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# Allocating for Graduation--A Correlation Analysis of Institutional Education and General Expenditures and Six-Year Graduation Rates at All Public, Four-Year or Above Degree-Granting Colleges and Universities

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**ALLOCATING FOR GRADUATION—A CORRELATION ANALYSIS OF  
INSTITUTIONAL EDUCATION AND GENERAL EXPENDITURES AND  
SIX-YEAR GRADUATION RATES AT ALL PUBLIC, FOUR-YEAR OR ABOVE  
DEGREE-GRANTING COLLEGES AND UNIVERSITIES**

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the Graduate College  
of  
Marshall University  
in partial fulfillment of the requirements  
for the degree of

Doctor of Education  
In Educational Leadership

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## **ABSTRACT**

### **Allocating For Graduation—a Correlation Analysis of Institutional Education and General Expenditures and Six-year Graduation Rates at all Public Four-Year or Above Degree Granting Colleges and Universities**

This study utilizes six-year graduation rates and E&G expenditures for the population of all public, four-year or more degree-granting institutions in the United States, as reported in the National Center for Educational Statistics' IPEDS database, to examine the correlation between graduation rate and institutional expenditures expressed as percentages of total institutional E&G expenditure. Results of this study's partial correlation analysis revealed there is not a strong correlation between graduation rate and levels of E&G expenditures. Further, the study showed that the proportions of E&G expenditures do not vary appreciably at institutions with the highest, lowest, or mid-level six-year graduation rates. Public higher education administrators, politicians, and policy makers faced with the challenge of improving graduation rates should be made aware that higher graduation rates cannot be "bought" by striving for optimal resource allocation levels.

## **DEDICATION**

This dissertation is lovingly dedicated to my wife, Connie, for her sacrifice, support, and encouragement throughout the years prior to, and during, my second round of graduate years. She has been my light in times of darkness.

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Like most long-term goals, the attainment of a terminal degree is possible only with the support and encouragement of others. I made my way through the gauntlet with the help of the following, to whom I am most appreciative:

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## TABLE OF CONTENTS

ABSTRACT .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENTS .....	iv
TABLE OF CONTENTS .....	v
LIST OF TABLES .....	vii
CHAPTER 1: INTRODUCTION .....	1
Problem Statement .....	7
Purpose of the Study .....	7
Research Questions .....	8
Operational Definitions .....	8
Limitations .....	13
Assumptions .....	15
Significance .....	15
Summary .....	16
CHAPTER TWO: REVIEW OF LITERATURE .....	18
Classification of Previous Studies .....	18
<i>Student Retention Theories</i> .....	18
<i>The Role of Financial Aid in Persistence</i> .....	21
<i>Other Predictors of Persistence</i> .....	27
<i>Spending as a Form of Organizational Behavior</i> .....	30
<i>The Role of Ratios in Persistence</i> .....	33
Summary .....	40
CHAPTER THREE: METHODS .....	42
Purpose of the Study .....	42
Research Design .....	43
Population .....	43
Database .....	44
Correlation Variables .....	44
Summary of Methods Used .....	45

Data Analysis .....	46
Summary .....	47
CHAPTER FOUR: RESULTS .....	48
Presentation and Analysis of Data .....	48
Descriptive Parameters .....	49
Statistical Tools and Data Manipulation.....	49
Analysis.....	51
Summary of Findings.....	55
CHAPTER FIVE: SUMMARY AND CONCLUSIONS	57
Purpose.....	57
Population .....	57
Methods.....	58
Summary of Findings.....	59
Conclusions and Implications.....	60
Recommendations.....	67
Summary .....	68
REFERENCES .....	69
APPENDIX.....	78
Curriculum Vitae .....	78

## LIST OF TABLES

Table 1	<i>Zero Order and Partial Correlations</i>	Page 52
Table 2	<i>Comparison of Bachelor's Graduation Rates (150% of Time) and Percentage of Total E&amp;G Spending Variables for Entire Population of Four-Year or More Public Degree Granting Institutions Which Accept Title IV Funds</i>	Page 53

## CHAPTER 1: INTRODUCTION

According to Titus (2006), only a small amount of research has examined the relationship between persistence and institutional expenditures. In his study, persistence was defined as “being enrolled or having completed an undergraduate degree program three years after first enrolling in the same four-year institution” (p. 258). One limitation of Titus’ study was that it did not address college degree completion. Adelman (1999) asserted that persistence to graduation, rather than retention rates, should be the focus of measuring success in higher education; “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).

The present study will examine if there is a significant relationship between six-year graduation rate for bachelor’s degree seeking students and the ten categories of institutional spending that make up total education and general (E&G) spending on the US Department of Education’s annual Integrated Postsecondary Education Data System (IPEDS) Finance Survey. Use of the IPEDS database will provide accurate financial and graduation records for the study, which is limited to the entire population of all *public*, four-year or above degree-granting institutions in the United States which participate in the Title IV federal financial aid program.

Carey, writing for the Education Trust, has stated, “American’s colleges and universities have a serious and deep-rooted problem: far too many students who enter our higher education system fail to get a degree” (2004, p. 4). Americans are concerned about higher education’s ability to provide the number of graduates required to compete in the global marketplace of the 21st century. In the past 10 years, the United States has

dropped from first to second in college attainment among developed nations. While college attainment rates have more than doubled for some countries over 20 years, the U.S. rate, alone among its peers of developed nations, is unchanged (p. 4). At a time when the Bureau of Labor Statistics shows a need for millions of new jobs that require a four-year degree or more in the coming decade, hundreds of thousands of young Americans leave the higher education system without a degree.

As high technology jobs are increasingly exported to foreign countries, policy makers are placing higher education under the microscope, and the findings are not encouraging. Far too many students who begin college never finish; less than four in 10, full-time, first-time degree-seeking students graduate within four years, and just over six in 10 graduate in six years (Carey, 2005).

The focus of the Higher Education Act of 1965 was on assuring access to higher education for all Americans. Today, on the eve of the Reauthorization of the Higher Education Act, the focus has shifted to accountability. Shin & Milton (2004) cited a State Higher Education Executive Officers (SHEEO) survey conducted between 1996 and 1997, which found the most commonly used performance indicator by state higher education governing bodies is the six-year (150% of normal time) graduation rate of a full-time, first-time freshmen cohort six years after their entry into higher education. The American Association of State Colleges and Universities (2002) noted that the Graduation Rate Survey (GRS) has been administered by the National Center for Education Statistics since 1996 and that the “six-year graduation rate is well established as an accountability indicator” (p. 3).

Student persistence to graduation in a timely manner is obviously a major, ongoing concern for state and federal policymakers. In fact, persistence (and retention of students from the freshman to sophomore year) has been a major focus of study dating back to Spady (1970). In 1975, Tinto greatly expanded interest in the topic when he provided a theoretical synthesis of recent research about dropouts from higher education. In the subsequent three decades, many researchers, including Tinto, have expanded upon the body of research on student retention and persistence by examining the role that student and institutional characteristics play in the higher education process.

In 1987, Tinto detailed his theory that institutions play a major role in influencing the social and intellectual development of students. According to Tinto, improved student retention “springs from the ongoing commitment of an institution, of its faculty and staff, to the education of its students” and “requires that institutions adopt a new way of thinking about educational departure” (p. 187).

Among the most frequently cited researchers who have addressed student retention are Astin; Bean; Berger and Braxton; Cabrera, Nora, and Castaneda; and Pascarella & Terenzini. The unifying theme of this and similar research has been a focus on student involvement, student experiences, student engagement (Kuh, 2005), and educational practices (Chickering & Gamson, 1999). While studies have examined the varying influences of financial aid upon student persistence to graduation, “researchers have given little attention to the role and effect of institutional expenditures on college students” (Ryan, 2004).

Consideration of the role of institutional expenditures and/or institution-specific variables on student graduation rates has been the subject of a small number of recent

dissertations. In addition to Ryan, dissertations by Fenske (1993), Brune (1996), Carter (2002), Deike (2003), Hwang (2003), O’Rear (2004), Gansemer-Topf (2004), Stater (2004), and Whitaker (2004) have addressed the influence of institutional behaviors, specifically various institutional expenditures, on graduation rates.

Fenske, examining the role of student financial aid (specifically comparing loans versus grants) in retention and degree attainment at a single large, public urban university (Arizona State University), found that “while the type of aid [did] not have a significant relationship to degree completion . . . amount of total aid [did] have a significant relationship to outcomes” (iii). Brune (1996) analyzed the perceptions and attitudes of higher education administrators toward institutional factors which impact time to graduation; resource allocation was one of the four categories in her survey. She found that while resource allocation “was not significant overall . . . percentages of resources invested in salaries and benefits for faculty . . . in operating expenses . . . and percentage of resources devoted to operating capital outlay . . . [had] varying implications for degree completion for each of the eight colleges [studied]” (p. 154). Carter (2002) addressed the effects of institutional characteristics on persistence and graduation rates. He found that selectivity was the most powerful predictor of graduation rates across all ethnic groups.

Deike (2003) considered preenrollment, enrollment, and financial aid variables as part of a 12-year longitudinal study of student graduation using survival analysis at a large public university in the northeast. Relevant to the current study, he found that the total aid amount students received by semester and the percentage of total aid to cost of attendance at the institution were not statistically significant (p. 87).

Gansemer-Topf's 2004 dissertation presented the results of a regression analysis used to determine the relationship between institutional expenditure patterns and graduation rates at private baccalaureate and general colleges and universities from the perspective of the relationship between expenditures per student and retention and graduation rates, as well as from the relationship between the percentage of institutional expenditures and retention and graduation rates. She found that "the independent variables significantly predicted retention and graduation rates, but the specific independent variables (i.e. instruction, academic support, et cetera) that significantly contributed to the models varied" (p. 158).

Stater (2004) conducted a study at three large public universities to examine the effects of grants, loans, and merit aid on graduation. His study found "financial aid has complex and often unintended effects on educational outcomes. Grants, loans, and merit aid all appear to affect graduation rates at flagship institutions" mainly because of the ways in which they modify enrollment and persistence. Ryan (2004) examined the effect of institutional expenditures on degree attainment utilizing data from the Integrated Postsecondary Education Data System (IPEDS) and data from the 1996 edition of The College Board's annual publication, "The College Handbook." His study suggested that student persistence to graduation is impacted by the amount and types of financial expenditures within colleges and universities (p. 89).

Other dissertations of recent years, such as Hwang (2003) and Whitaker (2004) have measured the impact of tuition and financial aid on persistence to graduation. Hwang concluded that for each \$1,000 tuition increase, the probability of persistence for first-time, first-year freshmen increased by 12%, perhaps suggesting that students

perceive higher tuition as exemplifying higher educational quality at their institutions. Whitaker stated that while literature shows a strong relationship between receiving financial aid and persisting to graduation, there was “conflicting evidence . . . that suggests [the] influencing factor of financial aid . . . may provide negative or positive variable effects, which is not predictable” (p. 82).

Outside of these dissertations, perhaps St. John has been the most frequent contributor of studies on the impact of institutional cost and financial factors on student persistence. Independently (St. John, 2000) and in collaboration with others (e.g. Paulsen & St. John, 1997; St. John, Hu, & Weber, 2001; St. John, Hu, Simmons, Carter, & Weber, 2004; St. John, Paulsen, & Carter, 2005), St. John has examined the relationship of expenditure and graduation rates on the state and national levels. Additional researchers in this area have included McPherson, Schapiro, & Winston, 1989; Porter & Barberini, 1989; Bresciani & Carson, 2002; and Titus, 2006.

Ryan (2004) has echoed the importance of St. John’s ongoing investigation into the relationship between institutional finances and persistence to graduation. He stated that “research that focuses on the impact of institutional expenditures and addresses the lack of an expenditure component in persistence frameworks may lead to improvements in student persistence frameworks and theory development while clarifying our understanding of expenditure effects” (p. 4). While a vast amount of research has examined student persistence to graduation, few studies have been performed to analyze the impact of institutional expenditures on the graduation rates of undergraduates.

## **Problem Statement**

Despite previous research, lacking in higher education is a resource allocation profile that correlates expenditure levels to graduation rate for all public, four-year or above degree-granting institutions (irrespective of Carnegie classification). For purposes of this study, degree-granting institutions are defined as per the National Center for Educational Statistics (NCES) definition: postsecondary institutions which are eligible for Title IV financial aid programs that award a baccalaureate or higher degree. Such a profile, developed with information from a national database, could fill this void and perhaps contribute to a fuller understanding of findings from previous research studies which have examined, individually, the influence that some of these expenditures have on persistence rates at selected public, private, or a mixed population of public and private institutions.

## **Purpose of the Study**

The purpose of this study is to examine the correlation between the ten nationally reported operating expenses of higher education institutions that comprise total education and general (E&G) expenditures as reported annually to the Integrated Postsecondary Education Data System (IPEDS), and the six-year graduation rates of baccalaureate students at all public, four-year degree-granting institutions in the United States. The NCES, as part of reporting for IPEDS, requires institutions to satisfy the requirements of the Student Right-to-Know legislation by annually reporting the six-year graduation rate of their full-time, first-time degree seeking undergraduates. Another section of the annual IPEDS survey, Finance, requires the same institutions to report current expenditures by function. While the national IPEDS database contains both the six-year graduation rates

and the ten categories that comprise total E&G expenditures for the entire population of public, four-year or above degree-granting institutions, the correlation between six-year graduation rates and the ten categories of E&G expenditures for this population is currently unknown and has not been found as a part of any study during the literature review for the current study.

### **Research Questions**

The following research questions will be addressed by this study:

1. What is the correlation, if any, between each of the ten categories of E&G expenditures as reported in the IPEDS finance survey for the 1998-1999 academic year and six-year graduation rate at public, four-year or above degree-granting institutions as reported in the 2004 IPEDS graduation rate survey for the 1998 freshman cohort when each of the ten expenditure categories is expressed as a proportion of the total E&G expenditure?
2. What are the differences, if any, in the proportions of E&G expenditures in the population at the following levels: at institutions with the highest six-year graduation rates (arbitrarily set at 60% and above), at institutions with the lowest six-year graduation rates (arbitrarily set at 30% and below), and those in the middle range of six-year graduation rates (arbitrarily set at 31% to 59%)?

### **Operational Definitions**

Definitions as provided in the Glossary for the annual IPEDS survey (NCES, 2005-06):

**Education and General (E&G) expenditures** (used prior to GASB 34/35)—Costs incurred for goods or services used to provide instruction, public service, academic

support, student services, institutional support, operation and maintenance of plant, and scholarships and services.

**FASB (Financial Accounting Standards Board)** — Financial Accounting Standards Board (FASB) is recognized by the American Institute of Certified Public Accountants (AICPA) as the body authorized to establish accounting standards. In practice it defers to the Governmental Accounting Standards Board (GASB) for the setting of accounting standards for local and state government entities.

**GASB (Governmental Accounting Standards Board)** —The Governmental Accounting Standards Board (GASB) establishes accounting standards for local and state entities including governmental colleges and universities.

**General Purpose Financial Statement (GPFS)** — Financial statements issued to parties outside the management of an institution. These are provided to creditors, donors, public officials outside the institution, and other external parties. GPFS differ from internal management financial reports, although GPFS may also be of use to board members and officials of the institution. The audit opinion is issued on the GPFS.

**Graduate Rate Survey (GRS)** —Data are collected on the number of students entering the institution as full-time, first-time, degree-or certificate-seeking undergraduate students in a particular year (cohort), by race/ethnicity and gender; the number completing their program within 150% of normal time to completion; the number that transfer to other institutions if transfer is part of the institution's mission; and the number of students receiving athletically-related student aid in the cohort and number of these completing within 150% of normal time to completion. The GRS automatically generates worksheets that calculate rates, including average rates over 4 years.

**IPEDS (Integrated Postsecondary Education Data System)**—The Integrated Postsecondary Education Data System (IPEDS) conducted by the NCES. The web-based data collection system currently consists of the following components: Institutional Characteristics (IC); Completions (C); Employees by Assigned Position (EAP); Fall Staff (S); Salaries (SA); Enrollment (EF); Graduation Rates (GRS); Finance (F); and Student Financial Aid (SFA).

**Normal time to completion** — The amount of time necessary for a student to complete all requirements for a degree or certificate according to the institution's catalog. This is typically 4 years (8 semesters or trimesters, or 12 quarters, excluding summer terms) for a bachelor's degree in a standard term-based institution.

**Instruction** — The instruction category includes academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and remedial and tutorial instruction conducted by the teaching faculty for the institution's students. Excluded are expenses for academic administration where the primary function is administration (e.g., academic deans).

**Research** — This category includes all expenses for activities specifically organized to produce research outcomes and commissioned by an agency either external to the institution or separately budgeted by an organizational unit within the institution. The category does not report nonresearch sponsored programs (e.g., training programs).

**Public service** — Reports expenses for all activities budgeted specifically for public service and for activities established primarily to provide noninstructional services beneficial to groups external to the institution. Examples are seminars and projects

provided to particular sectors of the community. Also included are expenditures for community services and cooperative extension services.

**Academic support** — A functional 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 educational materials . . . organized activities that provide support services to the academic functions of the institution . . . media such as audiovisual services; academic administration . . . and formally organized and separately budgeted academic personnel development and course and curriculum development expenses. . . .

**Student services** — Reports 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. Examples are career guidance, counseling, and financial aid administration. This category also includes intercollegiate athletics and student health services, except when operated as self supporting auxiliary enterprises.

**Institutional support** — Reports expenses for the day-to-day operational support of the institution, excluding expenses for physical plant operations. Also includes expenses for general administrative services, executive direction and planning, legal and fiscal operations, and public relations/development.

**Operation & maintenance of plant** — Reports all expenses for operations established to provide service and maintenance related to grounds and facilities used for education and general purposes. This category also includes expenses for utilities, fire protection, property insurance, and similar items.

**Scholarships and fellowships expenses, excluding discounts & allowances** — Reports scholarships and fellowships expenses in the form of outright grants to students selected and awarded by the institution. Reports only amounts that exceed fees and charges assessed to students by the institution and that would not have been recorded as discounts & allowances. This classification includes the excess of awards over fees and charges from Pell grants and other resources, including funds originally restricted for student assistance. This category does not include loans to students or amounts where the institution is given custody of the funds but is not allowed to select the recipients; these are transactions recorded in balance sheet accounts and not revenues and expenses.

**Mandatory transfers** — Those transfers that must be made to fulfill a binding legal obligation of the institution. Includes mandatory debt-service provisions relating to academic and administrative buildings, including (1) amounts set aside for debt retirement and interest; and (2) required provisions for renewal and replacements to the extent not financed from other sources. Also includes the institutional matching portion for Perkins loans when the source of funds is current revenue.

**Nonmandatory transfers** — Transfers from current funds to other fund groups made at the discretion of the governing board to serve a variety of objectives, such as additions to loan funds, funds functioning as endowment (quasi-endowment), general or specific plant additions, voluntary renewals and replacement of plant, and prepayments on debt principal.

**Total Educational and General Expenditures** — For each institution, this consists of the sum of the ten preceding variables (Instruction through Nonmandatory transfers) as described above and as reported in the institution's GPFS.

## **Limitations**

Porter and Barberini (1989) have cautioned that “it is extremely difficult to determine causality in research involving the persistence” to graduation of students, but institutions need not “deal in causality where student persistence is concerned... [i]f the magnitude of the differences observed in studies based on the financial aid/student persistence ...is significant” (p. 29). By extension, the same should be considered apropos in regards to the ten independent variables in this non-experimental research study if they demonstrate a high correlation to six-year graduation rate.

This study is based upon an existing database, one in which “the evaluator cannot select who is to be exposed to the [independent variables], and to what degree” (United Kingdom Evaluation Society, 2003). Kerlinger (1973), one of the leading educational research methodologists, called this form of research *ex post facto* research. However, Kerlinger (1986) later used the term *nonexperimental* research to describe an empirical inquiry. A *nonexperimental* research study, according to Kerlinger, is one in which the researcher “does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about relations among variables are made, without direct intervention, from concomitant variant of independent and dependent variables” (Johnson, 2000, How Should, ¶ 4).

In a truly experimental study, the researcher is able to manipulate the independent variables, randomize, and interpret results. In a *nonexperimental* study such as the present one, the researcher cannot manipulate the (preexisting) data for the independent variables, or randomly select those involved in the population studied, and runs the risk

of misinterpreting the results obtained. In a correlational study, “there may be measured or unmeasured variables affecting the results” (Field, 2000, p. 89). Causation cannot be implied from a strong correlational relationship, but a strong degree of correlation can suggest that a fruitful area for additional study has been indicated. The present study is a nonexperimental study; therefore, its results cannot imply causation. Because of the causal limitations inherent in nonexperimental designs, strong correlations—if found in the study—can only infer causation; they cannot prove it.

The researcher has limited the study to the population of all public, four-year or above degree-granting institutions in the United States and chosen to use only the IPEDS database to obtain six-year graduation rates and operating expenses for these institutions. Public institutions vary from private institutions in regards to educational costs and financial (Voorhees, 1997), just as budget priorities differ for two-year and four-year public institutions; therefore, it is appropriate to study the population of only public, four-year or above degree-granting institutions. Similarly, the use of a single database reduces the opportunity for error that can occur when variables from two or more databases from different research entities are merged. Graduation rates are herein limited to the fall 1998 cohort of full-time, first-time freshmen who graduated within 6 years (by 2004) of first enrolling in a particular institution. The researcher has chosen to exclude from the analysis any cases for which the relevant data was unreported for the years analyzed (academic year 1998-1999 for total E&G expenditures and six-year graduation rates for the fall 1998 cohort as reported in the 2004 graduation rate survey).

## **Assumptions**

The researcher has assumed that the IPEDS data base is accurate, and that all graduation rate and operating expense data are properly attributed to the correct institution.

## **Significance**

This study will fill a void in the literature devoted to examining the correlation between institutional E&G expenditures and six-year graduation rate, and provide a more comprehensive understanding of this area by including institutional spending categories that have been omitted from previous studies. This research has been guided by the rationale that all variables comprising E&G expenditures should be included in a study of the correlation between said expenses and six-year graduation rates.

State and federal policy makers, higher education governing boards, and administrative leadership at higher education institutions could utilize the results of this study to assess the allocation of E&G expenditures at higher education institutions and make adjustments to spending levels at institutions. Each of the ten categories of operating expenses represents an aggregate of annual spending for separate administrative areas (such as academic support, student services, etc). By examining the correlation of each to graduation rate, individuals can more readily mentally grasp the impact of the vast number of intermingled financial decisions that produces the annual total for each operating expense category (Graicunas, 1937).

Because the findings of this study focus only on the broad E&G expenditure categories, they might serve as a general guide for policy makers and administrators to make modifications in the sums of money expended in areas which the literature

indicates are most conducive to improving graduation rates. An advantage of this study is that it utilizes the most recent and comprehensive national database available and has as its subject only all *public*, four-year degree-granting institutions. Additionally, the study appears to be the first to utilize all ten operating expense categories that comprise total E&G expenditures, as reported to IPEDS, with the advantage of maintaining the integrity of data by obtaining graduation rates from the same national database.

### **Summary**

As detailed above in the brief review of relevant literature, previous studies examining the relationship between institutional spending and graduation rate have either examined a single aspect of institutional spending (usually financial aid) or analyzed the impact of institutional spending exclusively at private institutions or a combination of private and public institutions. As O'Rear (2004) observed, "while many student-specific and institution-specific variables have been studied in prior research, there is a knowledge void in investigations looking at the relationship of institution-wide variables" to retention (p. 30).

In 1982, Tinto advised that his 1975 interactionalist model of student dropout did not "seek to directly address the impact of financial press or other forces external to the institution's immediate environment" (p. 688). Of course, then, as now, external forces, especially in the form of local, state, and federal funds provided to the institution, do dictate the shape of the institution's internal environment. Institutions make decisions about where and how to allocate limited resources, and those decisions impact students, but the degree to which internal allocation of resources affects student persistence to graduation is unknown.

The evaluation of institutional expenditures as a form of organizational behavior that influences student graduation finds a theoretical framework in the work of Birnbaum (1988). More than a decade later, Berger (2002), crediting Astin and Scherrei (1980) as the first researchers to study the impact of organizational structure on student outcomes, adapted Birnbaum's 1988 model of organizational structure to investigate how individual students are influenced by institutional structure.

## **CHAPTER TWO: REVIEW OF LITERATURE**

The purpose of this review of selected literature is to provide an overview of major studies in the area of retention of college students to completion (graduation), and the growing efforts of some researchers to show a correlation between institutional graduation rate and financial expenditures.

### **Classification of Previous Studies**

#### ***Student Retention Theories***

Since 1975, when Tinto's model of student dropout appeared, a great deal of research has been conducted on ways to improve the retention rate at colleges and universities. Tinto's interactionist theory of student departure suggests that students are more likely to persist in college if the institution makes efforts to increase the student's sense of belonging to the institution and involvement with the faculty and activities offered by the institution. In 1982, Tinto stated that his 1975 model "sought to highlight the complex manner in which social interactions within the formal and informal academic and social systems of the institution impinge upon student dropout," and asked institutions to consider how they, themselves, may be contributing to the dropout problem that they seek to correct (p. 688).

While retention literature of the past thirty years has been dominated by efforts to prove, disprove, integrate, or improve upon Bean and Tinto's models, there has been a growing trend for researchers and policymakers to focus on the subject of persistence to graduation in a timely (usually 150% of normal time) manner, rather than concentrating

efforts largely upon retention of freshmen to the second year. Researchers such as Adelman (1999) have asserted that persistence to graduation, rather than retention rates, should be the focus of measuring success in higher education; “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).

The literature in recent years has used institutional expenditures as one way to examine the possible correlation of finances and institutional graduation rate. Student persistence to graduation in a timely manner is a major, ongoing concern for state and federal policymakers. Persistence and retention of students from the freshman to sophomore year has been a major focus of study dating back to Spady (1970). In 1975, Tinto greatly expanded interest in the topic when he provided a theoretical synthesis of recent research about dropouts from higher education. In the subsequent three decades, as detailed below, many researchers, including Tinto, have expanded upon the body of research on student retention and persistence.

In addition to Tinto, other frequently cited researchers who have addressed student retention include Astin; Bean; Berger and Braxton; Cabrera, Nora, and Castaneda; and Pascarella & Terenzini. Astin (1977), following up on his 1975 national study of college dropouts, found that programs to increase student involvement enhanced student persistence and magnified the effect of undergraduate education on the student’s behavior, personality, satisfaction, and career progress. He concluded that a divide exists between educational policy and educational research because policy makers tend to view the allocation of resources as an end rather than a means to empower educational results.

Bean's 1982 causal model of student attrition grouped men and women according to high and low confidence levels on the basis of interaction effects. In order of decreasing importance, the ten independent variables found to influence dropout from higher education were: intent to leave; grades; opportunity to transfer; practical value; certainty of choice; loyalty; family approval; courses; student goals; and major and job certainty.

Berger and Milem (1999) found that examining direct and indirect effects of Tinto's 1975 model of individual student departure with constructs of Astin's (1984) theory of involvement provides a useful combined model of persistence. The researchers found that students were more likely to persist to graduation if they shared the values, norms, and behaviors that they found already operating at the institution; therefore, Berger and Milem concluded, it is important to find ways for campus environments to represent the values of a wider spectrum of students.

In 1987, Tinto detailed his theory that institutions play a major role in influencing the social and intellectual development of students. According to Tinto, improved student retention begins with the commitment of an institution, its faculty, and its staff to the education of its students and "requires that institutions adopt a new way of thinking about educational departure" (p. 187). The unifying theme of this and similar research has been a focus on student involvement, student experiences, student engagement (Kuh, 2005), and educational practices (Chickering & Gamson, 1999).

Among the programs which have been developed to address the issues of student learning, student-faculty contact, communication, and engagement are Chickering and Gamson's Seven Principles for Good Practice in Undergraduate Education. First printed

in its final form in 1987, the seven principles have been adopted numerous times (Chickering and Gamson, 1999). The College Student Experiences Questionnaire, the Learning Process Inventory and Assessment, and the National Survey of Student Engagement are among the noted adopters.

Pascarella and Terenzini (1979) conducted a study to broaden the work of Spady and Tinto by examining the relationship between freshman year persistence/withdrawal decisions and various forms of informal student-faculty contact outside the classroom. Using setwise multiple regression analyses to predict freshman persistence/withdrawal decisions from a random sample of Syracuse University students, the researchers concluded that the findings “tend to support the importance which both the Spady and Tinto models attach to student informal contact with faculty beyond the classroom in fostering . . . social and academic integration and . . . the likelihood of students persisting in college” (p. 217).

### ***The Role of Financial Aid in Persistence***

Bresciani and Carson (2002) examined Mortenson’s belief that it is the amount of unmet need that determines whether students continue to enroll in college. Unmet need is the sum of money a student still needs after all awarded aid has been subtracted from total student need. The study concluded that “the level of unmet need is more predictable of a student’s ability to persist than is percentage of gift aid” (p. 121), and recommended that institutions could improve persistence rates by making changes in financial aid packages that would reduce the levels of unmet need.

Cabrera, Nora, and Castaneda (1993) simultaneously tested Tinto’s Student Integration Model (1987) and Bean’s Student Attrition Model (1982) in terms of

persistence. The researchers found that “financial aid, academic advising, counseling and other support services, per se, are not likely to improve retention,” rather the various student support services should be combined in a united effort to address student attrition (p. 136).

Porter and Barberini (1989) examined the ways student financial aid officers could collaborate with institutional researchers to study issues such as the relationship between student financial aid and undergraduate student persistence. The authors advised that while institutions understand that their revenues are impacted by student persistence to the same degree as by recruitment of new students, strangely, few “actually include financial aid considerations into . . . tuition and budgeting decisions” (p. 19). As Bresciani and Carson (2002) would state more than a decade later, Porter and Barberini contended that unmet need is more important than total dollars awarded to students.

In 2000, St. John wrote that student financial aid’s impact on enrollment is not clearly defined by existing research: “some researchers continue to hold doubts that student aid influences enrollment and persistence, while others continue to develop increasingly sophisticated methods in their analyses of aid-packaging strategies” (p. 61). Building on his previous research, St. John stated that student aid and college prices influence persistence, but that while a student may choose to enroll at a particular institution because of an attractive financial-aid package, the package may not be adequate to keep a student in college as he or she becomes aware of the actual cost of living at the institution.

St. John found that as the value of government grants declines, researchers have begun to recognize the critical impact of student aid. He cited Tinto as an example of a

leading theorist on retention who had once stated that financial problems were merely a “polite excuse” for dropping out of college. By 1987, Tinto had revised his model based on a significant body of new persistence research (p. 69) to include financial considerations. St. John reported in an earlier study (St. John, Paulsen, and Starkey, 1996) that some national research has shown financial considerations have explained more variance in persistence than variables related to the college experience and college achievement. St. John (2000) concluded that institutions should routinely assess the impacts of student aid on first time enrollment and persistence, in order that they might make better decisions about the amounts to invest in student grants and the level of emphasis to place on loans and work.

St. John, Hu, and Weber (2001) examined the relationship between state grants on college persistence by students in Indiana. As in an earlier case study of the state of Washington, the researchers concluded that “adequate student aid can help equalize opportunity to persist” (422) for minorities and recommended that student financial aid should be periodically evaluated using existing data sources.

In 2004, St. John, Hu, Simmons, Carter, and Weber analyzed random samples of students enrolled in public institutions in a Midwestern state. The study revealed that choice of major, for African Americans more than Whites, had a direct impact on persistence. The authors stated their study offered new insights on prior findings on student financial aid. They surmised that African Americans are more concerned about immediate financial returns on their educational investment, and were therefore more likely to pursue certain majors that promised these financial returns.

Hoef (2004) examined the differing degrees to which background, achievement and aspirations, institutional characteristics, college experience, prices, debt, and financial aid affected persistence in male and female students at four-year colleges, using data obtained from the 1996 National Postsecondary Student Aid Study (NPSAS). Of particular interest to the present study were Hoef's findings regarding financial aid's impact on the persistence of students. The variables of high debt, medium debt, and low debt were all negatively associated with persistence for males, while only medium debt showed a negative effect on persistence for females, with a much smaller effect size than for males. Students of both sexes receiving an increase in grants and loans were more likely to persist, as were those of both sexes receiving an increase in amount of work study. Hoef noted that current federal policy supporting increases in loans and decreases in the amounts of grants has had a negative impact, particularly on male persistence, and should be changed to improve student persistence levels.

Fenske (1993) examined the role of student financial aid, specifically comparing loans versus grants on retention and degree attainment at a single large, public urban university, Arizona State University. She found that "while the type of aid [did] not have a significant relationship to degree completion . . . amount of total aid [did] have a significant relationship to outcomes" (iii).

Deike (2003) considered preenrollment, enrollment, and financial aid variables as part of a 12-year longitudinal study of student graduation using survival analysis at a large public university in the northeast. Relevant to the current study, he found that while the total aid amount students received by semester and the percentage of total aid to cost

of attendance at the institution were not statistically significant, they were approaching significance (p. 87).

Stater (2004) conducted a study at three large public universities to examine the effects of grants, loans, and merit aid on graduation. His study found that financial aid's impact on persistence is complex and often produces unforeseen effects. At flagship institutions, financial aid appears to impact graduation rates mainly because of the ways in which it modifies enrollment and persistence.

Dissertations of recent years, such as Hwang (2003) and Whitaker (2004) have measured the impact of tuition costs and financial aid on persistence to graduation. Hwang concluded that for each \$1,000 tuition increase, the probability of persistence for full-time, first-time, first-year freshmen increased by 12%, perhaps suggesting that students perceive higher tuition as exemplifying higher educational quality at their institutions. Whitaker found "conflicting evidence ... that suggests [the] influencing factor of financial aid, among others, may provide negative or positive variable effects, which is not predictable" (p. 82).

Paulsen and St. John (1997) examined the financial connection between college choice and persistence for a sample of both public and private four-year colleges and universities. According to the researchers, studies increasingly have shown that financial variables such as financial aid and educational costs affect student choice of institution, as well as persistence. Paulsen and St. John included six variables in their consideration of the effects of financial variables to persistence: grant dollars, loan dollars, work dollars, tuition dollars, housing dollars, and food/travel dollars. For their public sector sample, they found that five of the six financial variables were significantly related to

persistence for at least one of four steps of their analysis. In their private sector sample, all six financial variables were significantly related to persistence in at least one of four steps of analysis. The researchers concluded that financial aid counselors should become more aware of the financial constraints students face.

St. John, Paulsen, and Carter (2005) adapted Paulsen and St. John's earlier (1997) financial nexus model to explore the connection between college choice and persistence for African Americans and Whites. They found that sensitivity to finances played a larger role in African American choice of college, and in their persistence decisions. While tuition and student financial aid played a pivotal role in their choice of college, grants and tuition represented a large, direct influence on their persistence. After controlling for living expenses, Whites found loans more effective than did any other groups. The researchers concluded that the current federal loan policies "accentuate the privileges of Whites and increases inequities between White and African Americans" (p. 565).

Paulsen (1998) examined recent research on how the costs associated with investing in a college education affect student assessment of the return on their educational investment. He found that an important factor that can bring about change in the likelihood of a student attending or persisting in college as a result of changes in tuition or grants is how the student views the impact of increased costs on their appraisal of the potential returns of a college education. Paulsen cited research that found African American students are more affected by increases in tuition and decreases in financial aid than are Whites, even "after controlling for income, ability, and socioeconomic backgrounds of students" (p. 484). Because students are responsive to price and

subsidies, tuition, grants, and loans represent the major policy implements for higher education leaders, policy analysts, and other decision makers to use in cultivating access, choice, and opportunity in advanced education. Paulsen recommended that higher education leaders should produce and implement financial policies that can further advance equal access and choice in higher education.

### ***Other Predictors of Persistence***

Stumpf and Stanley (2002) conducted an analyses of every four-year college or university in the United States listed in the College Handbook to determine if high school grade point averages and scores on academic aptitude tests (the SAT and ACT) could predict institutional graduation rates. The output from their simultaneous multiple regression model led them to conclude that “persistence to graduation . . . of student populations attending colleges can be predicted much better than persistence on the individual level within a college.” They further found that the 25th-percentile mean on the SAT Math and/or the ACT is an important measure of college persistence. “College attrition appears to occur predominantly in colleges that have low SAT Math or ACT 25<sup>th</sup>-percentile means” (p. 1050).

Astin (1997) argued that the Federal Student Right-to-Know and Campus Security Act of 1991’s requirement for institutions to disclose information about graduation rates provides an inaccurate, unfair measure of institutional quality. He found that more than 50% of the variance in institutional retention rates can be directly traced back to the quality of students who initially enroll, rather than to institutional effects. Astin made the case for a formula which calculates an expected retention rate for baccalaureate institutions that includes student high school GPA and SAT/ACT scores. According to

Astin's formula, students with both high grades and test scores are more than three times more likely to obtain a bachelor's degree than students with low test scores and grades. He also examined the topic of length of time to degree and concluded that many students take more than the "normal" four years to graduate because course scheduling policies may have made it difficult for students to complete program requirements in four years. Lack of adequate financial instructional support may contribute to prohibitive course scheduling. He concluded that if institutional performance is to be measured by student outcome measures (such as graduation rates), student input characteristics must be accounted for; otherwise, "such outcome measures, by themselves, tell us little about institutional performance or effectiveness" (p. 656).

Carter (2002) addressed the effects of institutional characteristics on persistence and graduation rates. Using the areas of institutional quality, which is, in essence, selectivity of an institution as measured by entrance exam scores and student spending; academic integration; and social integration as described in prior work by Astin (1975 and 1982) and Tinto (1987), Carter assessed the effect of each on the persistence and graduation rates of African American, Hispanic, and White Freshman enrollment. He found that selectivity was the most powerful predictor of graduation rates across all ethnic groups. Carter noted that this finding "is consistent with prior research in the area, particularly Astin (1975, 1982) and Pascarella and Terenzini (1991)" (p. 127).

Kim, Rhoades, and Woodard (2003) conducted research which examined the common assertion by most state policymakers and legislatures that sponsored research funds have a negative impact on the graduation of undergraduate students at public research universities. The researchers, using institutional and student characteristics for

nearly 60,000 students at 22 public research universities, found that contrary to the assumption of much higher education literature that suggests increased spending on research results in decreased attention on instruction, “there is a [positive] linear relationship between sponsored research expenditures and student graduation” (p. 68). The authors cautioned that their data does not provide an explanation for the positive association, but they surmise that existing literature on the role of research and teaching environments may point to the reason—researchers and practitioners should take note of the significant role of revenues and the accompanying effects on research and instructional activities in higher education.

In 1987, Tinto held that financial concerns are not of primary importance in the retention process and that persistence, for most students, “is more reflective of the character of their social and intellectual experiences on campus . . . than of their financial resources” (p. 158). By 2004, Tinto had expanded his focus to improving retention and graduation for the 46% of low-income students who directly enter higher education after high school. He advocated providing sufficient financial aid for low-income students to enable them to attend full-time, and when necessary, allow these students to work fewer hours at a job, which preferably would be located on, rather than off, campus (p. 9) because part-time students working off campus are less likely to graduate. He recommended that because the purchasing power of Pell Grants has not kept pace with rising college costs, the federal government should substantially increase funding for Pell Grants and encourage states and institutions to increase need-based aid as college tuition increases.

### *Spending as a Form of Organizational Behavior*

Using a sample from a very selective, private research university, Berger and Braxton (1998) revised Tinto's (1987) interactionist theory of student departure via an examination of the influence of organizational attributes in the persistence process. In addition to commonly used background characteristics of students and a measure of peer relations, the researchers added three organizational attributes: institutional communication, fairness in policy and rule enforcement, and participation in decision making. All three organizational attributes were found to have significant indirect effects on student intent to persist. The authors concluded that "all three organizational attributes are important predictors of social integration and even demonstrate statistically significant indirect effects on persistence . . . [and] provide strong support for the inclusion of organizational attributes as a potential source of social integration" (p. 116).

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

Burke (1998, Spring) examined the status of performance funding and its prospects for the future. He conducted a telephone survey of all of the State Higher Education Finance Offices (SHEFO's) in the fifty states, Puerto Rico, and the District of Columbia. At that time, ten states had performance funding, and eight indicated they

were likely to continue it. Officers from eighteen states believed their state would be likely to adopt performance funding in the next five years. Burke (1998, November-December) concluded that the SHEFO survey, as well as a later poll of governors conducted by the Education Commission of the States (Assessment Update, 1998), suggested an ongoing dissatisfaction with public higher education budgeting practices and a strong desire to consider results in funding higher education.

McPherson, Schapiro, and Winston (1989) studied the impact of federal student aid on institutional spending behavior. They found that surprisingly little empirical research had been done on how the distribution of federal financial aid affects institutional financial expenditures. Using financial cross sectional data sets for American colleges and universities for three different years, the researchers analyzed the relationship among financial variables and patterns of expenditures. They concluded that external financial aid strongly influences the behavior of higher education institutions, specifically that institutions increase their student aid spending when federal student is reduced and “tuition and expenditure levels seem to respond to changes in the level of financing available from other sources” (p. 53).

Birnbaum (1988) provided a theoretical framework for the evaluation of institutional expenditures as a form of organizational behavior. He contended that the literature on organizational leadership suggests five basic approaches for study. One of these, behavioral theories, studies “activity patterns, managerial roles, and behavioral categories of leaders” (p. 23). Birnbaum suggested that social exchange theory is well suited to higher education. According to Birnbaum, social exchange theory states that leaders obtain power through their official positions and their personalities to the degree

that they generate and equitably distribute rewards, and lose power to the extent that they fail to accomplish these ends. He showed that higher education is a form of political system that depends on social exchange, and accordingly, mutual dependence. In organizational politics, power is obtained, refined, and used to accomplish desired objectives in situations which find groups in disagreement. Departments with greater prestige wield more power over the allocation of internal resources than departments with lesser influence. Access to personnel and budget, information sources, and internal and external authority are forms of administrative power. Birnbaum concluded that the allocation of financial resources is a political decision of “who gets what, when, and how” (p. 136), and that budgets are documents which keep the yearly score of the power exercised by the various subgroups competing for resources at an institution.

Berger (2002), who credited Astin and Scherrei (1980) as the first researchers to study the impact of organizational structure on student outcomes, adapted Birnbaum’s 1988 model of organizational structure to investigate how individual students are influenced by institutional structure. He concluded that organizational structure does impact student learning, and that an orientation by institutions “toward external connections and influences in organizational decision making” increases the likelihood that student learning will be negatively affected (p. 54). The slight effect of entry characteristics on student outcomes led Berger, like Pascarella & Terenzini (1991) before him, to conclude that in terms of student learning, what happens to students in college is more important than student experiences prior to college.

### *The Role of Ratios in Persistence*

Recent research, including the present study, blends a consideration of ratios derived from total E&G revenue expenditures with a ubiquitous key performance indicator—six-year (150% of normal time) graduation rate for students enrolled in public, four-year or above degree-granting institutions in the United States.

According to Galicki (1981) ratio analysis may have been created as early as 1891 to evaluate business performance (p. 36). He states that Sherer (1969) was the first researcher to use ratio analysis to measure the financial health of colleges by analyzing general expense ratios and expenditure patterns. However, the National Federation of College and University Business Officers Associations (NFCUBOA), as early as 1956, used an analysis of expenditure classifications, expressed as percentages of total expenditures, to provide a form of comparison of income and expenditures at colleges and universities. Of particular interest to the current study is the NFCUBOA report's classification of educational and general expenditures, which was comprised of eight expenditure subclassifications—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 (p. 37) and student aid (p. 32).

The 1956 NFCUBOA study of sixty private liberal arts colleges, using Volume I of College and University Business Administration as a guide, was based on the operating summaries for the year 1953-54 (p. 4). Public institutions and graduate schools were not included in the pilot study because of “their greater complexity of operating problems” (p. 5). The report cautioned that users of the report should not use the report's

results improperly because “it is impossible to rely solely on cold figures in judging the effectiveness of an educational program” (p. 5).

Four years later, a follow-up study performed a similar analysis on operating data for 1957-1958 for 56 of the original 60 institutions (NFCUBOA, 1960) The 1956 study found that the median E&G expenditures for all 60 participating institutions was 60%, while the 1960 study revealed a median E&G expenditure for the 56 participating institutions of 62.6%. Medians for seven of the sub classifications of E&G expenditures for the 1956 and 1960 studies, respectively, were as follows: general administration 9.1%, 8.8%; student services 9%, 9.4%; public services and information 5.4%, 5.9%; general institutional 3.5%, 3.9%; instruction, departmental, research and specialized educational activities 50.1%, 49.6%; libraries 5%, 4.9%; operation and maintenance of physical plant 16%, 16.6%; and student aid 6.1%, 4.5%.

KPMG LLP (2002), the assurance and tax firm, and Prager, McCarthy & Sealey, LLC, a provider of financial services to higher education, advocate the use of ratio analysis to “measure success factors against institution-specific objectives” (p. 3), among them the question of whether financial asset performance supports an institution’s strategic direction. The two firms recommended the use of a small number of ratios to provide a clear, concise picture of an institution’s performance, resources, and need. They state that the ratios provide financial officers with tools to prioritize funding, allocate resources, and “manage debt issuances effectively and fairly among the operating units” (p. 10). They described “the allocation of scarce resources [as] a critical function of leaders in achieving institutional mission” (p. 16). The authors provided four ratios that supply information about the financial health of an institution; therefore, they caution that

because their ratios only account for financial aspects of an institution, the ratios “must be blended with key performance indicators in other areas, such as academics...to understand a more complete measure of institutional strength” (p. 19).

Titus (2006) used resource dependency theory to focus his study of the relationship between institutional financial context and student persistence at four-year colleges and universities. Titus stated that “resource dependency theory explains organizational behavior in terms of an organization’s internal adjustment to changes in the availability of such external resources as finances that an organization must have in order to function” (p. 356). He used student-level data from the 1996-1998 Beginning Postsecondary Students longitudinal database and the IPEDS Fall 1995 and Fiscal Year 1996 Finance surveys in his analysis designed to answer his research questions. Most relevant to the present study was Titus’ question of whether “student persistence is influenced by an institution’s internal expenditure patterns” (p. 358). Titus defined persistence as “being enrolled or having completed an undergraduate degree program 3 years after first enrolling in the same four-year institution” (p. 358). He expressed as a limitation the fact that his study did not address college degree completion. Analyzed expenditure patterns included percentages of total E&G spent on administration, instruction, research, student services, and grants and scholarships. Among his findings, and most related to the current study, was that “the average chance of persistence is dependent not only on the level of institutional expenditures but also on institutional expenditure patterns” (p. 369).

Gansemer-Topf, Saunders, Schuh, and Shelley (2004) examined the relationship of resource expenditures and allocation to student engagement at public and private

institutions which had been selected for the Documenting Effective Educational Practices (DEEP) study. Institutions were selected to be part of DEEP because of their higher than expected graduation rates and scores on the National Survey of Student Engagement. Of interest to the current study is the third of the 2004 study's three guiding questions: "Did Deep institutions have a different pattern of resource allocation as measured by the percentage of budget devoted to expenditure categories of instruction, academic support, student services, institutional support, and institutional grants (scholarships) than their peers..." (p. 6). Using finance and enrollment data from IPEDS, the 2004 study found no significant difference for budget percentages devoted to the aforementioned expenditure categories by DEEP institutions as opposed to their peers (p. 6). The researchers concluded that while their study did not support Berger's (1997) theory that organizational behavior such as resource allocation can influence student involvement, it did "suggest that organizational behaviors other than resource allocation do influence student involvement in educationally purposeful activities" (p. 15) and speculated that "these DEEP institutions are embracing organizational behaviors and cultures that surpass investments of financial resource allocation" (p. 17). Gansemer-Topf et al. recommended that institutions should more carefully examine their allocation of resources, and that more effective use of resources, as opposed to obtaining more resources, may be the key to improving student learning.

Researchers have examined the impact of expenditure patterns on student perceptions of their own leadership abilities (Smart, Ethington, Riggs, & Thompson, 2002). The study of over 300 colleges and universities over a four-year period revealed a modest, but statistically significant influence of institutional expenditure patterns on

students' leadership abilities. The researchers concluded that their results corroborate Pascarella and Terenzini's 1991 survey finding that higher education's impact on students is, in large part, decided by the degree of effort and involvement exerted by the individual student (p. 610).

Brune (1996) analyzed the perceptions and attitudes of higher education administrators toward institutional factors which impact time to graduation; resource allocation was one of the four categories in her survey. She found that while resource allocation "was not significant overall . . . percentages of resources invested in salaries and benefits for faculty . . . in operating expenses . . . and percentage of resources devoted to operating capital outlay . . . [had] varying implications for degree completion for each of the eight colleges [studied]" (p. 154).

Gansemer-Topf (2004) conducted a regression analysis to determine the relationship between institutional expenditure patterns and graduation rates at private baccalaureate and general colleges and universities from the perspective of the relationship between expenditures per student and retention and graduation rates, as well as from the relationship between the percentage of institutional expenditures and retention and graduation rates. She found that "the independent variables significantly predicted retention and graduation rates, but the specific independent variables (i.e. instruction, academic support, etc) that significantly contributed to the models varied" (p. 158).

Ryan (2004) examined the effect of institutional expenditures on degree attainment utilizing data from the Integrated Postsecondary Education Data System (IPEDS) and data from the 1996 edition of The College Board's annual publication, "*The*

*College Handbook.*” His study suggested that institutional spending priorities and amounts spent affect student persistence to graduation (p. 89).

In 2006, Gansemer-Topf and Schuh revisited the population studied in Gansemer-Topf’s 2004 dissertation—private, baccalaureate institutions. In the more recent study, the researchers scrutinized the relationship of institutional selectivity and institutional expenditures to retention and graduation rates. The study used expenditure data for instruction, academic support, student services, institutional support, and institutional grants from the 2002 IPEDS Finance Survey. Enrollment data were obtained from the IPEDS 2001 Enrollment survey. Six-year graduation rate and first-year retention were taken from the publication *America’s Best Colleges 2004*, published by US News. The study represents an expansion on Ryan’s 2004 dissertation by including an examination of the impact of institutional expenditures on first-year retention rates and institutional selectivity. The researchers consulted *Barron’s Profiles of American Colleges of 2001* (2000) to obtain ratings for institutional selectivity.

Two of Gansemer-Topf and Schuh’s four research questions closely parallel, in part, the two questions raised by the present study. The present study also examines the relationship between percentage of institutional expenditures and six-year graduation rates, but it includes, in addition to the five variables listed above in Gansemer-Topf and Schuh’s 2006 study, expenditures for research, public service, operation and maintenance of plant, mandatory transfers, and non-mandatory transfers for the population of all *public, four-year or above degree-granting institutions*. It does not include a consideration of institutional selectivity or first-year retention. Like the present study, Gansemer-Topf and Schuh (2006) also questioned if percentage of institutional

expenditures significantly predicts six-year graduation rates. Gansemer-Topf and Schuh questioned if percentage of specific institutional expenditures predict first-year retention and six-year graduation rates for institutions with varying levels of institutional selectivity, whereas the present study asks if institutions with higher six-year graduation rates present different institutional expenditure patterns than institutions with lower six-year graduation rates.

The researchers, citing Bowen (1980), asserted that conducting an analysis using institutional expenditures expressed as percentages “level[s] the playing field between affluent and less affluent institutions and provides more information within an institutional leader’s control” (p. 621). The researchers suggested that while affluent institutions may be able to spend much more on any given expenditure category, less affluent institutions could achieve comparable or better results if they strategically target their smaller resources on specific areas that could affect retention and graduation (p. 621).

Findings relevant to the objectives of the present study were that generally, expenditures and graduation rates were directly related. Graduation rates were higher when an institution could spend a higher amount or percentage on particular functions. However,

for low selectivity institutions, amount of institutional support expenditures did not have a direct effect on graduation rates. For high selectivity institutions, percentage of expenditures on institutional grants did not have a significant effect on graduation rates. Percentage of expenditures for student services did not have a direct effect on graduation rates.” (p. 629)

The researchers concluded that their study of private baccalaureate institutions confirmed its theoretical framework—“Berger’s (2001-2002) theory that organizational behavior can influence student persistence” (p. 629); organizational behavior, in the form of resource allocation, does influence graduation rates.

### **Summary**

As detailed above in this selected review of relevant literature, previous studies examining the relationship between institutional spending and graduation rate have either examined a single aspect of institutional spending or analyzed the impact of institutional spending exclusively at private institutions or a combination of private and public institutions. O’Rear (2004) noted that “while many student-specific and institution-specific variables have been studied in prior research, there is a knowledge void in investigations looking at the relationship of institution-wide variables” to retention (p. 30).

In 1982, Tinto advised that his 1975 interactionalist model of student dropout did not “seek to directly address the impact of financial press or other forces external to the institution’s immediate environment” (p. 688). Of course, then, as now, external forces, especially in the form of local, state, and federal funds provided to the institution, do dictate the shape of the institution’s internal environment. Institutions make decisions about where and how to allocate limited resources, and those decisions impact students, but the degree to which internal allocation of resources affects student persistence to graduation is unknown.

Despite previous research, lacking in higher education is a resource allocation profile that correlates expenditure levels to graduation rate at all public, four-year or

above degree-granting institutions. Such a profile, developed with information from a national database, could fill this void and perhaps contribute to a fuller understanding of findings from previous research studies which have examined, individually, the influence that some of these expenditures have on persistence rates.

## **CHAPTER THREE: METHODS**

### **Purpose of the Study**

The purpose of this study is to examine the correlation between the ten nationally reported operating expenses of higher education institutions that comprise total education and general (E&G) expenditures, as reported annually to IPEDS, and the six-year graduation rates of bachelor's or equivalent students at all public, four-year or above degree-granting institutions in the United States. Whereas previous research has correlated IPEDS finance data with institution graduation rate at public (Fenske, 1993; Deike, 2003; Stater, 2004), private (Gansemer-Topf, 2004), or a combination of public and private institutions (Gansemer-Topf, Saunders, Schuh, & Shelley, 2004) this study is the first to correlate six-year bachelor's graduation rate at all public, four-year or above degree-granting institutions in the United States, individually with all ten variables which comprise E&G expenditures. For purposes of the partial correlation analysis, each of the ten variables will be converted to representative percentages of total E&G for each institution.

The resulting research questions were:

1. What is the correlation, if any, between each of the ten categories of E&G expenditures as reported in the IPEDS finance survey for the 1998-1999 academic year and six-year graduation rate at public, four-year or above degree-granting institutions as reported in the 2004 IPEDS graduation rate survey for the 1998 freshman cohort when each of the ten expenditure categories is expressed as a proportion of the total E&G expenditure?

2. What are the differences, if any, in the proportions of E&G expenditures in the population at the following levels: at institutions with the highest six-year graduation rates (arbitrarily set at 60% and above), at institutions with the lowest six-year graduation rates (arbitrarily set at 30% and below), and those in the middle range of six-year graduation rates (arbitrarily set at 31% to 59%)?

### **Research Design**

The study used an ex post facto design. It used E&G financial expenditure variables referenced in the annual IPEDS Finance Survey, and the statistical procedure of partial correlation, which determined the level of correlation between said variables and the six-year bachelor's or equivalent graduation rate for each institution in the studied population. Expenditure and graduation variables were obtained from the U. S. Department of Education's National Center for Education Statistics (2006) IPEDS-PAS electronic database.

### **Population**

This study's population included all public, four-year or above, degree-granting institutions (irrespective of Carnegie classification) reported in the federal IPEDS database. The query of the IPEDS Dataset Cutting Tool yielded a total of 614 institutions, of which 521 complete observations were available for use in the analysis.

All institutions that take part in any federal student financial aid assistance program authorized by Title IV of the Higher Education Act of 1965 are required to complete the IPEDS survey in an accurate, timely manner. The required completion of

IPEDS surveys was mandated by the Higher Education Act of 1992 (as described at <http://nces.ed.gov/ipeds/AboutIPEDS.asp>).

### **Database**

This study utilized the Integrated Postsecondary Education Data System (IPEDS) Peer Analysis System (PAS) database maintained by the U. S. Department of Education's National Center for Educational Statistics (NCES). The researcher logged in to the database on the Institution Level and used a function within PAS called the Dataset Cutting Tool (DCT), which allows the user to download IPEDS Finance Survey and Enrollment Survey data from the 1998-1999 data year and graduation data from the Frequently used/derived variables from the 2003 data year representing 2004, which provided the graduation rate data for the 1998 cohort. From the list of variables for graduation rates of full-time, first-time degree or certificate-seeking undergraduate students, the researcher selected the graduation rate, grand total bachelor's or equivalent degree seeking subcohort (4-yr. institution) for completers of bachelor's or equivalent degrees total (150% of time), and the grand total (4-yr. institution) bachelor's or equivalent degree seeking adjusted subcohort (revised cohort minus exclusions).

### **Correlation Variables**

The researcher extracted for the 1998-1999 data year all of the ten expenditures variables which comprise total E&G expenditures: Instruction, Research, Public service, Academic Support, Student Services, Institutional support, Operation and Maintenance of Plant, Scholarships and fellowships, mandatory transfers, and Nonmandatory transfers. These variables, converted to percentages of total E&G expenditures, were individually

correlated with graduation rate as downloaded from the IPEDS PAS system from the 2003 data year representing 2004.

### **Summary of Methods Used**

This research study utilized the IPEDS database to obtain the dependent variable (six-year graduation rate) and independent variables (the ten categories which constitute the total E&G expenditures for all public, four-year or above, degree-granting institutions in the United States). To standardize the dependent and independent variables, the ten E&G expenditure variables were converted to proportions. The study used the reported 2004 six-year graduation rate for the fall 1998 cohort of full-time, first-time freshmen and the E&G expenditure variables from the IPEDS finance survey for the 1998-1999 academic year, which was the freshman year for the 1998 cohort of full-time, first-time freshmen. Incomplete observations were removed, and descriptives were run on the database. A partial correlation was then run on graduation rate and each of the ten expenditure variables, while controlling for the remaining nine expenditure variables for each partial correlation that was run. The database was then sorted (see Table 1) according to the following three varying levels of the dependent variable: institutions with graduation rates of 0 to 30%, institutions with graduation rates of 31 to 59%, and institutions with graduation rates of 60% to 100%. Descriptives and partial correlations were run as previously done for the entire database to determine the correlation in the population ( $\rho$ ) at the varying levels of the dependent variable.

## Data Analysis

Data were prepared and analyzed using Microsoft-Office Excel 2003 for Windows and SPSS Version 14.0 for Windows. The output from the Dataset Cutting tool were manipulated as follows: the completers of bachelor's or equivalent degrees total graduation rate column was divided by the adjusted subcohort (revised cohort minus exclusions) to obtain the institutional graduation rate for students who completed their bachelor's or equivalent degree-seeking program within six-years. The columns for each of the ten expenditure variables which comprise total E&G expenditures were divided by the total E&G expenditures, yielding the percentage of total E&G expenditures represented by each of the ten expenditure variables.

The institution graduation rate and the percentages of total E&G expenditures for each of the ten expenditure variables were entered into SPSS. Descriptive statistics were run for institution graduation rate and each of the ten constituent E&G variables, with selected options including mean, standard deviation, minimum and maximum values, variance, and range.

A partial correlation was run for graduation rate (GRrate 150) individually against each of the ten E&G variables while controlling for the other 9 E&G variables. SPSS settings were set for two-tailed tests of significance and "display actual significance level." Options selected also included "zero-order correlations" and "exclude cases listwise."

Data for this study includes the entire population, which is often referred to as enumeration or non-random data. According to Garson (2006), "significance tests are not appropriate for inferential analysis." However, Garson has held that significance can be

reported as “an arbitrary criterion” in honor of its common use “in social science for exploratory analysis of non-random data.” The partial correlations obtained represent the actual relationship between six-year graduation rate and each of the ten E&G expenditures, while controlling for the other nine E&G variables.

A simple scatter plot was run for each partial correlation. A histogram was run on graduation rate, with the normal curve superimposed over the histogram plot.

Descriptives for graduation rate were explored further, with statistics run at the 95% confidence level for the mean, as well as normality plots and the Kolmogorov-Smirnov test of normality.

### **Summary**

The methods utilized in this chapter determined if there was a correlation between the ten categories of E&G expenditures and six-year graduation rate at public, four-year or above degree-granting institutions when each of the ten expenditure categories was expressed as a proportion of the total E&G expenditure.

It further determined if there were differences in the proportions of E&G expenditures in the population at the following levels: at institutions with the highest six-year graduation rates, at institutions with the lowest six-year graduation rates, and those in the middle range of six-year graduation rates.

## **CHAPTER FOUR: RESULTS**

### **Presentation and Analysis of Data**

The purpose of this study was to examine the correlation between the six-year graduation rates of bachelor's or equivalent students and the ten nationally reported operating expenses of higher education institutions that comprise total education and general (E&G) expenditures, as reported annually to IPEDS, at all public, four-year or above degree-granting institutions in the United States. For purposes of the partial correlation analysis, each of the ten variables was converted to representative percentages of total E&G for each institution.

This research study utilized the IPEDS database to obtain the dependent variable (six-year graduation rate) and independent variables (the ten categories which constitute the total E&G expenditures for all public, four-year or above, degree-granting institutions in the United States). The study used the reported 2004 six-year graduation rate for the fall 1998 cohort of full-time, first-time freshmen and the E&G expenditure variables from the IPEDS finance survey for the 1998-1999 academic year, which was the freshman year for the 1998 cohort of full-time, first-time freshmen. The researcher extracted for the 1998-1999 data year all of the ten expenditures variables which comprise total E&G expenditures: Instruction, Research, Public Service, Academic Support, Student Services, Institutional Support, Operation and Maintenance of Plant, Scholarships and Fellowships, Mandatory Transfers, and Nonmandatory Transfers.

## **Descriptive Parameters**

This study's population included all public, four-year or above, degree-granting institutions (irrespective of Carnegie classification) reported in the federal IPEDS database. The query of the IPEDS Dataset Cutting Tool yielded a total of 614 institutions, of which 521 complete observations were available for use in the analysis.

Incomplete observations were removed, and descriptives were run on the database. The following descriptive statistics were produced to measure the dispersion and distribution of the data: frequency, range, minimum, maximum, mean, standard deviation, skewness, and kurtosis.

Descriptive statistics and histograms were generated individually for six-year baccalaureate graduation rate, the ten E&G variables (with each expressed as percentage of total E&G), and total E&G. Graduation rate was further described with 5% trimmed mean, percentiles, extreme values, tests of normality, stem-and-leaf plot, a normal Q-Q plot, a detrended normal Q-Q plot, and a box plot. Two tests of normality were run for graduation rate: Kolmogorov-Smirnov provided a significance level of 0.012; Shapiro-Wilk was significant at 0.006. Kurtosis was 0.224, with a standard error of 0.210.

## **Statistical Tools and Data Manipulation**

Data were prepared and analyzed using Microsoft-Office Excel 2003 for Windows and SPSS Version 14.0 for Windows. The output from the IPEDS Dataset Cutting tool were manipulated as follows: the completers of bachelor's or equivalent degrees total graduation rate column was divided by the adjusted subcohort (revised cohort minus exclusions) to obtain the institutional graduation rate for students who

completed their bachelor's or equivalent degree-seeking program within six years. The columns for each of the ten expenditure variables which comprise total E&G expenditures were divided by the total E&G expenditures, yielding the percentage of total E&G expenditures represented by each of the ten expenditure variables.

The institution graduation rate and the percentages of total E&G expenditures for each of the ten expenditure variables were entered into SPSS. Descriptive statistics were run for institution graduation rate and each of the ten constituent E&G variables, with selected options including mean, standard deviation, minimum and maximum values, variance, and range.

A partial correlation was run for graduation rate (GRate 150) individually against each of the ten E&G variables while controlling for the other nine E&G variables. Options selected also included "zero-order correlations" and "exclude cases listwise."

Data for this study included the entire population, which is often referred to as enumeration or non-random data. According to Garson (2006), "significance tests are not appropriate for inferential analysis." However, Garson has held that significance can be reported as "an arbitrary criterion" in honor of its common use "in social science for exploratory analysis of non-random data." For this reason, significance is reported in Table 1, accompanied by Garson's suggested footnote. Similarly, because the entire population is included rather than a random sample, the partial correlations obtained for the population parameter represent the actual relationship between six-year graduation rate and each of the ten E&G expenditures, while controlling for the other nine E&G variables.

## Analysis

A partial correlation was run for the database of the entire population on six-year bachelor's or equivalent graduation rate and each of the ten expenditure variables, while controlling for the remaining nine expenditure variables for each partial correlation that was run. The analysis, using Pearson's correlation coefficient on the population parameters, indicated there was no relationship between graduation rate and any of the ten expenditure variables. Obtained correlation coefficients  $\rho$  (rho) between the dependent variable, graduation rate in 150% of time (GRate 150), and the ten independent variables ranged from -0.009 to -0.010 (See Partial Correlations results on the bottom of Table 1).

Graphs (scatterplots) were plotted separately for six-year graduation rate and each of the ten E&G expenditure variables. A visual review of the plots confirmed there was no linear relationship between graduation rate and any of the ten expenditure variables.

The database was then sorted (see Table 2) according to the following three varying levels of the dependent variable: institutions with graduation rates of 0% to 30%, institutions with graduation rates of 31% to 59%, and institutions with graduation rates of 60% to 100%. Descriptives and partial correlations were run as previously done for the entire database to determine the correlation in the population ( $\rho$ ) at the varying levels of the dependent variable.

Using data from institutions with graduation rates of 0% to 30%, partial correlation was run on six-year graduation rate and each of the ten expenditure variables, while controlling for the remaining nine expenditure variables for each partial correlation

Table 1  
Zero Order and Partial Correlations

Control Variables		GRate150	Instruction	Research	PubService	AcadSuppo	StudServic	InstSupport	OpMnPlant	ScholFello	Mandatory	Nonmand
-none- (GRate 150)	Correlation	1.000	-.166	.433	.063	.139	-.176	-.264	-.145	-.331	.044	.091
	Significance	.	.000	.000	.148	.001	.000	.000	.001	.000	.316	.036
	df	0	530	530	530	530	530	530	530	530	530	530
Instruction	Correlation	-.166	1.000	-.459	-.364	-.029	.068	-.088	-.009	-.006	-.148	-.092
	Significance	.000		.000	.000	.500	.119	.043	.844	.889	.001	.034
	df	530	0	530	530	530	530	530	530	530	530	530
Research	Correlation	.433	-.459	1.000	.378	-.094	-.526	-.478	-.375	-.432	-.032	.038
	Significance	.000	.000	.	.000	.030	.000	.000	.000	.000	.455	.377
	df	530	530	0	530	530	530	530	530	530	530	530
PubService	Correlation	.063	-.364	.378	1.000	-.110	-.331	-.312	-.298	-.287	-.051	-.055
	Significance	.148	.000	.000	.	.011	.000	.000	.000	.000	.244	.208
	df	530	530	530	0	530	530	530	530	530	530	530
AcadSupport	Correlation	.139	-.029	-.094	-.110	1.000	.072	-.062	-.046	-.211	-.156	-.165
	Significance	.001	.500	.030	.011		.099	.154	.287	.000	.000	.000
	df	530	530	530	530	0	530	530	530	530	530	530
StudServic	Correlation	-.176	.068	-.526	-.331	.072	1.000	.216	.366	.132	-.103	-.103
	Significance	.000	.119	.000	.000	.099		.000	.000	.002	.017	.018
	df	530	530	530	530	530	0	530	530	530	530	530
InstlSupport	Correlation	-.264	-.088	-.478	-.312	-.062	.216	1.000	.285	.172	.006	-.146
	Significance	.000	.043	.000	.000	.154	.000		.000	.000	.889	.001
	df	530	530	530	530	530	530	0	530	530	530	530
OpMnPlant	Correlation	-.145	-.009	-.375	-.298	-.046	.366	.285	1.000	.015	.028	-.145
	Significance	.001	.844	.000	.000	.287	.000	.000		.727	.519	.001
	df	530	530	530	530	530	530	530	0	530	530	530
ScholFello	Correlation	-.331	-.006	-.432	-.287	-.211	.132	.172	.015	1.000	-.122	-.062
	Significance	.000	.889	.000	.000	.000	.002	.000	.727		.005	.154
	df	530	530	530	530	530	530	530	530	0	530	530
Mandatory	Correlation	.044	-.148	-.032	-.051	-.156	-.103	.006	.028	-.122	1.000	.053
	Significance	.316	.001	.455	.244	.000	.017	.889	.519	.005		.219
	df	530	530	530	530	530	530	530	530	530	0	530
Nonmandat	Correlation	.091	-.092	.038	-.055	-.165	-.103	-.146	-.145	-.062	.053	1.000
	Significance	.036	.034	.377	.208	.000	.018	.001	.001	.154	.219	
	df	530	530	530	530	530	530	530	530	530	530	0
PARTIAL CORRELATIONS (GRate 150 (each correlation run while controlling for the remaining nine depend. variables.)	Correlation	1.000	-.009	-.010	-.010	-.010	-.010	-.009	-.009	-.010	-.009	-.010
	Significance		.829	.816	.823	.823	.824	.830	.830	.812	.834	.828
	df	0	521	521	521	521	521	521	521	521	521	521

Note: Because the present study does not use randomly sampled data, significance tests are not appropriate for inferential analysis. However, significance is reported here as an arbitrary criterion in deference to its widespread use in social science for exploratory analysis of non-random data (as per Garson, 2006).

that was run. The analysis, using Pearson's correlation coefficient, indicated there was no relationship between graduation rate and any of the ten expenditure variables.

Obtained correlation coefficients  $\rho$  (rho) between the dependent variable, graduation rate in 150% of time (GRate 150), and the ten independent variables ranged from 0.056 for instruction to 0.073 for institutional support.

Table 2

*Comparison of Bachelor's Graduation Rates (150% of Time) And Percentage of Total E&G Spending Variables for Entire Population of Four-Year or More Public Degree Granting Institutions Which Accept Title IV Funds*

Variable	Average Graduation Rate 0-30%	Average Graduation Rate 31-59%	Average Graduation Rate 60% up	Average Graduation Rate for Entire Population
Graduation Rate 150% of Time	23%	44%	70%	44%
Instruction	39%	38%	39%	38%
Research	3%	5%	12%	6%
Public Service	4%	4%	5%	4%
Academic Support	8%	10%	10%	10%
Student Services	8%	8%	5%	7%
Institutional Support	12%	12%	11%	11%
Operation and Maintenance of Plant	9%	9%	7%	8%
Scholarship and Fellowships	14%	12%	8%	11%
Mandatory Transfers	2%	1%	2%	2%
Nonmandatory Transfers	1%	1%	1%	1%
Valid Number of Samples	100	340	92	532

Using data from institutions with graduation rates of 31% to 59%, a partial correlation was run on graduation rate and each of the ten expenditure variables, while controlling for the remaining nine expenditure variables for each partial correlation that was run. The analysis, using Pearson's correlation coefficient, again indicated there was no relationship between six-year graduation rate and any of the ten expenditure variables. Obtained correlation coefficients  $\rho$  (rho) between the dependent variable, graduation rate in 150% of time (GRate 150), and the ten independent variables were -0.011 in all instances, except for the partial correlation of graduation rate and research (-0.010); and graduation rate and student support services (-0.010).

Lastly, using data from institutions with six-year graduation rates of 60% to 100%, a partial correlation was run on graduation rate and each of the ten expenditure variables, while controlling for the remaining nine expenditure variables for each partial correlation that was run. The analysis, using Pearson's correlation coefficient, indicated there was no relationship between graduation rate and any of the ten expenditure variables. Obtained correlation coefficients  $\rho$  (rho) between the dependent variable, graduation rate in 150% of time (GRate 150), and the ten independent variables ranged from 0.091 for nonmandatory transfers to 0.131 for instruction.

Graphs (scatterplots) were plotted separately for six-year graduation rate and each of the ten E&G expenditure variables at the three varying levels of the dependent variable, graduation rate. A visual review of the plots confirmed there was no linear relationship between graduation rate and any of the ten expenditure variables.

## Summary of Findings

The methods utilized in this chapter provided answers to the study's two research questions. Results obtained for the correlation coefficient of the population parameter indicated there was no relationship between six-year graduation rate and the ten categories of E&G expenditures at public, four-year or above degree-granting institutions when each of the ten expenditure categories was expressed as a proportion of the total E&G expenditure.

It further determined, as shown in Table 2, there were only slight differences in the proportions of E&G expenditures in the population at the following levels: at institutions with the highest six-year graduation rates, at institutions with the lowest six-year graduation rates, and those in the middle range of six-year graduation rates. While average graduation rates for the three levels varied from 23% to 70%, there was very little variance among averages for the ten expenditure variables. Ranges for each of the ten independent variables are as follow: instruction—38% to 39%; research—3% to 12%; public service—4% to 5%; academic support—8% to 10%; student services—5% to 8%; institutional support—11% to 12%; operation and maintenance of plant—7% to 9%; scholarship and fellowships—8% to 14%; mandatory transfers—1% to 2%; and nonmandatory transfers—no variation.

Institutions with the highest average graduation rate spent the highest percentage in the categories of research and public service, and the lowest percentages in the categories of student services, operation and maintenance of plant, and scholarships and fellowships. Institutions with the middle graduation rate range spent the lowest percentage in the category of mandatory transfers. Institutions with the lowest graduation

rates spent the lowest percentage in the research and academic support expenditure categories, and the highest percentage in the scholarship and fellowships category.

## **CHAPTER FIVE: SUMMARY AND CONCLUSIONS**

### **Purpose**

The purpose of this study was to examine the correlation between the six-year graduation rates of bachelor's or equivalent students and the ten nationally reported operating expenses of higher education institutions that comprise total education and general (E&G) expenditures, as reported annually to IPEDS, at all public, four-year or above degree-granting institutions in the United States.

The following research questions were addressed by this study:

1. What is the correlation, if any, between the ten categories of E&G expenditures and six-year graduation rate at all public, four-year or above degree-granting institutions when each of the ten expenditure categories is expressed as a proportion of the total E&G expenditure?
2. What are the differences, if any, in the proportions of E&G expenditures in the population at the following levels: at institutions with the highest six-year graduation rates, at institutions with the lowest six-year graduation rates, and those in the middle range of six-year graduation rates?

### **Population**

This study's population included all public, four-year or above, degree-granting institutions (irrespective of Carnegie classification) reported in the federal IPEDS database. The query of the IPEDS Dataset Cutting Tool yielded a total of 614 institutions, of which 521 complete observations were available for use in the analysis for question

no. 1. Analysis for question no. 2 found that 532 institutions provided their graduation rate.

### **Methods**

This research study utilized the IPEDS database to obtain the dependent variable (six-year graduation rate) and independent variables (the ten categories which constitute the total E&G expenditures for all public, four-year or above, degree-granting institutions in the United States). To standardize the dependent and independent variables, the ten E&G expenditure variables were converted to proportions. The study used the reported 2004 six-year graduation rate for the fall 1998 cohort of full-time, first-time freshmen and the E&G expenditure variables from the IPEDS finance survey for the 1998-1999 academic year, which was the freshman year for the 1998 cohort of full-time, first-time freshmen.

Incomplete observations were removed, and descriptives were run on the database. A partial correlation was then run on graduation rate and each of the ten expenditure variables, while controlling for the remaining nine expenditure variables for each partial correlation that was run. The database was then sorted (see Table 2) according to the following three varying levels of the dependent variable: institutions with graduation rates of 0% to 30%, institutions with graduation rates of 31% to 59%, and institutions with graduation rates of 60% to 100%. Descriptives and partial correlations were run as previously done for the entire database to determine the correlation in the population ( $\rho$ ) at the varying levels of the dependent variable.

Data were prepared and analyzed using Microsoft-Office Excel 2003 for Windows and SPSS Version 14.0 for Windows. A partial correlation was run for

graduation rate (GRate 150) individually against each of the ten E&G variables while controlling for the other nine E&G variables. SPSS settings were set for two-tailed tests of significance and “display actual significance level.” Options selected also included “zero-order correlations” and “exclude cases listwise.”

Data for this study includes the entire population, which is often referred to as enumeration or non-random data. According to Garson (2006), “significance tests are not appropriate for inferential analysis.” However, Garson has held that significance can be reported as “an arbitrary criterion” in honor of its common use “in social science for exploratory analysis of non-random data.” For this reason, significance is reported in Table 1, accompanied by Garson’s suggested footnote. Similarly, because the entire population is included rather than a random sample, the partial correlations obtained for the population parameter represent the actual relationship between six-year graduation rate and each of the ten E&G expenditures, while controlling for the other nine E&G variables.

### **Summary of Findings**

The analysis revealed no correlation between six-year graduation rate and any of the ten financial variables which constitute E&G expenditures. In addition, the analysis revealed only small differences in the proportions of E&G expenditures in the population at institutions with the highest six-year graduation rates, with the lowest six-year graduation rates, and those in the middle range of six-year graduation rates.

## Conclusions and Implications

The findings of the present study, examined in the context of prior findings in the literature, reveal parallels with commonly cited studies which were conducted on sample populations, and contrasts with aspects of other studies. Prior to examining these similarities and departures, it is necessary to review the relevant findings from several of the key studies cited in the review of literature (Chapter 2). While many previous studies have examined the issue of improving retention and graduation since Tinto's 1975 article *Dropout from higher education: A theoretical synthesis of recent research*, most have focused on ways that institutions can improve student opportunities for success by modifying the campus environment to improve student feelings of involvement (Astin, 1977), (Berger & Milem, 1999); increasing student-faculty contact and communication (Chickering & Gamson, 1999), (Pascarella & Terenzini, 1979); or increasing financial aid (Porter & Barberini, 1989), (Bresciani & Carson, 2002).

More relevant to the present study are a smaller number of studies in recent years that have examined the correlation between individual E&G expenditure categories and graduation rates. For example, St. John, Paulsen, and Starkey (1996) suggested that some national research has indicated that financial considerations have accounted for more persistence variance than the frequently studied variables of college experience and college achievement. Ryan (2004) found that the degree and placement of institutional expenditures influence graduation rates. Hoef (2004) stated that students of both sexes who received an increase in grants and loans or an increase in amount of work study were more likely to persist. Studies by Paulsen and St. John (1997), St. John, Paulsen, and Carter (2005) and Paulsen (1998) examined differences of sensitivity to finances among

Whites' and African Americans' persistence decisions. Titus (2006) found that institutional expenditure patterns influence the average opportunity for student persistence.

Other studies have reported mixed results regarding the relationship of finances to the graduation rate. Gansemer-Topf (2004) showed in a study of private colleges and universities that while expenditures predicted retention and graduation rates, the degree to which individual expenditure categories predicted retention and graduation varied. Berger and Braxton (1998) concluded that organizational attributes have statistically significant indirect effects on persistence.

The present study, using the total population of all public, 4-year or more degree-granting institutions, conversely did not find evidence that financial expenditures by the institution (particularly on scholarships/fellowships) is strongly related to graduation rate. Several studies in the literature echo this study's findings. Cabrera, Nora, and Casteneda (1993) similarly concluded that "financial aid, academic advising, counseling, and other support services, per se, are not likely to improve retention; rather, they should be combined in a united effort to address student withdrawal." Deike's (2003) 12-year longitudinal study of student graduation at three flagship institutions found no statistical significance between total aid students received and percentage of total aid to cost of attendance. Whitaker (2004) found financial aid may have unpredictable positive or negative effects on graduation. Berger and Braxton (1998) stated that organizational attributes have statistically significant indirect effects on persistence.

One implication of these findings is that researchers must look for other variables which can be found to consistently correlate to graduation rates. Recent research has

introduced institutional selectivity as a variable in the study of graduation rates. Stumpf and Stanley (2002) concluded that attrition appears predominantly in institutions that have low SAT Math or ACT 25<sup>th</sup> percentile means. In 1977, Astin wrote that over half of the variance in institutional retention rates can be traced directly back to the quality of students who initially enroll, rather than to institutional effects. He found students with both high GPA and test scores were more than three times more likely to obtain a bachelor's degree than students with low test scores and grades. Carter (2002) asserted that selectivity is the most powerful predictor of graduation rates across all ethnic groups.

The present study is similar in purpose to the 1954 NFCUBOA study of private institutions, which reflected a desire of higher education administrators to determine if a particular mixture of expenditures can bring about a desired result, be it an improved graduation rate or efficiency in other areas of educational delivery. Today, ratio analysis, as formulated in the present study, continues to be used as a tool to determine whether an institution's use of its financial assets supports the organization's mission (KPMG LLP and Prager, McCarthy, & Sealey LLC, 2002), with the caveat that ratios must be considered along with other key performance indicators to obtain a more complete view of performance toward organizational mission. Most recently, Gansemer-Topf and Schuh (2006) have affirmed the advantages of expressing institutional expenditures as percentages: it provides a means of comparing wealthy and less affluent institutions in terms that supply information that is within an administrator's control.

The results of the present study call into question whether administrators can have improved graduation rates as a goal when they set their institution's expenditure levels.

First, the results of the analysis indicate there is no correlation between percentages of spending on the ten categories which constitute institutional expenditures and the six-year graduation rate for the entire population of public, four-year or above degree-granting institutions. This study's findings contrast with those of some previous studies conducted on more limited populations. Reportedly, increased or decreased spending on certain categories of expenditures may improve graduation rates for selected institutions or segments of their student populations which share particular traits: previous research has found correlation between certain expenditure levels and six-year graduation rate when a smaller sample of the total population of public, four-year or above degree-granting institutions have been studied. For instance, Kim, Rhoades, and Woodard's (2003) study of 22 public research universities found that sponsored research expenditures and student graduation are strongly correlated. Much of future research into this area will probably continue to find correlation between expenditure levels and graduation rate when smaller samples are drawn from the total population.

Secondly, this study, which included the entire population of public, four-year or above degree-granting institutions, did not find that institutions which spent larger percentages in areas which one would expect to improve graduation rates, such as instruction and student services, reported higher graduation rates than institutions spending less in these areas. A recent, previous study confirms these results: Gansemer-Topf, Sanders, Schuh, and Shelley (2004) found no significant differences for budget percentages devoted to instruction, academic support, student services, institutional support, and scholarships at institutions reporting higher graduation rates than their peers.

If levels of expenditure do not predict six-year graduation rate, then why do some institutions report graduation rates which are 2 to 3 times higher than others?

Future studies, as have some conducted in the past, may focus on the role that the quality of instruction and institutional administration, separately or in combination, play in the six-year graduation rate. The findings provided for question 2 (see Table 2) of the present study seem to indicate great similarity in the proportions of total E&G that institutions are spending, both within and across institutional graduation rate category levels. Why are these similarities present? One may assume a level of homogeneity in the standards applied to the training of the nation's faculty and administrators. In addition to receiving educations which include exposure to prevalent theories and practices of higher education, these professionals have access to common associations, conferences, journals, and texts. Employment in public higher education brings with it a public expectation that faculty and administrators have demonstrated a prescribed level of academic ability in the attainment of their required degrees.

While this expectation of demonstrated ability, such as the holding of a specific required degree, is commonplace for faculty and administrators, the expected academic abilities of incoming freshmen vary widely. Previous researchers have argued that institutional selectivity plays a major role in the six-year graduation rate. While a recent study (Gansemer-Topf & Schuh, 2006) has considered the role of selectivity on graduation rates in *private* higher education institutions, a similar study of the role of selectivity on graduation rates in public higher education institutions has not been conducted. Administrators and public policy makers should account for institutional

selectivity before evaluating the success or failure of an institution largely in terms of six-year graduation rates.

In the three decades since Tinto first trained the spotlight on ways that institutions could reduce the dropout rate, much has been written and many dollars have been spent in efforts to improve student persistence and graduation levels. While the literature is rife with student success stories from individual campuses or groups of studied institutions, the present study's analysis of the entire population of public, four-year or more, degree-granting institutions does not support the concept that administrations can spend their way to higher graduation rates.

Perhaps examination of the problem has come full circle, and the present study indicates a need for study of graduation rates to return to its beginning point—the abilities, attitudes, and potentials of the individual student. Studies often cited in the literature seem to confirm the present study's findings in regards to the degree to which finances affect retention. Tinto stated in 1987 that financial concerns are of secondary importance in the retention process. Bean's (1982) causal model of attrition found that among ten independent variables found to influence dropout from higher education, intent to leave, grades, and opportunity to transfer all ranked higher than the first financial consideration, that of the practical value students perceived for higher education. Researchers (Gansemmer-Topf, Sanders, et al) have speculated that it is likely that organizations with higher graduation rates possess organizational cultures that extend beyond resource allocation. Astin (1997) asserted that more than half of the variance in retention rates can be traced directly back to the quality of students who initially enroll rather than to institutional effects.

The second question of the present study presents an important starting point for future researchers to examine some of the aforementioned non-financial variables using the entire population of public 4-year degree-granting institutions. This study has placed institutions in three graduation level categories. While the analysis revealed no correlation between graduation rates and E&G expenditure levels, and little variance was found in spending levels at the three graduation levels, much worthwhile data could be gleaned by the questions which are raised. What are the characteristics of the institutions in each category? Are institutions of particular enrollment sizes more or less likely to be present in a particular graduation level category? Does admission selectivity based on ACT/SAT scores or GPA effectively predict institutional graduation rate, as Carter (2002) contended?

Administrators, policy makers, and researchers may have to acknowledge that selectivity is the most powerful predictor of graduation rates (Carter, 2002). While much can, has, and will continue to be done to improve student opportunities for success, the impact of college on students' lives is largely set by the individual student's efforts and degrees of involvement (Smart, Ethington, Riggs, & Thompson, 2002). While researchers have found that shared values, norms, and behaviors present at an institution increase the likelihood that students will persist, it should be recognized that institutional selectivity contributes to the environment created by an institution of higher learning.

Education, like many other systems, can be described in terms of the Input-Processing-Output conceptual model. Despite the best efforts of public higher education institutions to improve their delivery methods (Processing) to result in an improved

graduation rate (Output), the outcome will always depend, to varying degrees, on the qualities of the incoming student (Input).

### **Recommendations**

The following recommendations are offered as a careful consideration of the results of this study.

1. Future researchers could expand upon this study by including selectivity as a factor in consideration of the role of E&G expenditures on six-year graduation rates at all public, four-year or above, degree-granting institutions.
2. The present study utilized the reported expenditures for the freshman cohort year of 1998 and the six-year graduation rate for this cohort (2004). Future researchers may wish to repeat the present study by including an average of expenditures over the entire six-year period to determine if expenditure levels varied enough to bring about a different outcome in the correlation analysis.
3. As indicated in Table 2, institutions with lower graduation rates spend more on instruction than those institutions with higher graduation rates. Further research could examine if increased spending in this or other expenditure areas results in an increase in graduation rate over a period of several different freshman cohorts.
4. The present study's methods could be used in an analysis of public institutions categorized by student population or regions of the country to determine if results vary from those obtained herein for the overall population.

## Summary

Graduation from college or university is critical for success in today's competitive national and international economies. Unfortunately, rising health care costs and other social services have increased competition for scarce state and federal dollars.

Governments are demanding that higher education provide evidence that it is worthy of its requested funding. Six-year graduation rate has become a well-established means for governments to measure the success rates of public colleges and universities; therefore, it is essential for public higher education institutions to increase their graduation rates.

Conventional wisdom would suggest that spending larger proportions of total E&G on instruction, student support services, scholarships and fellowships, or other common expenditures should result in higher six-year graduation rates; however, this study, utilizing the entire population of public, four-year or above degree-granting institutions, found no correlation between expenditure levels and six-year graduation rates. These findings call into question whether institutional graduation rates can be improved by modifying the proportions of E&G expenditures.

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## **APPENDIX**

### **Curriculum Vitae**

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**EDUCATION**

**Ed.D., Educational Leadership, 2006**

Marshall University College of Graduate Studies

**M.A., English**

Marshall University, Huntington, WV - 1989

**B.A., English**

Concord College, Athens, WV - 1987

**A.S., Mining Engineering Technology**

Bluefield State College, Bluefield, WV – 1977

**PROFESSIONAL EXPERIENCE**

West Virginia State University – Institute, WV 2002-Present

*Project Evaluation Coordinator*

Coordinate Title III Grant Programs and compile and submit Annual Performance Report

Complete Federal IPEDS Surveys

Coordinate Data Files Submission to WV Higher Education Policy Commission

Design and Compile Annual *West Virginia State University Fact Book*

Chair of Proofreading Committee

Chair of Hospitality Committee

**Teaching Experience**

Ohio University Southern – Ironton, Ohio 2002-2003

English 150 (Proctorville Campus)

English 151 (Ironton and Proctorville Campuses)

English 152 (Proctorville Campus)

West Virginia State University – Institute, WV 1989–2001

Enhanced Skills Training Program Instructor

English 200: Writing Workshop

English 205: Reading Workshop

English 101: Composition

English 102: Composition and the Research Paper

English 112: Technical Writing

English 204: Writing for Business

Marshall University—Huntington, WV 1987-1990  
Graduate Assistant, English Department  
Adjunct, English Department 1989-90  
English 099  
English 101: English Composition I  
English 102: English Composition II

**Internet Consultant 1994-2001**

RESA III, Beckley WV  
ONOW, Putnam County Board of Education, Eleanor, WV  
Thomas, Spilman, & Battle law firm, Charleston, WV  
Russia School in America, Institute, WV  
West Virginia Governor’s Honors Academy, Institute, WV

**Engineering Experience**

Environmental Project Engineer 1977—1987  
H&F Mining, Bluefield, WV 1977—1978  
Kithekan Fuel Corporation, Matoaka, WV 1978  
Jewell Ridge Coal Corporation, Jewell Ridge, VA 1978—1984  
Preservati Construction Company, Princeton, WV 1984—1987

**PROFESSIONAL MEMBERSHIP**

Association for Institutional Research

**PUBLICATIONS**

Jones, J.D. (2006). Insuring that no child is left behind: a Strategic Mentor Program for middle and high school students. D. R. Cantrell (Ed.). New York: Weekly Reader Press.

Securro, S., Jones, J. D., Cantrell, D., & Blackwell, J. (2006). Intervention that adds up: the impact of Merit software on standardized achievement test scores of middle school students. *I-manager’s Journal on School Educational Technology*, 2(1), June-August, 47-53.