics (Phillippe, 2003) reports that 30% of community college students who work full time also attend classes full time. Students ages 30 to 39 see an increase in that percentage to 41%. The U.S.

Department of Education reports that 75% of the employers of these students provided financial support for their efforts (U.S. Department of Labor, 2013). High involvement of employers in the education of their employees would suggest support by the states for community colleges.

Post-Secondary Funding, Retention and Graduation Rate

While many researchers have utilized Tinto's (1975, 1987) theory of student departure to improve the retention rate of students at post-secondary institutions, there has been a growing trend for researchers and policymakers to focus on persistence to graduation in a timely manner. The need to improve retention and graduation rates has never been so important. With a declining economy and soaring unemployment rates, the Federal Government has pledged over two billion dollars to the community college sector over the next several years to increase the number of Americans with college degrees. Many of these funds must be earned by demonstrating improved graduation rates (American Association of Community Colleges, 2014; Tinto, 2006; U.S. Department of Labor, 2013). Therefore, community colleges must invest more time and energy to improving the retention and graduation rates of their students.

Bean (1980) and Berger and Milem (2000) offer another major theory in student persistence/dropout research by examining how institutional factors may influence student persistence decisions. The researchers found that students were more likely to persist to graduation if they shared the values, norms, and behaviors that were already in operation at the institution.

Tinto (1987) stated institutions play a major role in influencing the social and intellectual development of their students. The institution, its faculty and its staff must

make a commitment to the education of its students in order to improve the retention rates of its students. Tinto (1987) believed that institutions must "adopt a new way of thinking about educational departure" (p. 187).

Titus (2006) determined there has only been a small amount of research that examined the relationship between funding, or institutional expenditures, and persistence. One limitation of Titus' study was that it did not address completion of a college degree. Graduation, rather than retention rates, should be the focus of measuring success in higher education (Adelman, 1999). Adelman stated, "degree completion is the true bottom line for college administrators, state legislators, parents, and most importantly, students – not retention to the second year, not persistence without a degree, but completion" (p. v).

A common measure of community college performance is the graduation rate for students within 150% of the time in which they would be expected to complete a degree or certificate taking a full-time program of courses and academically prepared for college level courses at inception (Student-Right-to-Know Act, 1990). This is the Student-Right-to-Know (SRK) rate from the Student-Right-to-Know Act (1990) and is based upon an entering cohort of all first-time students who attend full-time when initially enrolling. Associate program students are tracked for three years (150% of normal time for a 2-year degree) and certificate programs are proportionally less. The graduation rate is the ratio of all students who complete a certificate or associate degree *at that college* within the 150% time period to the total number of students in the initial cohort (Student-Right-to-Know Act, 1990).

Community college personnel and advocates have resisted the use of graduation rates for funding (Bailey, Calcagno, Jenkins, Leinbach & Kienzl, 2006). They argue that graduation rates are a misleading outcome measurement for community colleges since a majority of students do not seek degrees or transfer to a baccalaureate institution. Community colleges serve multiple student needs, which reflect their mission and the diverse goals of their students (Bailey et. al., 2006).

Factors beyond the control of the college may impede students' graduation. Many community college students face serious barriers to college success, including family and work responsibilities and deficient academic preparation (Bailey et.al., 2006). Students who may not have access to baccalaureate institutions are the target population community colleges serve. Since the community colleges cannot control many of these barriers, nor can they mitigate them, advocates argue the community colleges should not be criticized or penalized for students' failure to complete (Bailey et.al., 2006).

<div align="center">Performance Funding and Accountability</div>

Burke (1998a) examined performance funding and future prospects of performance funding at higher educational institutions. He conducted a telephone survey of the State Higher Education Finance Officers (SHEFO's) in the fifty states, Puerto Rico, and the District of Columbia. At the time of the survey, ten states had performance funding, with eight states indicating they were likely to continue the funding. Finance Officers from eighteen states believed their state would likely adopt performance funding within the next five years. Burke (1998b) concluded that the SHEFO survey suggested an ongoing dissatisfaction with public higher education budgeting practices and a strong desire to consider results in funding higher education. A poll of governors conducted by

the Education Commission of the States (Assessment Update, 1998) suggested the same findings as Burke.

Using the First Time in College (FTIC) graduation rate as the measure of institutional performance, Shin and Milton (2004) conducted a study to discover whether states using performance budgeting and funding programs exhibited improved institutional performance over the five-year period of 1997 through 2001. All public, four-or-more-year institutions in the United States were included in the study. The researchers concluded that institutional performance, as measured by FTIC graduation rate, did not improve noticeably after states adopted performance based budgeting.

Many states recognize graduation rates as a significant productivity measure, tying funding to the rate should improve institutional performance (Layzell, 2001). Layzell states budgetary constraints in the last few years, along with policymakers' interest in accountability and program-based budgeting have resulted in performance-based budgeting. Thus, more public colleges' allocated funds are based on achievement of previously established goals, objectives and outcomes. "Performance-based budgeting is the logical extension of a system of performance indicators; and it connects accountability, performance, and funding levels." (Layzell, 2001, p. 202).

Johnstone (1998) reported higher education funding policies nationwide have received more attention due to higher education accountability and transparency issues. With the growth and diversification of higher education, policymakers are implementing policies to supplement governmental revenue allocations by raising tuition. Johnstone suggested colleges and universities are under growing pressure to cut costs, measure and report on performance, and compete for financial resources as a result of accountability.

A study of the financial context of institutions on student persistence at four-year colleges and universities was performed by Titus (2006b). His research found that many states use budget allocations to link institutional accountability by using graduation rates or retention rates as indicators of student performance. Although public funding has declined in recent years, policymakers still try to link public funding to student performance. Titus (2006b) stated that policymakers have been looking for ways to strengthen this link for many years.

Two findings by Titus (2006b) are crucial to the present research. First, using resource dependency theory, he found the average chance-of-student-persistence rate, after taking student-level variables and other institution-level variables into account, is dependent upon the extent to which an institution relies on tuition as a revenue source. This finding implies that there could be some significance in the relationship of revenue distribution across core revenue components and graduation rates. Second, Titus' (2006b) research suggested that the average chance of persistence is dependent upon the level of institutional expenditures and those expenditure patterns.

Astin (1993) found that more than half the variations in student success come from key inputs in higher education, with graduation rates remaining the most popular measure of student performance. Policymakers are extremely interested in graduation rates with recent discussions regarding institutional accountability. With this attention on accountability, any information that would clarify, make transparent, and link higher education funding to graduation rates would be a valuable commodity (Astin, 1993).

Zhang (2008) used panel data to examine the link between state funding and graduation rates at four-year public institutions. His examination found a positive

relationship between state funding and college graduation rates. Zhang determined that a

ten percent increase in an institutions state appropriation per FTE increased graduation

rates by approximately 0.64 percentage points when holding one factor constant. This

research suggested an increase in graduation rates was tied to revenue allocations.

Relationship of Expenditure Ratios and Graduation Rate

In 1956, the National Federation of College and University Business Officers

Associations (NFCUBOA) utilized expenditure classifications to compare income and

expenditures at colleges and universities. Of particular interest to the current study is the

NFCUBOA's classification of educational and general expenditures, which was

comprised of eight expenditure sub classifications – general administration, student

services, public services and information, general institutional, instruction and

departmental research and specialized educational activities, organized research, libraries,

and operation and maintenance of educational plant and student aid.

KPMG LLP, Prager, McCarthy & Sealey, LLC, and BearingPoint Inc. (2005)

have provided support and guidance to numerous higher education institutions for many

decades. The firms consider the use of financial ratios to be an important tool of

financial analysis and, more importantly, to be "critical to measuring the achievement of

the institutional mission" (p.1). They recommend using ratios to provide a clear, concise

picture of an institution's performance, resources, and need.

Ryan (2004) examined the relationship between IPEDS E&G institutional

expenditures and their influence on six-year graduation rates at baccalaureate level

colleges and universities in the United States. He used regression analysis to determine a

positive and significant relationship between instructional expenditures and degree

attainment, as well as a positive and significant relationship between academic support expenditures and degree attainment.

Gansemer-Topf (2004) examined the relationship between IPEDS E&G institutional expenditures and retention and graduation rates at private baccalaureate colleges and universities. Using standard multiple regression, she found the funding per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted first-year retention and six-year graduation rates; and, the percentage of expenditures in the areas of instruction, academic support, and institutional grants significantly predicted retention and graduation rates. However, the specific independent variables (i.e. instruction, academic support, etc.) that significantly contributed to the models varied.

Cantrell (2006) utilized six-year graduation rates and the IPEDS E&G expenditures in a correlation analysis of public four-year and above, degree-granting institutions in the United States. He found that there is not a significant variance of institutional expenditures at institutions with the highest, lowest, or mid-level six-year graduation rates.

<center>Summary</center>

The literature indicates that the public wants colleges and universities held accountable for achieving their core mission of graduating students. Colleges and universities receive funding from the federal level, the state level and the local level. These stakeholders are requesting evidence of a return on their dollars invested in these institutions. For colleges and universities to continue to attract current and new revenue

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streams, they must develop clear and measurable goals for the achievement of their core mission.

With a declining economy and soaring unemployment rates, the Federal Government has pledged over two billion dollars to the community college sector over the next several years to increase the number of Americans with college degrees. Many of these funds must be earned by demonstrating improved graduation rates (American Association of Community Colleges, 2014; U.S. Department of Labor, 2013). Therefore, community colleges must invest more time and energy to improving the retention and graduation rates of their students.

Despite previous research, lacking is a resource allocation examination that correlates higher education expenditure levels to graduation rate at public, two-year degree-granting institutions. Such an examination could fill a gap and may contribute to a better understanding of previous research findings.

Chapter III

METHODOLOGY

This study examined the relationship between Community College education and general (E&G) expenditures, as reported annually to IPEDS, and the three-year graduation rates for full-time associate degree-seeking students in the southeastern region of the United States in order to influence institutional initiatives for the achievement of improved student outcomes. Research exploring these relationships may provide useful information to help align budget and resource allocation for expenditures to achieve institutional goals, including improved graduation rates.

The objective of this quantitative research study was to investigate if a predictive relationship exists between federally defined E&G expenditures and three-year graduation rates. The relationship of each of the expenditure categories was considered as a percentage of total expenditures.

Research Questions

To influence institutional initiatives for the achievement of improved student outcomes, it is essential to examine the relationship between Community College E&G expenditures, as reported annually to IPEDS, and the three-year graduation rates for full-time associate or certificate degree-seeking students in the southeastern region of the United States. To examine this relationship, the following research questions were addressed:

1. Do the funding allocations for instruction, academic support, student services, and institutional support adequately predict the three-year graduation rate at community colleges, primarily certificate and diploma granting institutions, in the southeastern region of the United States?

    1a. What is the accuracy of the prediction model?

    1b. Which variable has the strongest predictive power?

2. Does cross-validation support the prediction model?

Research Design

Archived data were gathered from the annual IPEDS Finance Survey and Enrollment Survey. IPEDS consists of surveys conducted annually by the U.S. Department's National Center for Education Statistics (NCES) (n.d.). Information is gathered from every college, university, and technical and vocational institution participating in federal student financial aid programs. Institutions are required to report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid.

Expenditures by category and graduation rates were gathered from the IPEDS system for public Community Colleges in the southeastern United States. According to NCES (n.d.), the graduation rate data provides information on institutional productivity and helps institutions comply with reporting requirements of the Student Right-to-Know Act. The finance data collected by IPEDS conforms to the accounting standards established by the Governmental Accounting Standards Board (GASB). The financial information provides an understanding of the costs required to provide postsecondary education.

Correlational Designs

The purpose of a correlational design is to describe the extent of the relationship that exists between two variables and the strength of this relationship. The design chosen by the researcher, multiple regression, is a type of correlational design. The limitation to a correlational design is that a causal relationship is unable to be established (Jeon, 2015).

Causation occurs because two variables share a relationship and does not mean that one causes the other, but that the variables are interacting with each other. If the review of data determines a relationship between graduation rate and departmental expenditures, it does not necessarily mean that an increase in departmental expenditures contributed to a higher graduation rate (Jeon, 2015).

Multiple Regression. According to Mertler and Vannatta (2013), the goal of multiple regression is to obtain a linear equation to predict a dependent variable using one or more independent variables. Multiple regression allows researchers to estimate the relationship of each independent variable to the dependent variable while controlling for the effects of the other independent variables in the model. This is very powerful because the unique effect of each variable may be estimated using multiple regression.

The primary goal of regression analysis is to create a linear combination of independent variables to predict a dependent variable (Jeon, 2015). The goal of this research was to predict the graduation rate based upon the departmental area or areas that an institution allocates monetary resources.

Jeon (2015) suggests the purposes or advantages of regression analysis are figuring out independent variable influence on dependent variable, providing a relationship between independent variable and dependent variable, and estimating

dependent variable according to changes of a set of independent variables. The potential power of regression analysis is to either predict outcomes or explain relationships.

Weaknesses of regression analysis include multiple correlation, multicollinearity and predictor selection. Multiple correlation shows the amount of information about a dependent variable contained in the combination of independent variables. Multicollinearity arises with the existence of moderate to high intercorrelations among predictor variables in a regression analysis. Predictor selection is an important process in regression analysis. Researchers need to select a parsimonious set of predictor variables, using published research results as a guide, that will give an efficient regression equation (Jeon, 2015; Mertler & Vannatta, 2013).

Population and Sample Setting

The target population included full-time public postsecondary institutions in the United States as reported in the federal IPEDS database. The accessible population included full-time associate degree public institutions in the southeastern portion of the United States. The data used in this study were based on institution-level variables. Institutions were identified using components of nine interrelated surveys conducted by IPEDS.

This study used a stratified sampling plan to identify institutions within the accessible population. The criteria for selection included institutions in the southeastern portion of the United States that award at an associate degree level. The rationale for selecting these criteria was important because the researcher is currently employed at an institution within the accessible population and is interested in the outcomes of this research model.

Mertler and Vannatta (2013) suggest a multiple regression analysis include a sample size of 104, plus the number of predictor variables included in the study. A dataset of N = 313 institutions was created using variables for each institution that included institutional characteristics, expenditure, and graduation rate data.

Instrumentation

This study utilized the IPEDS database maintained by the NCES. All postsecondary institutions that have a Program Participation Agreement with the Office of Postsecondary Education of the U.S. Department of Education to administer Title IV aid are required to report data using this web-based data collection system. The system is built around interrelated surveys that collect institution-level data in areas of enrollment, program completions, faculty, staff and finances. The surveys are broken down into ten categories called survey components. The survey components are: institutional characteristics (IC), admission test scores, student charges, fall enrollment (EF), twelve-month enrollment (E12), completions (C), graduation rates (GRS), student financial aid (SFA), finance, and human resources (NCES, 2011).

Each of the ten components are further divided into three broader categories based upon the type of information contained in them: general information, student surveys, and resource surveys. The general information category includes the institutional characteristics component. The student surveys category is the largest category, consisting of information on seven of the ten components. This survey includes admissions test scores, student charges, fall enrollment, twelve-month enrollment, completions, graduation rates, and student financial aid components. Finally, the resource surveys category is comprised of information from both the finance and human

resource components (NCES, 2011). Variables from the institutional characteristics, finance, and graduation rates components were analyzed in this study.

The Higher Education Act of 1965 (1965), as amended, requires all institutions that participate in Title IV federal student aid programs report data annually to IPEDS. The data are made available to: (a) students and parents through the College Navigator college search web site located at http://nces.ed.gov/collegenavigator/, (b) to institutions through data feedback reports, and (c) to researchers and others through the IPEDS Data Center located at http://nces.ed.gov/ipeds/datacenter/ (NCES, 2011).

IPEDS provides the basic data needed by researchers to explore and analyze trends in postsecondary education in the United States. IPEDS data are used at the federal and state level for policy analysis and at the institutional level for benchmarking and peer analysis (NCES, 2011). According to Cook and Pullaro (2010), the IPEDS Graduation Rate Survey is the most widely used and cited source for graduation rates.

The institutional characteristics component of the IPEDS surveys collects basic institutional data that are necessary to sort and analyze all IPEDS survey components. Data are collected for an academic year, which generally extends from September of one calendar year to June of the following year. Specific data elements currently collected for each institution include: institution name, address, telephone number, control or affiliation, calendar system, levels of degrees and awards offered, types of programs, application information, student services, and accreditation. For this study, institution name and levels of degrees and awards offered were utilized.

The finance survey component of the IPEDS surveys collects data on each institution's finances, with different versions of the form based on institutional control

(public, private not-for-profit, and private for-profit). Information on assets, liabilities, revenues, expenses, and scholarships and grants from an institution's general purpose financial statements are reported to IPEDS. Public institutions report financial information using the Governmental Accounting Standards Board (GASB) requirements. Private institutions use the Financial Accounting Standards Board (FASB) requirements. For this study, expense accounts for public institutions were analyzed.

The graduation survey component collects the number of students entering the institution as full-time, first-time degree/certificate-seeking students in a particular year or cohort, by race/ethnicity and gender. Institutions operating on semester, trimester or quarter terms, report on a fall cohort, the number of students completing within 150% of normal time to program completion (NCES, 2011).

Validity and Reliability

The IPEDS Data System is a system of interrelated surveys conducted annually by the U.S. Department of Education's National Center for Education Statistics (NCES). The NCES is the primary federal entity for collecting and analyzing data related to education in the United States and fulfills a Congressional mandate to collect, collate, analyze, and report statistics on American education (Jackson, Jang, Sukasih, & Peeckson, 2005; NCES, 2011). A data quality study was implemented by the NCES to test the accuracy, reliability, validity, and other quality measures within and across the IPEDS surveys.

The validity of IPEDS data when compared to data collected by non-IPEDS sources was assessed against Thomson Peterson data. The Thomson Peterson database was used as an external source for comparison because it is one of the largest and most

comprehensive sources of postsecondary data available; however, the purpose of collecting data from higher education institutions varies between IPEDS and Thomson Peterson. Institutions provide data voluntarily to Thomson Peterson, while IPEDS data collection is congressionally mandated and required for all Title IV institutions (Jackson et al., 2005).

The results of the study conducted by Jackson et al. (2005) tend to "confirm the perception that IPEDS is the most comprehensive data system available for information related to postsecondary education" (p. 290). The authors found that information was more likely to be found in IPEDS than in Thomson Peterson (Jackson et al., 2005).

Jackson et al. (2005) proposed the implementation of a Web-based system to collect data. They suggested that this system should have built-in edit checks, as well as, other quality checks. While this process addressed data consistency, the accuracy of data provided by institutions nor the reliability of IPEDS data in general was not addressed. It is possible that institutions could submit inaccurate data (Jackson et al., 2005).

Procedures

Prior to data collection, approval to conduct this research project was obtained from the Valdosta State University Institutional Review Board (IRB). The researcher downloaded IPEDS finance survey data from FY2011-2013 and graduation data from the frequently used/derived variables from the 2014 data collection year, which provided graduation rate data for the 2011 cohort. From the list of variables for graduation rates, the researcher selected the graduation rate for institutions located in the southeastern United States that offered degrees, diplomas, or certificates within two years or less.

The expenditure variables were comprised of the E&G categories for each of three successive fiscal years (FY) beginning with FY2011. The E&G expenditures include expense data for instruction, research, public service, academic support, student services, institutional support, net grant aid to students, and other expenses. The E&G expenditures exclude expenditures for auxiliary enterprises (e.g. bookstores, residence halls), hospitals, and independent operations, since such expenditures are not directly related to the provision of educational services (NCES, 2011; Paulsen & Smart, 2001).

According to Paulsen and Smart (2001), excluding the expenditures for research and public service as a means to better isolate expenditures related to the teaching mission of higher education institutions is advocated by some analysts. For the purposes of this study, the expense data for instruction, academic support, student services and institutional support were the only E&G expenditures collected as part of the dataset.

The graduation rate for fall 2014 undergraduates was determined for each institution. The three-year graduation rate was determined by dividing the grand total of 2011 completers (within 150% of normal time for diplomas) by the total number of students in the adjusted fall 2014 cohort (revised cohort minus exclusions) for each institution.

<center>Data Collection and Management</center>

The variables from IPEDS were imported to a Microsoft Office Excel 2016 (Excel) spreadsheet for initial review, exploration, and calculation of descriptive statistics. The variables were grouped by institution, expenditure category and fiscal year to calculate the three-year averages for expenditures.

Since institutional expenditures over the course of a student's enrollment would impact graduation rates, a mean expenditure value was calculated using Excel. A mean expenditure value was obtained by calculating expenditures per student for three successive fiscal years beginning with FY2011, summing these results, and dividing by three. The Excel data were imported to IBM SPSS Statistics v24 for statistical analysis. Initially, descriptive statistics provided basic information on range, means, standard deviation, variance and minimum and maximum values (Mertler & Vannatta, 2013).

Table 1 presents the variables, variable descriptions, and variable names used in this study. Instruction, academic support, student services, and institutional support were the predictor variables selected since they correlate to the educational and teaching mission of higher education institutions. The variables were grouped by institution, expenditure category, and fiscal year to calculate three-year averages. The predictor variables averages were then calculated as the percentage each category represented of the institution's total expenditures over a three-year period. The outcome variable was the three-year cohort graduation rate.

For this research project, the researcher gathered archived data from the NCES IPEDS survey. This is a national database in which all postsecondary institutions that participate in federal student aid programs are required to report institution data. To ensure confidentiality, NCES is required by federal law to protect against disclosure of individually identifiable information collected in the IPEDS surveys (NCES, 2011).

Table 1

Average Percentage of Expenditures – Predictor and Outcome Variables, Descriptions, and Variable Names

Expenditure Category	Variable Description	Variable Name
Instruction	Average Percentage of Expenditures for Instruction	INST*
Academic Support	Average Percentage of Expenditures for Academic Support	ACSUP*
Student Services	Average Percentage of Expenditures for Student Services	STSVC*
Institutional Support	Average Percentage of Expenditures for Institutional Support	INSUP*
Graduation Rate	Three-year Cohort Graduation Rate	GRADRT**

Note: * Predictor variable.
      ** Outcome variable.

Data Screening

The graduation rate and the percentages of total E&G expenditures for each of the expenditure variables were imported to IBM SPSS Statistics v24, where statistical tests were conducted. Descriptive statistics were run for institution graduation rate and each of the expenditure variables. This included analyzing the mean, standard deviation, minimum and maximum values, variance, and range to make inferences about the influence between institutional expenditures and three-year graduation rate (Mertler & Vannatta, 2013).

Multiple regression was the statistical technique utilized to assess the relationship or correlation between the outcome variable (graduation rates) and predictor variables (institutional expenditures). Mertler and Vannatta (2013) state that the multiple regression model can be very sensitive to outliers. Prior to conducting the multiple regression analysis, the data set was examined for missing data and multivariate outliers

using Mahalanobis distance. To determine the Mahalanobis distance, the critical value of chi square (χ^2) was calculated. The critical value of chi square at $\rho < .001$ with $df = 5$ was determined to be 20.51. Institutions that had a Mahalanobis distance that exceeded the chi square critical value were eliminated (Mertler & Vannatta, 2013).

Mertler and Vannatta (2013) state that the assumptions of normality, linearity and homoscedasticity must be met to apply multiple regression methods correctly. Each variable was tested for normality through the use of histograms. Linearity and homoscedasticity were examined through a residuals plot (Mertler & Vannatta, 2013).

Data Analysis

Standard multiple regression was conducted to determine the extent to which the predictor variables predicted the outcome variable. The model utilized in this study was:

$$\hat{y} = \beta x_1 + \beta x_2 + \beta x_3 + \beta x_4$$

where $\hat{y}$ = GRADRT, x_1 = INST, x_2 = ACSUP, x_3 = STSVC, and x_4 = INSUP

Multiple regression was also used to assess if any of the variables were most influential in predicting graduation rates (Mertler & Vannatta, 2013).

Tolerance statistics were run to test for multicollinearity. Multicollinearity occurs when there is a high intercorrelation among the independent variables. When variables are intercorrelated, it makes it difficult to determine the influence of a specific independent variable on the dependent variable and can create an erroneous regression model. This statistic represents the variance proportion of a particular independent variable not explained by its linear relationship with other independent variables. Tolerance ranges from 0 to 1, with 0 indicating multicollinearity (Mertler & Vanatta, 2013). The threshold to assess the presence of multicollinearity for this study was 0.1.

Mertler and Vannatta (2013) suggest analyzing four measures to test the null hypothesis: the F-test, R^2, R^2_{adj}, and β. The F-test examined the extent in which the relationship between the independent and dependent variables were linear. An F-test that is significant ($p \leq .05$) demonstrates that institutional expenditures significantly predict the dependent variable (graduation rates) (Mertler & Vannatta, 2013).

The squared multiple correlation (R^2) is the proportion of the variance in the dependent variable (graduation rates) that can be explained by institutional expenditures. Change in R^2 is important because it is used to determine which variables significantly contribute to the model. R^2_{adj} is similar to R^2 but takes into account the sample size and number of independent variables. The higher the R^2 and R^2_{adj}, the more influence institutional expenditures have on predicting graduation rates (Mertler & Vannatta, 2013).

Beta weights (β) or standardized regression coefficients show the amount of influence each individual independent variable has on predicting the dependent variable. These are often utilized to create a prediction equation for the standardized variables. T-tests were conducted on each standardized regression coefficient. It was concluded that variables with a significance level of $p \leq .05$ significantly contributed to the dependent variable (graduation rates) (Mertler & Vannatta, 2013).

Cross-validation is the process of assessing how the results of an analysis will generalize to an independent data set. It uses the existing data to simulate the process of generalizing new data. This technique assesses the reliability and generalizability of the findings (Hair Jr., Anderson, Tatham, & Black, 1995). Cross-validation is primarily a way of measuring the predictive performance of a statistical model (Hyndman, 2010). If

the equation does not predict well for other samples, it is not fulfilling its designated

purpose (Mertler & Vannatta, 2013).

The original sample was randomly divided into two subsets, a training set and a

testing set, within SPSS. The data was split in half into a training set and a testing set.

Analysis was performed on the training set to answer Research Question 1. The

regression model from Research Question 1 was cross-validated with the testing set to

answer Research Question 2. Field (2009) and Hastie, Tibshirani, and Friedman (2009),

suggest evaluating the R^2 and the standard error of the estimate to determine if the test set

is comparable to the training set. The R^2 of each model should be relatively equal and the

standard error of the estimate should be within one standard error (Hastie et al., 2009).

<div align="center">Summary</div>

Research suggests there are remaining questions concerning the relationship

between institutional spending and success of students. This study used the federal

IPEDS datasets to investigate the influence of institutional spending on three-year

graduation rates at public, 2-year or below degree granting institutions in the southeastern

United States. Chapter 4 presents the study's findings, and, chapter 5 summarizes the

key findings of the study, addresses the limitations of the study, and discusses the

theoretical and practical implications. Finally, chapter 5 makes recommendations for

future research.

Chapter IV

RESEARCH FINDINGS

The purpose of this study was to examine the relationship between community college education and general (E&G) expenditures and the three-year graduation rates for full-time associate or certificate degree-seeking students in the southeastern region of the United States in order to influence institutional initiatives for the achievement of improved student outcomes. Research exploring these relationships could provide useful information to align budget and resource allocation for expenditures to achieve institutional goals, including improved graduation rates.

This research study utilized the IPEDS database to obtain the dependent variable (three-year graduation rate) and independent variables (E&G expenditures). The study used the reported 2014 three-year graduation rate for the fall 2011 cohort and the E&G expenditure variables from the IPEDS finance survey for the 2011–2013 academic years. The query of the IPEDS Dataset Cutting Tool yielded a total of 313 institutions, of which 300 complete observations were available for use in the analysis. The researcher extracted the following E&G expenditures: Instruction, Academic Support, Student Services, and Institutional Support.

Data were prepared and analyzed using Microsoft Office Excel 2016 (Excel) and IBM SPSS Statistics v24. The 2014 three-year graduation rate and the E&G expenditure variables for the 2011–2013 academic year were imported into Excel. The expenditure

variables for each institution was derived by calculating a mean expenditure value. The expenditure variables for academic years 2011–2013 were summed and divided by three.

The Excel data were imported to IBM SPSS Statistics v24 for statistical analysis. Stepwise multiple regression was the statistical technique used to determine the extent in which the independent expenditure variables predicted the outcome variable (graduation rates), and to determine which, if any of the variables was most influential in predicting graduation rate. The measures associated with standard multiple regression included the F-test, R^2, R^2_{adj}, and β.

Data Screening

The sample consisted of $N = 313$ full-time associate or certificate degree-seeking institutions in the southeastern region of the United States as reported in the IPEDS database of the National Center for Education Statistics. Incomplete observations were removed and descriptive statistics were run on the data. Of these institutions, five did not report expenditure data and eight did not report graduation rate data. Excluding these institutions resulted in $N = 300$ institutions that were available for analysis in this study's final sample.

Table 2 presents the number and percentage of institutions by state. It was noted that no state had a majority percentage of institutions. North Carolina had the largest number with 57 institutions, which accounted for 19.00% of the final sample. Tennessee had the second largest number with 39 institutions accounting for 13.00% of the final sample. Florida had 35 institutions accounting for 11.67% of the final sample. The remainder of states accounted for 10% or less of the final sample.

Table 2

Distribution of Institutions by State

State	Number of Institutions	Percent
Alabama	24	8.00
Arkansas	22	7.33
Florida	35	11.67
Georgia	24	8.00
Kentucky	16	5.33
Louisiana	16	5.33
Mississippi	15	5.00
North Carolina	57	19.00
South Carolina	20	6.67
Tennessee	39	13.00
Virginia	24	8.00
West Virginia	8	2.67
Total	300	100.00

Study Variables

As defined by NCES (2011), instructional support is the expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution. This category contains expenses for departmental research and public service not separately budgeted. Included in this category are expenditures for general

academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions.

Academic support is the expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service. It includes the retention, preservation, and display of education material (for example, libraries, museums, and galleries); organized activities that provide support services to the academic functions of the institution (such as a demonstration school associated with a college of education or veterinary and dental clinics if their primary purpose is to support the instructional program); media such as audiovisual services; academic administration (including academic deans but not department chairpersons); and formally organized and separately budgeted academic personnel development and course and curriculum development expenses (NCES, 2011).

Student services is the expenses category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program (NCES, 2011). Examples include student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside then normal administration, and student records. Intercollegiate athletics and student health services are also included in this category, except when operated as self-supporting auxiliary enterprises.

Institutional support is the expense category that includes expenses for administration – the day-to-day operational support of the institution. This category

includes expenses for general administrative services, central executive-level activities concerned with management and long range planning, legal and fiscal operations, space management, employee personnel and records, logistical services such as purchasing and printing, and public relations and development (NCES, 2011).

Descriptive statics were run on the full dataset for institution graduation rate and each of the expenditure variables. This included the mean, standard deviation, minimum and maximum values, variance, and range. Table 3 presents the descriptive statistics for the study variables.

Table 3

Descriptive Statistics for Study Variables (N = 300)

Variable	*M*	*SD*	Minimum	Maximum	Variance	Range
INST	47.41	8.34	17.89	82.14	69.55	64.25
ACSUP	7.48	4.14	0.09	21.74	17.16	21.65
STSVC	9.68	3.60	0.99	23.85	12.96	22.86
INSUP	15.31	4.65	0.36	38.16	21.61	37.80
GRADRT	28.72	21.85	2.00	100.00	477.41	98.00

The total average percentage of expenditures for instructional support represented over 47% of total institutional expenditures; the total average percentage of institutional support expenditures represented about 15% of total institutional expenditures; the total average percentage of student services expenditures represented about ten percent of total institutional expenditures; the total average percentage of academic support expenditures represented about seven percent of total institutional expenditures.

Mahalanobis distance was used to test for missing data and multivariate outliers. The critical value of chi square at $\rho < .001$ with $df = 5$ was determined to be 20.51. It was determined that thirteen institutions exceeded the chi square critical value and were removed. Excluding these institutions resulted in $N = 300$ institutions that were available for analysis in this study's final sample.

The study variables were tested for the assumption of normality through the use of histograms. The output of histograms for each of the study variables showed a symmetrical distribution, which means that the data are normally distributed. Linearity and homoscedasticity were examined through a residuals plot. In reviewing the residuals plot, it was noted that the points were randomly and evenly dispersed throughout the plots. This pattern was indicative that the assumptions of linearity and homoscedasticity were met.

A correlation was run for the data to determine if a relationship existed between the study variables. Table 4 presents the results of the correlation results for the study variables. The analysis, using Pearson's correlation coefficient, indicated a significant, positive relationship between graduation rate and instructional support variables, $r = .38$, $p < .001$. The output also indicated a significant, negative relationship between graduation rate and academic support variables, $r = -.43$, $p = .001$. Also, instructional support had significant, negative relationships with academic support, $r = -.20$, $p = .001$; student services, $r = -.21$, $p = .001$; and, institutional support, $r = -.18$, $p = .001$. And, the output indicated there was no relationship between graduation rate and student services. The output also indicated there was no relationship between graduation rate and institutional support.

This means that as the funding for instructional support increases, the graduation rate of an institution should increase. Conversely, as the funding for academic support increases, the graduation rate should decrease. Finally, as instructional support funding increases, the institution should experience a decrease in the funding for academic support, student services, and institutional support.

Table 4

Correlation Results for Study Variables (N=300)

Variable	2	3	4	5
1. GRADRT	.38*	-.43*	-.05	-.05
2. INST	_	-.20*	-.21*	-.18*
3. ACSUP		_	.06	-.08
4. STSVC			_	-.08
5. INSUP				_

Note: *$p < .001$

Tolerance statistics were run to test for multicollinearity. The threshold to assess the presence of multicollinearity for this study was 0.1. The tolerance levels for each study variable were analyzed. None of the study variables were determined to have a tolerance level below 0.1.

Findings

Research Question 1 examined the relationship between institutional expenditures and graduation rate. Research Question 2 cross-validated the prediction model. The original data ($N = 300$) was split in half for a training set ($N = 150$) to answer Research Question 1 and a test set ($N = 150$) to answer Research Question 2. For purposes of

clarity, findings for this study are presented first for Research Question 1 and then for Research Question 2.

Research Question 1

Do the funding allocations for instruction, academic support, student services, and institutional support adequately predict the three-year graduation rate at community colleges, primarily certificate and diploma granting institutions, in the southeastern region of the United States?

    a. What is the accuracy of the prediction model?

    b. Which variable has the strongest predictive power?

To address Research Question 1, a stepwise multiple regression analysis was conducted using 50% of the data to assess the predictors of the criterion variable graduation rate. Table 5 presents the results of the regression analysis, which indicated that the model was statistically reliable in predicting three-year graduation rates.

Table 5

Summary of Regression Output Results for Research Question 1 (N = 150)

Variable	B	SE B	β
INST	0.75	0.19	.30*
ACSUP	-1.71	0.39	-.32*
R^2		0.236	
R^2_{adj}		0.225	
F		22.670	

Note: Graduation rate is the dependent variable, *p < .001

A significant regression equation was found, $F(2, 147) = 22.67, p < .001$, with an R^2 of .236, indicating that approximately 24% of graduation rate can be accounted for by the predictor variables. The regression equation for predicting the graduation rate was:

Graduation Rate = 5.178 + .754 (Instructional Support) – 1.706 (Academic Support)

The results indicated two variables, instructional support and academic support, were significant predictors of graduation rate. Student services and institutional support were not significant predictors of graduation rate. Instructional support, $\beta = .30, p < .001$, had a significant positive *Beta* weight indicating a positive or direct relationship with the dependent graduation rate variable. Academic support, $\beta = -.32, p < .001$, had a significant negative *Beta* weight indicating a negative or indirect relationship with the dependent graduation rate variable.

Research Question 1a. To assess the accuracy of the prediction model, the coefficient of determination, R^2, was evaluated. The prediction model found in Research Question 1 included an R^2 value of .236. This indicates that approximately 24% of graduation rate can be accounted for by the predictor variables.

Research Question 1b. The *t* value of each significant variable was analyzed to determine the variable from the prediction model with the strongest predictive power. Instructional support, $t(147) = 4.05, p < .001$, and academic support, $t(147) = -4.35, p < .001$, are significant predictors of graduation rate. From the value of the *t*-statistics, instructional support had the strongest predictive power.

Research Question 2

Does cross-validation support the prediction model?

SPSS was used to cross-validate the prediction model obtained in Research

Question 1. The original data was randomly split in half in SPSS into a training set

(N=150) and a test set (N=150). Using the regression model obtained in Research

Question 1, a multiple regression analysis was run in SPSS against the test set data.

According to Field (2009) and Hastie et al. (2009), an evaluation of the R^2 and the

standard error of the estimate should be performed to determine if the test set is

comparable to the training set. The R^2 of each model should be relatively equal and the

standard error of the estimate should be within one standard error (Hastie et al., 2009).

Table 6 presents the results of training set compared with the results of the test set.

Table 6

Training Set (N = 150) and Test Set (N = 150) Results for Research Question 2

Data Set	R^2	SE of Estimate
Training Set	.236	18.30
Test Set	.310	19.14

Reviewing the results, the training set R^2 = .236 and the test set R^2 = .310. The

difference of .074 is minor. The results of the standard error of the estimate for the

training set of 18.30 and the test set of 19.14 creates a difference of 0.83. This was

within one standard error that Hastie et al. (2009) suggested. Given these results, the test

set was comparable to the training set.

Summary of Findings

The methodology used for this study addressed the research questions. The

gathered sample of institutions included thirteen institutions with missing data that were

excluded, resulting in a final sample of $N = 300$ complete observations for this study. Results obtained from multiple regression analysis indicated the existence of a relationship between three-year graduation rate and two of the expenditure variables at community colleges, primarily certificate and diploma granting institutions, in the southeastern region of the United States. The regression results identified predictor variables with both positive (direct) and negative (indirect) relationships with the dependent variable, graduation rate.

For Research Question 1, instructional support and academic support are significant predictors of graduation rate. Instructional support had a positive *Beta* weight, which indicated the existence of a positive or direct relationship with the dependent variable. Academic support had a negative *Beta* weight, which indicated the existence of a negative or indirect relationship with the dependent variable.

Research question 2 tested the performance of the prediction model from Research Question 1 using cross-validation. The results of the training set $R^2 = .236$ and the test set $R^2 = .310$ created a difference of .074 is minor. The results of the standard error of the estimate for the training set of 18.30 and the test set of 19.14 created a difference of 0.83. This is within one standard error that Hastie et al. (2009) suggested. Given these results, the test set was comparable to the training set.

Chapter 5 summarizes and presents the interpretation of these findings with regard to the objectives and the intentions of this study, compares findings with those of previous research and literature, and makes recommendations and conclusions.

Chapter V

SUMMARY AND CONCLUSIONS

Institutional resource distribution, whether in the areas of instruction, academic

support, student services, institutional support, or otherwise, may directly or indirectly

influence the satisfaction, retention, and ultimately, graduation of students. The findings

of this study may provide information for leaders addressing institutional priorities as

pressure for accountability and societal expectations for higher education continues to

grow. This topic is critical for higher education and is highlighted by the challenges of

competition, diminishing revenue streams, shifting student demographics, advancements

in technology, political demands for accountability, and public expectations for

improvements in access, affordability, and the quality of education. These forces all

create significant threats and opportunities for higher education (Goldstein, 2012).

Drawing upon Berger and Milem's (2000) organizational theory as a theoretical

framework, the purpose of the study was to examine the relationship between

institutional expenditures and three-year graduation rates as a means to influence the

spending and educational practice of institutions for the achievement of improved student

outcomes and institutional success. This study sought to determine if three-year

graduation rates might be predicted using federally defined expenditure categories. The

research results provides information to be used for informed decision-making

concerning resource allocation, budgetary alignment, and expenditure disbursement as a

means to achieve institutional priorities, improved graduation rates, and institutional success.

The first research question examined the relationship between institutional expenditures and the three-year graduation rate. The second research question sought to cross-validate the results of research question one. This chapter presents the interpretation of these findings, the implications for practice, and recommendations for future research.

<div align="center">Summary of Findings</div>

For Research Question 1, analysis of the model results in the identification of two variables with significant *Beta* weights, both positive and negative, indicating a positive, direct, or a negative, indirect, relationship with the dependent graduation rate variable. Instructional support, $t(147) = 4.05$, $p < .001$, had a positive *Beta* weight, which indicated the existence of a positive or direct relationship with the dependent variable. Academic support, $t(147) = -4.35$, $p < .001$, had a negative *Beta* weight, which indicated the existence of a negative or indirect relationship with the dependent variable.

These findings are consistent with previous research that found an increase or decrease in spending in certain expenditure categories may improve graduation rates. Gansemer-Topf (2004) and Ryan (2004) found that increased expenditures in instruction and academic support may influence graduation rates.

Research question 2 tested the performance of the prediction model from research question 1 using cross-validation. The results of the training set $R^2 = .236$ and the test set $R^2 = .310$ created a difference of .074 is minor. The results of the standard error of the estimate for the training set of 18.30 and the test set of 19.14 created a difference of 0.83.

This is within one standard error that Hastie et al. (2009) suggested. Given these results, the test set was comparable to the training set.

Conclusions and Implications for Practice

The purpose of this study was to examine the relationship between institutional expenditures and the three-year graduation rate as a means to influence spending and educational practice for the achievement of improved student outcomes and institutional success. The results of the regression analysis confirms that a relationship exists between institutional expenditures and graduation rates. The regression model analyzed significantly predicted three-year graduation rate. As indicated in the $R^2 = .236$, institutional expenditures account for approximately 24% of the variance in graduation rate.

The findings of this study are consistent with theories of student persistence and organizational behavior – student outcomes model. Bean (1980) and Berger and Milem (2000) examined how institutional factors may influence student persistence decisions. The researchers found that students were more likely to persist to graduation if the students shared the values, norms, and behaviors that were already in operation at the institution. Astin (1993) found that more than half the variations in student success come from key inputs in higher education, with graduation rates remaining the most popular measure of student performance. Student involvement in their educational community and connection with faculty has a positive association with learning, academic performance, and student retention.

Tinto (1975, 1993) investigated student integration based on experiences in the academic and social systems of higher education. Tinto's model suggests that dropout

behavior is more likely to occur when students are not sufficiently integrated into the fabric of the institution. According to Tinto (1993), institutional policy is a reflection of the specific situations in which institutions find themselves. As a result, institutions need to understand how their own actions influence their students. Once institutions obtain this understanding, policy makers were able to identify areas for action, policies to develop, and conduct ongoing evaluations to continuously improve and address student persistence and completion.

Berger and Milem (2000) focused on organizational behavior dimensions to provide an organizational perspective of college departmental impact on student outcomes, such as persistence and graduation rate. Organizational structures, practices, and policies are more likely to influence student outcomes through the kinds of student experiences and values they promote or discourage. As institutions align policies and practices in support of student success and build on the strengths of these relationships, students are more likely to persist until graduation.

Results of the regression model generated for Research Question 1 imply the existence of a positive or direct relationship between instructional support and graduation rate and a negative or inverse relationship between academic support and graduation rate. Stated differently, an increase in spending in instructional support infers an increase in graduation rate, while a decrease in spending in academic support infers an increase in graduation rate. Results of Research Question 2 validate the findings in Research Question 1. Table 7 presents the significant expenditure variables from the analysis of Research Question 1.

Table 7

Summary of Significant Variables for Research Question 1

Variable	*B*	*SE B*	β	*t*	*Sig.*
INST	0.75	0.19	.30*	4.05	.001
ACSUP	-1.71	0.39	-.32*	-4.35	.001

Instructional Support

The instructional support variable was identified as an influential variable in the regression model. Increased spending for instructional support predicts an increase in graduation rate. Included in the IPEDS instructional support category are expenditures related to instructional activities within the academic divisions of the institution, which includes not only faculty salaries, but also teaching supplies, expenditures for department research and public service activities not budgeted separately, faculty travel & development, and other expenses of an academic nature.

Recommendations based on these findings suggest that institutions should consider allocating resources to improve program delivery that addresses the needs of traditional, non-traditional, minority, continuing education, and distance education students. Purchases of instructional resources, learning resources, and education technologies may also be inferred from this finding. In order to eliminate student involvement gaps, institutions might consider additional funding for work-study positions to keep students involved with their academic department and career goals. The finding supports the theory that as institutions allocate resources to instruction, they are supporting the ability of students to connect with faculty and other students, which is

consistent with the integration and involvement theories of Astin (1993) and Tinto (1993).

Academic Support

The academic support variable was identified as an influential variable in the regression model. Decreased spending for academic support predicts an increase in graduation rate. Academic support is an expense category with the primary purpose being the support of the academic program and includes libraries, museums, and other activities including academic advising services. As we see the prevalence of on-line classes, institutions may rely less on physical space associated with libraries and more on on-line resources for faculty and students. Academic departments and faculty have assumed responsibility for academic advising, which may explain some of the reason that academic support variables had a negative relationship with graduation rate in the regression model.

This study's findings mimic findings of other similar studies that found an increase or decrease in spending in certain expenditure categories may improve graduation rates. Ryan (2004) and Gansemer-Topf (2004) found that increased expenditures in instruction and academic support may influence increased graduation rates. Gansemer-Topf (2004) identified an inverse relationship between student services expenditures and graduation rates, while Ryan (2004) was not able to identify any significant relationship between the variables.

Student Services

Analysis of the model resulting from this study did not identify the allocation of resources for student services as significant in predicting three-year graduation rates. The

student services category includes expenditures for activities whose primary purpose is to contribute to students' emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program. A significant amount of student services expenditures are used for administrative activities, including admissions and registrar related activities.

Since the majority of the institutions in this study, roughly 62%, are considered commuter institutions, many students may not be engaged with their instructors or peers. Prior studies by Tinto (1975), Astin (1993), and Braxton (2000) found that student involvement affects persistence. Tinto (1975) found that the lack of integration into the college's social system would lead to low commitment to that social system and increase the probability that students would decide to leave the institution. Astin (1993) found that students' academic and personal development can be enhanced by frequent interaction with faculty and peer interaction, whether academic, athletic, or social. Braxton (2000) suggested that students enter college with characteristics that affect their initial levels of commitment to the institution; however, their subsequent levels of institutional commitment are positively influenced by their level of integration into the social communities of the institution, which increased the level of persistence. It might be beneficial for the institutions in this study to invest more resources towards student services areas which could result in more students connecting with the social community of the institution, which would likely lead to increased persistence and graduation.

Institutional Support

Finally, institutional support category was found not to have a significant effect on graduation rate. Expenditures included within the institutional support category are

those such as executive direction and planning, legal and fiscal operations, community relations, and general administrative services.

Institutions can simplify organizational structure by decreasing layers of management and increasing the number of direct reports for each supervisor. They can eliminate redundancies in information technology, human resources, and finance by centralizing some of these services. Purchasing can be consolidated to ensure best deals with suppliers. Unused facility space could be rented during off-service hours. In addition, administrative functions such as payroll and building maintenance can be outsourced.

This finding is supportive of Berger and Milem (2000) who found that adding more administrative costs is least likely to contribute to improved graduation rates and may negatively affect student persistence. Ryan (2004) also found a negative and insignificant relationship between administrative expenditures and degree attainment.

Recommendations for Future Research

This study was limited to associate or certificate degree awarding institutions in the southeastern region of the United States. Future studies could replicate this study utilizing other geographic regions of the United States to determine if similar findings would result. Similar studies could be conducted for the for-profit or four-year institutions.

This study did not consider student body or organizational characteristics, such as admissions selectivity, religious affiliation, or Carnegie classification. Further research might consider such differences in determining the sample of institutions.

Another approach could involve disaggregation of the expenditure variables into payroll and operating expenditures to analyze which components of the expenditure variables affect graduation rate. Other researchers might consider gathering supplemental expenditure data to analyze the results. Further research could desegregate institutional funding at the federal and state level to determine the effect on graduation rate.

A surprising finding to the researcher was that student services expenditures were not significant in predicting graduation rates. This could be because many community colleges are commuter schools. Further research could investigate the individual services, such as athletics and student activities, that might affect graduation rate or student involvement at community colleges. An in-depth study could also be performed on the different major age groups at community colleges and how those groups might affect the graduation rate.

This study did not consider student decisions that may be influenced by external factors unrelated to institutional expenditure decisions. Future research could investigate how student decisions, such as student development, student demographics, student engagement, personal life issues, financial issues, and institutional differences, influence graduation rates.

Summary

Graduation from higher education institutions is critical for success in today's competitive economy. Society and governments are demanding that higher education institutions provide evidence that they are worthy of requested funding. Graduation rate

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has become a well-established means to measure these success rates; therefore, it is imperative for higher education institutions to increase their graduation rates.

This study's findings require institutional leaders to consider the implications of their decisions when determining the allocation of funds for expenditures. Leaders could use the results of this study to fine-tune the expenditure categories to support that most likely would result in increased student retention and graduation rates for their specific institution and campus.

From prior research noted earlier and the researcher's over fifteen years of experience in this area, the researcher expected to find that institutional expenditures within community colleges had an impact on graduation rate. Specifically, expenditures in instructional support, academic support, and student services would have a significant relationship, whether positive or negative, with graduation rate and expenditures in institutional support would not have a significant relationship with graduation rate. The researcher was surprised that this research project did not find a significant relationship between student services and graduation rate since the majority of the prior research focuses on student engagement and involvement to increase graduation rate.

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APPENDIX A:

Institutional Review Board Exemption Report

Institutional Review Board (IRB)
for the Protection of Human Research Participants
PROTOCOL EXEMPTION REPORT

PROTOCOL NUMBER: 03480-2017

INVESTIGATOR: Ms. Michelle Siniard

SUPERVISING FACULTY: Dr. James L. Pate

PROJECT TITLE: *The Influence of Resource Allocation on Graduation Rates: An Analysis of Community College Expenditures.*

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is Exempt from Institutional Review Board (IRB) oversight under Exemption Category 4. You may begin your study immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS:

☒ *If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.*

Elizabeth W. Olphie   *05/03/2017*

Elizabeth W. Olphie, IRB Administrator   Date

Thank you for submitting an IRB application.
Please direct questions to irb@valdosta.edu or 229-259-5045.

Revised: 06.02.16