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Investing in student persistence: a regression analysis of institutional expenditure patterns and retention and graduation rates at private baccalaureate colleges and universities

Ann Marie Gansemer-Topf
Iowa State University

Investing in student persistence: A regression analysis of institutional expenditure patterns and retention and graduation rates at private baccalaureate colleges and universities

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Ann Marie Gansemer-Topf

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Larry H. Ebbers, Co-major Professor
John H. Schuh, Co-major Professor
Virginia C. Arthur
Mark J. Chidister
Mary E. Huba

Iowa State University

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Co-major Professor

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For the Major Program

This work is dedicated to Dan, Madeline, and John

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CHAPTER 1: OVERVIEW OF STUDY

"Critics, including many who believe the American system of higher education is the best in the world, believe that the enterprise is inefficient and wasteful" (Taylor & Massy, 1996; p. xi).

Historically, institutions of higher education were entrusted organizations: federal and state organizations could provide financial support with few questions from the public, and tuition could be increased with little protest from students or their families (Kerr, 2001). In the past decade, this privileged status of higher education with respect to public trust has declined (Trow, 1998). At the federal, state, and individual levels, constituents want to know what the money given to institutions of higher education is buying and how institutions will demonstrate that this money is well-spent (Burke, 1998; Hartle, 1998). Although college leaders continue to ask for increasing resources, the public is requiring institutions of higher education to identify ways to improve their performance (i.e. providing a stronger undergraduate education) without increasing costs (Massy, 1999a).

Higher education administrators are aware of expectations to demonstrate their productivity and efficiency but are challenged with how to do this. Productivity can be defined simply as "the ratio of output to input in an organization" (Schapiro, 1996, p. 37), but in higher education, measuring these inputs and outputs is not simple. First, colleges and universities have several inputs (i.e. state funding, faculty, student ability, etc.), and outputs (i.e. teaching, research, student learning, etc.) may not be within the direct control of institutional governance (Birnbaum, 1988; Massy, 1999a). Secondly, many of these inputs and outputs frequently are complex, multi-faceted, and difficult to measure (Massy; Stringer, Cunningham, Merisotis, Wellman, & O'Brien, 1999).

Nevertheless, it is imperative that studies on efficiency, no matter how challenging, be conducted: the public trust in higher education as well as the survival of institutions may be at stake (Bowen, 1980; Massy, 1999b). Commenting on the need for this research related to higher education, Massy urged, "One should carry out rigorous research as fast as possible, but be prepared to make leaps of commitment to imperfect but implementable measures that offer a reasonable promise of improving the status quo" (p. 388).

As mentioned earlier, efficiency studies of higher education institutions are difficult to undertake because they focus on inputs that frequently are not in control of institutional leaders and outputs that are not always measurable (Birnbaum, 1988). However, one plausible place to begin may be to examine how resources are allocated within the institution and the extent to which allocated resources meet institutional goals such as high first-year retention and 6-year graduation rates. Investigating the relationship between resource allocation and retention and graduation bypasses some of the difficulties associated with other productivity studies since resource allocation strategies primarily are developed and controlled by institutional leaders (Bowen, 1980) and graduation and retention rates are tangible, measurable outputs (Burke, 1998).

Examining the relationship between resource allocation strategies and retention and graduation rates is logical for other reasons as well. Resource allocation decision-making is a valuable factor to examine since it impacts almost all other functions within the institution (Massy, 1999a). In an era of tight budgets, allocating additional resources to one area, such as instruction, may result in another area, such as libraries, experiencing a decline in resources. As Massy concluded, "Analyses of resource allocation processes are ... important because they deeply affect and impact most other institutional processes" (p. 3).

Retention and graduation rates are two measures that frequently have been employed to evaluate efficiency and productivity (Burke, 1998). Retention rates are important as they predict the ability of an institution to keep the students who choose to attend their institution. As Stodt (1987) noted, students do not buy a four-year contract; they purchase a semester at a time. Institutions must "help students recognize the ways in which their investment is paying off, by indicating the benefits gained from a given course, contacts made at the college...and activities that prepare them for the 'real' world" (Stodt, p. 8). In studies of retention, first-year retention rates commonly are used because students are most likely to drop out in the first year. As a result, an institution's first-year retention rate provides insight into its ability to retain students (Tinto, 1993).

Graduation rates are critical in that they signify the completion of a specific goal that is shared by institutions and students. Most students who enroll in a four-year institution do so with the intent of completing an undergraduate degree (The Chronicle of Higher Education, 2002). Completion of a baccalaureate degree is related to both personal and societal benefits such as more job opportunities, greater income potential, and higher degrees of civic involvement (Underwood & Rieck, 1999). Graduation rates are important indicators of how well institutions are helping students and society achieve these benefits.

Little research has been conducted that examines how an organizational financial strategy such as resource allocation may provide insight into improving undergraduate retention and graduation rates. Ironically, this is the question that institutional stakeholders (students, parents, legislators) are pressing institutions to answer: How can 4-year institutions allocate limited resources effectively and efficiently and still maintain or increase productivity as measured in terms of retention and graduation rates (Alexander, 2000)? In the

last decade, costs and prices continued to rise but did the additional expenditures help to improve the quality and value of higher education? In other words, did the relationship between resource allocation decisions and retention and graduation rates change or remain constant over the past decade? This study addressed these questions.

Within the context of this dilemma lies another critical element that affects the relationship between resource allocation and retention and graduation rates: institutional selectivity. Institutional selectivity is a measure of admissions competitiveness (Barron's 2000). Selectivity scores provide information on the general academic qualities needed for admittance into a specific institution. Colleges and universities with high selectivity ratings enroll students with higher standardized test scores, high school grade point averages and high school rank than institutions with lower selectivity ratings (Barron's).

Research has illustrated that regardless of institutional behavior (e.g., resource allocation) students who academically are better prepared for college are more likely to be retained and to graduate (Astin, Korn, & Green, 1987). Institutions that are more selective are more likely to enroll high ability students (Barron, 2000). As a result, these institutions may have higher retention and graduation rates regardless of how they allocate their resources (Mayer-Foulker, 2002). Therefore, a more comprehensive understanding of the relationship between institutional expenditures and retention and graduation only can be achieved by accounting for institutional selectivity.

Purpose of Study

The purpose of this study was to examine the relationship between institutional expenditures related to instruction, academic support, student services, institutional support, and institutional grants and retention and graduation rates at private Baccalaureate Liberal

and General colleges and universities as defined by the Carnegie Classification system (2002). This study had three goals: a) to understand the relationship between institutional expenditures and retention and graduation rates, b) to understand the relationship of institutional selectivity, institutional expenditures and retention and graduation rates and c) to investigate if these relationships have changed in the past ten years (1992 - 2002). Expenditures were viewed from two perspectives:

1. The relationship between the amount of money spent per student and retention and graduation rates at private Baccalaureate Liberal and General colleges and universities.

2. The relationship between the percentage of institutional expenditures and retention and graduation rates at private Baccalaureate Liberal and General colleges and universities.

Significance

This study built on current research by investigating how an organizational behavior such as resource allocation may influence first-year retention and 6-year graduation rates. Much of the research on retention has focused on the characteristics or traits (i.e. academic ability or experiences or financial need) of students (see Astin, 1984; Cabrera, Nora & Castaneda, 1992; Tinto, 1993). Significantly less research has examined how institutional behavior rather than student characteristics or experiences is related to retention and graduation (Berger, 2001-2002).

Understanding organizational behavior is important because it has the potential to impact the graduation and retention rates of all students. Unlike strategies that target specific student populations or programs, the organizational behavior of an institution can have more far-reaching consequences on the entire student population (Berger, 2001-2002). If resource allocation strategies that improve retention and graduation can be identified, then potentially

powerful information will be available to institutional decision-makers in the process of resource allocation. Subsequently, this information ultimately may result in increased productivity in the form of improved retention and graduation rates.

Theoretical Framework

The relationship of organizational attributes to student departure has been studied previously (e.g., Berger & Braxton, 1998). This study extended that work and was framed by Berger's (2001-2002) assumption that "...colleges and universities are organizations and subsequently that the organizational perspective is an appropriate framework for gaining useful insights into how undergraduate retention can be improved on college and university campuses" (p. 3). In this study, colleges were perceived as organizations that can exhibit patterns of behavior (specifically by how they allocate resources) that can have "important consequences for the retention of undergraduate students" (Berger, p. 19).

Research Questions

This study revolved around one primary question: What institutional expenditures contribute to first-year retention rates and graduation rates at Baccalaureate Liberal and General private institutions? This encompassing question can be dissected into ten research questions. These ten research questions can be grouped into three subcategories: amount of money spent per student, percentage of institutional expenditures, and longitudinal analysis.

Amount of Money Spent per Student

1. Did the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates at private Baccalaureate Liberal and General institutions?

2. Between 1996-1997 and 2001-2002, did the amount of money that was spent per student for instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?
3. Did institutional selectivity and the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants significantly predict first-year retention rates and 6-year graduation rates at private Baccalaureate Liberal and General institutions?
4. For institutions with differing levels of institutional selectivity, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants significantly predict first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Percentage of Expenditures per Student

5. Did the percentage of institutional expenditures in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates at private Baccalaureate Liberal and General institutions?
6. Between 1996-1997 and 2001-2002, did the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?
7. Did institutional selectivity and the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional

grants significantly predict first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General institutions?

8. For institutions with differing levels of institutional selectivity, did the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Longitudinal Analysis

9. For private Baccalaureate Liberal and General institutions, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants predict first-year retention and 6-year graduation rates for 1992, 1997, and 2002?

10. For private Baccalaureate Liberal and General institutions, did the percentage of institutional expenditures on instruction, academic support, student services, institutional support, and institutional grants predict first year retention and 6-year graduation rates for 1992, 1997, and 2002?

Null Hypotheses

To achieve the purposes of this study, the following null hypotheses will be tested:

Amount of Money per Student

1. The amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants did not significantly predict first-year retention rates at private Baccalaureate Liberal and General institutions.

2. Between 1996-1997 and 2001-2002, the amount of money that was spent per student for instruction, academic support, student services, institutional support, and institutional grants did not significantly predict 6-year graduation rates at private Baccalaureate Liberal and General institutions.
3. Institutional selectivity and the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants did not significantly predict first-year retention rates and 6-year graduation rates at private Baccalaureate Liberal and General institutions.
4. For institutions with different levels of institutional selectivity, the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants did not predict first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General institutions.

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5. The percentage of institutional expenditures in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants did not significantly predict first-year retention rates at private Baccalaureate Liberal and General institutions.
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significantly predict first-year retention rates and 6-year graduation rates at private Baccalaureate Liberal and General institutions.

8. For institutions with different levels of institutional selectivity, the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants did not predict first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General institutions.

Longitudinal Analysis

9. For private Baccalaureate Liberal and General institutions, the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants did not predict first-year retention and 6-year graduation rates for 1992, 1997, and 2002.
10. For private Baccalaureate Liberal and General institutions, the percentage of institutional expenditures on instruction, academic support, student services, institutional support, and institutional grants did not predict first year retention and 6-year graduation rates for 1992, 1997, and 2002.

Variables

The independent variables in this study were institutional expenditures devoted to instruction, academic support, student services, institutional support, and institutional grants. These expenditures were analyzed in two ways: amount of expenditures per student and percentages of institutional expenditures.

When the relationship between the amount of money that is spent per student on instructional expenditures and retention was examined (Research Questions 1, and 2), the independent variables were: instruction expenditures per student (IES), academic support

expenditures per student (ASES), student services expenditures per student (SSES), institutional support expenditures per student (ISES), and total institutional grants (scholarships, fellowships) expenditures per student (IGES). Institutional selectivity (INS SELECT) was added as an independent variable for Research Question 3.

Research Question 2 examined the relationship between institutional expenditures and graduation rates. Institutional expenditures over the course of a student's enrollment could influence 6-year graduation rates; therefore, a mean expenditure value was obtained by calculating expenditures per student for six years prior to Fall 2002, summing these results, and dividing by six. The independent variables were average institutional expenditures per student for instruction, (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), and institutional grants (AVIGES). Institutional selectivity (INS SELECT) was added as an independent variable for Research Question 3.

The independent variables used to investigate the relationship between the percentage of institutional expenditures and retention were: percentage of expenditures for instruction (PEI), percentage of expenditures for academic support (PEAS) percentage of expenditures for student services (PESS), percentage of expenditures for institutional support (PEIS), and percentage of expenditures for institutional grants (PEIG). Institutional selectivity (INS SELECT) was added as an independent variable for Research Question 7.

Research Question 6 examined percentage of institutional expenditures and 6-year graduation rates. Six-year average percentages of expenditures were calculated. The independent variables were: instruction (AVPEI), percentage of expenditures for academic support (AVPEAS), percentage of expenditures for student services (AVPESS), percentage of expenditures for institutional support (AVPEIS), and percentage of expenditures for

institutional grants (AVPEIG). Institutional selectivity (INS SELECT) was added as an independent variable for Research Question 7.

The dependent variables were first-year retention rates (RETEN) and six-year cohort graduation rates (GRAD). This study also examined the relationship between institutional expenditures and retention and graduation rates over time (1992, 1997, 2002).

Methodology

This quantitative study sought to determine if retention and graduation rates of private Baccalaureate Liberal and General institutions could be predicted by how institutions allocate funds to various institutional activities. The targeted population consisted of private Baccalaureate Liberal and General colleges and universities as identified by the 2000 Carnegie Classification system. The population included 466 private Baccalaureate Liberal and General institutions that enrolled approximately 6% of students of higher education. Baccalaureate Liberal and General institutions were chosen for three fundamental reasons: a) these institutions primarily focus on undergraduate, rather than graduate education (NCES, 2002a), b) these institutions are more sensitive to fluctuations in student numbers than their counterparts at Comprehensive or Research institutions and therefore, are most impacted by lower retention and graduation rates (Levitz, Noel, & Richter, 1999), and c) this is a population of institutions that has not been studied widely (Massy, 1999b).

This study focused on private, rather than public, Baccalaureate Liberal and General institutions in an attempt to minimize the influence of state funding and control. Although private institutions may receive funding directly or indirectly from state governments, in general they tend to have more direct control than their public counterparts in determining institutional expenditures (Bowen, 1980).

Data Collection

Data were collected using the Integrated Postsecondary Education Data System (IPEDS), an on-line database maintained by the National Center for Education Statistics [NCES], the *US News and World Report (US News)* "America's Best Colleges" and *Barron's Profiles of American Colleges of 2001.* IPEDS was used to identify all private Baccalaureate Liberal and General institutions and institutional expenditures. *US News* provided first-year retention rates and 6-year graduation rates. Barron's provided institutional selectivity ratings.

Data Analysis

Descriptive and inferential statistics were used to analyze the data and make inferences about the relationship between institutional expenditures and retention and graduation rates. Discriminant analysis procedures were employed to classify institutions into two subgroups: low selectivity and high selectivity institutions. Standard multiple regression was the primary statistical tool used in this study. It was employed to investigate if institutional expenditures significantly predict retention and graduation rates. In addition, multiple regression analysis was used to examine which, if any, of the independent variables significantly predicted retention and graduation rates. An alpha of .05 was used as the level of significance. *Statistical Package for the Social Sciences 11.5* (SPSS) was the software used to perform multiple regression.

Definition of Terms

To better understand this research, definitions of the following terms are provided:

Institutional Type

Baccalaureate General Colleges and Universities. Institutions that primarily are undergraduate colleges with a major emphasis on baccalaureate programs. During the period

studied, they awarded less than half of their baccalaureate degrees in liberal arts fields (Carnegie Foundation, 2002).

Baccalaureate Liberal Colleges and Universities. Institutions that primarily are undergraduate colleges with a major emphasis on baccalaureate programs. During the period studied, they awarded at least half of their baccalaureate degrees in liberal arts fields (Carnegie Foundation, 2002).

Dependent Variables

First-Year Retention Rate. First-year retention rates are commonly computed as a percentage. It is calculated by taking the total number of first-year students who returned their second year at a specific institution divided by the total number of the same group of students at the institution who started their first year. (*US News*, 2003).

6-year Graduation Rates. Percentage of freshmen who graduated within a six-year period. (Note: This excludes transfers into the school) *(US News, 2003).*

Independent Variables

Academic Support Expenditures. Expenditures for the support services that are an integral part of the institution's primary mission of instruction, research, or public service. Includes expenditures of libraries, museums, galleries, audio/visual services, academic computing support, ancillary support, academic administration, personnel development, and course and curriculum development (NCES, 2001b, p. 12).

Institutional Grants. Amount awarded to students from restricted and unrestricted institutional resources for the purpose of student aid, such as scholarships or fellowships funded by gifts or endowment return (NCES, 2001b, p. 7).

Institutional Selectivity Ratings: Degree of admissions competitiveness. Ratings factor in incoming students' average median entrance examination scores (e.g. SAT/ACT), high school rank, high school grade point average and the percentage of applicants who were accepted (Barrons, 2000).

Institutional Support. Expenditures for the day-to-day operational support of the institution, excluding expenditures for physical plant operations. Includes general administrative services, executive direction and planning, legal and fiscal operations, and public relations/development (NCES, 2001b, p. 12).

Instruction Expenditures. Expenditures of the colleges, schools, departments, and other instructional divisions of the institution and expenditures for departmental research and public service that are not separately budgeted. General academic instruction, vocational instruction, special session instruction, community education, preparatory and adult basic education, and remedial and tutorial instruction conducted by the teaching faculty for the institution's students (NCES, 2001b, p. 11).

Student Services. Funds expended for admissions, registrar activities, and activities whose primary purpose is to contribute to students' emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program (NCES, 2001b, p. 12).

Assumptions

To effectively conduct this study, several assumptions were acknowledged. The first assumption was that the data provided by IPEDS and *US News* were accurate. The study assumed that university administrators who provided the data to IPEDS and *US News* did so accurately and subsequently, IPEDS and *US News* correctly reported this data.

Because this study examined data from three different years (1992, 1997, 2002), this study assumed that data were collected and reported in a consistent and similar manner for each year. Although the IPEDS system has made changes in how it collects data, the variables used for this study were not affected in ways that made it unfeasible to compare data across the 10-year period (A. Mary, personal communication, June 4, 2003). Likewise, it was assumed that the methods *US News* used to calculate and report retention and graduation rates reported were consistent for the three years to be studied.

Limitations

This study examined the relationship between institutional expenditures and retention and graduation rates at private Baccalaureate Liberal and General institutions, but there are limitations to this research. These institutions typically spend a large percentage of their budget on undergraduate instruction and minimal resources in areas such as research and graduate education. Studies that include additional types of institutions (i.e. Research I or Doctoral universities) that have significant expenditures in other areas such as research may provide additional insight into the relationship between resource allocation and retention and graduation rates.

In addition to financial resources, institutions possess other valuable assets that can enhance retention and graduation. A campus' physical environment, for instance, plays a significant role in student satisfaction (Strange & Banning, 2001). The layout of the campus, landscaping, qualities of the classrooms and residence halls impact student behavior and attitudes and have consequences for student retention and graduation (Strange & Banning). Colleges and universities differ in their physical resources and although these may affect retention and graduation, this study did not account for these differences.

This study sought to provide a general overview of those expenditures that significantly predict retention and graduation rates. However, the categories themselves make it difficult to pinpoint specific institutional resource allocation decisions that are related to retention and graduation. For example, the student services category may include services such as registrar's office, admissions, and student activities. The category of academic support encompasses areas such as academic advising and library expenditures. Because of the complexity of these variables, additional studies employing qualitative research methods such as case studies may assist in understanding the multi-faceted nature of these variables and how they may contribute to a students' involvement in college.

Finally, this study will not answer the question, "How much is enough?" This study will not provide a formula for institutions to use to determine the amount of money needed to significantly improve retention or graduation rates. If institutions wanted to improve retention rates, for example, how much additional money would they need to allocate in the areas of instruction, academic support, or institutional grants to see results? If institutions currently have high graduation rates, would allocating even more resources in these areas improve graduation rates? Future studies could examine the relationship between institutional expenditures and retention and graduation rates more specifically.

Summary

The purpose of this study was to examine the relationship between retention and graduation rates and institutional expenditures related to instruction, academic support, student services, institutional support, and institutional grants at private Baccalaureate liberal and general colleges and universities. Included in this study is a review of literature and the methodology, results, and discussion. Chapter 2 provides a review of the literature related to

the topic of resource allocation and retention and graduation rates. Specifically, it covers research pertaining to accountability, productivity, and efficiency issues in higher education, higher education organizational behavior theory, resource allocation strategies, and theories of student retention. Chapter 3 outlines the methodology that was used to conduct the study. The results of this study are contained in Chapter 4. Chapter 5 provides a summary of the results and discusses implications for practice and future research.

CHAPTER 2: REVIEW OF LITERATURE

As the costs and price of higher education outpace inflation, the public is scrutinizing the financial decisions of institutional leaders more closely (Stringer, et al., 1999). Although the public still considers a college education a smart investment for students (The Institute for Higher Education Policy [IHEP], 1998), parents and legislatures are placing higher expectations on institutions to verify that they are using their resources effectively and efficiently (Alexander, 2000).

Two common measures of institutional effectiveness are first-year retention and 6-year graduation rates (Burke, 1998). First-year retention and 6-year graduation rates are important because they assess an outcome that is valued by students and the general public, namely, pursuing and completing a degree. Attending college and completing a degree has economic and social benefits for the individual as well as society. As reported in "Reaping the Benefits," a report sponsored by IHEP (1998), individuals who complete a college degree have a greater quality of life, better health, and increased job security. Society benefits from those who attend college since college graduates are more likely to spend money, be less reliant on governmental funds, and are more willing to contribute positively to their communities (IHEP).

A significant amount of research has been conducted to determine factors that lead to student persistence and graduation. However, most of these studies focused on student attributes such as academic and social skills, motivation, and commitment (Tinto, 1993). Fewer studies have examined how institutional attributes such as organizational behavior and culture are related to retention and graduation rates. This study supplemented research on organizational culture and retention and graduation rates by examining how an organizational

behavior, resource allocation strategies, impacts graduation and retention rates at baccalaureate colleges and universities.

To provide a richer context and understanding of this research problem, this chapter includes a review of relevant literature and research studies related to the topic. Seven areas are examined: a) current pressures of institutional accountability, efficiency, and effectiveness and their impact on resource allocation and retention and graduation, b) approaches to resource allocation strategies, c) expenditure patterns, d) organizational behavior within higher education institutions, e) research related to retention and graduation, f) research examining organizational behavior and student outcomes, and g) research examining resource allocation strategies and retention and graduation rates.

Accountability, Productivity, and Efficiency

Since the unrest of the 1960s, the public's attitude toward higher education increasingly has become negative (Kerr, 2001). Frustrations with increasing tuition, under-prepared graduates, and the belief that institutions are slow to adapt to changes have minimized the public's trust in institutions of higher education (Kerr). The result of this diminished trust has been an increased focus on accountability.

The nature of accountability in higher education has changed in the past 20 years moving from "an accounting of expenditures to demonstrating performance" (Burke & Modarresi, 2000, p. 432). According to Trow (1998), accountability in higher education refers to "the relations of colleges and universities to the people, groups, and institutions in the society that support them" (p. 15). To be accountable is "to report to others about the activities of an institution, its parts and members, to explain, to justify and to answer questions" (Trow, p. 16).

Institutional accountability commonly is equated with institutional productivity or efficiency (Baldridge, Ecker, Curtis, & Riley, 2000; Massy, 1999c). If an institution can be perceived as meeting its goals or doing more with less, it will be perceived as being accountable (Massy). In its most basic form, productivity is the ratio of "output per unit of input in an organization" (Schapiro,1996, p.27) and efficiency is defined as getting the most output with the least input (Bowen & Douglas, 1971). Since, in higher education, there are several outputs and inputs, Massy suggested looking at productivity as a ratio of the total benefits divided by total costs:

$$\text{Productivity} = \frac{\text{Total benefits}}{\text{Total costs}}$$

Despite this relatively simple formula, productivity is difficult to measure in colleges and universities since the inputs and outputs frequently are complex, multi-faceted, and intangible (Massy, 1999c). One variation in an input may have a variety of outputs (Bowen & Douglas, 1971). For example, one input may be resources to hire additional faculty members. Resources may be in the form of salary, equipment, or benefits. The outcome of these inputs may be smaller class sizes, more publications, or an enhanced learning environment.

The formula for productivity assumes that there are agreed-upon benefits and values of higher education. However, within a higher education institution, many different and somewhat conflicting goals may exist (Cohen & March, 1974). Many institutions, for instance, are expected to generate and disseminate knowledge for the benefit of society. This goal may suggest that a faculty member focuses on teaching students, or it may suggest that the faculty member engage in more research at the expense of teaching. Which faculty

member is more productive? The professor whose students are admitted into prestigious graduate schools or the faculty member with a significant number of publications?

Rhoades (2001) suggested that the questions of productivity be reframed. Broad questions such as "Is the institution productive?" must be specified into questions of "Productivity in whose interests?" (p. 627) "Productivity for which unit of analysis?" (p. 623), and "Productivity according to what functions?"(p. 625). More detailed definitions of productivity allow institutions to better assess their performance. Similarly, research that seeks to measure productivity must define the boundaries by which productivity will be measured. In this study, productivity was measured by institutional graduation and retention rates.

In addition to the disagreement about how to measure productivity in higher education, conflicting views on how to improve productivity also exist. For internal stakeholders such as faculty, increasing productivity involves "increasing benefits while holding costs constant or, better, increasing resource utilization while increasing benefits faster"(Massy, 1999c, p. 55). For external stakeholders such as legislatures, productivity improvement means "reducing costs while holding benefits constant...or increasing benefits while reducing costs" (Massy, p. 55). In other words, internal stakeholders believe that productivity can be improved by doing "more with more" whereas external stakeholders view productivity improvement as doing "more with less" (Massy). These opposing views provide challenges for college leaders.

Massy (1999c) believed that these seemingly incompatible approaches could be meshed into the "growth by substitution" model where "institutional decision makers maximize total benefits subject to a limit on total expenditures" (p. 56). Implementing growth

by substitution requires that decision makers look for ways to shift resources in those areas where return is the highest. As a whole, an institution may be doing more with less, but in those areas where an increase in resources will provide an increase in benefits, specific departments may be doing more with more.

As it relates to this study, the growth by substitution approach may mean putting money in those areas that significantly improve graduation and retention rates. It may be unrealistic for institutions to significantly raise more money, but the growth by substitution approach challenges institutions to allocate resources to areas where the chances of improving productivity may be greatest.

Institutions need to be more accountable and institutions need to increase their efficiency and effectiveness (Trow, 1998). Much of the critique surrounding higher education institutions can be summed up by one of these tenets (Massy, 1999b). Increased pressure for institutional accountability, efficiency and effectiveness provided the backdrop for the need and development of this study. By examining the relationship between resource allocation strategies and retention and graduation rates, this study proposed to shed light on institutional behavior (i.e., how institutions allocate resources) that may enhance productivity and efficiency (i.e., improved retention and graduation rates).

Revenue Theory of Costs, Cost Disease, and Growth Force

As mentioned earlier, the variety of inputs and outputs make it difficult to measure productivity and efficiency in higher education institutions. This section identifies additional qualities of colleges and universities that impact productivity and efficiency: revenue theory of cost, cost disease, and growth force (Bowen, 1980). In subsequent sections, differences in the organizational cultures among colleges and universities are highlighted. Underlying these

differences, however, is an organizational behavior related to resource expenditures that is common to all higher education institutions: institutions will raise as much money as they can and then spend it (Bowen). Known as Bowen's revenue theory of costs, this concept of organizational behavior sheds additional light on problems associated with productivity and efficiency.

The premise of Bowen's (1980) theory is that "an institution's educational cost per student unit is determined by the revenues available for that student" (p. 17). Expenditures, therefore, are based on the amount of money available to the institution and the number of students enrolled. Other factors such as need or fluctuations in the market do not impact costs per student. These factors may influence where money is dedicated, but educational costs per students, ultimately, are determined by the amount of money institutions can raise (Bowen).

Stemming from this revenue theory of costs are five "laws" of higher educational costs (Bowen, 1980). One, "the dominant goals of institutions are educational excellence, prestige, and influence" (Bowen, p. 19). These goals frequently are measured by institutional inputs: faculty-student ratios, books in the library, or PhDs on the faculty. Rarely are these goals measured by student outcomes such as retention or graduation rates (Bowen). Two, "in quest of excellence, prestige, and influence, there is virtually no limit to the amount of money an institution could spend for seemingly fruitful ends" (Bowen, p. 20). An institution seldom is satisfied with its current level of expenditures. As a result, both affluent and impoverished institutions may be burdened with financial problems (Bowen).

Three, "each institution raises all the money it can" (Bowen, 1980, p.20). There is never a limit to the amount of resources institutions will attempt to acquire. Four, "each institution spends all it raises" (Bowen, p. 20). Institutions do work to establish endowments

to "save" money, but the majority of other resources such as tuition or state funding are spent each year (Bowen).

Finally, "the cumulative effect of the preceding four laws is toward ever-increasing expenditures" (Bowen, 1980, p. 20). There are no limits set on the amount of money institutions will spend to increase their excellence and prestige. As a result, "the question of what *ought* higher education to cost - what is the minimal amount needed to provide services of acceptable quality - does not enter the process except as it is imposed from the outside" (Bowen, p. 20).

Cost Disease and Growth Force

Cost disease and growth force are cited frequently as reasons for declining productivity and efficiency within colleges and universities (Massy, 1999c). Cost disease is a factor in most labor-intensive organizations where the same amount of people is needed to do the work, but the cost associated with hiring these individuals continues to rise (Massy). As applied to the university setting, for example, a faculty member needs to be hired to teach a 3-credit course but due to market values and inflation, the resources needed to reimburse a faculty member in 2002 are significantly higher than in 1972. The course credits are the same, the time spent in the classroom is the same, but the faculty salary has continued to increase and therefore institutional expenditures have increased (Massy).

Institutions have responded to the cost disease factor in a variety of ways. Using the above example, institutions may choose to move from smaller to larger class sizes so that they are able to offer fewer courses but maintain student enrollment. Other institutions have incorporated technology by offering courses via the Internet to reach a greater number of students without increasing the faculty course load (Massy, 1999c).

Growth force is a second reason cited for stagnant productivity (Massy, 1999c). Higher education institutions are subjected to more regulations and as more money is devoted to meeting regulations, productivity decreases. Secondly, information is expanding at unprecedented rates and colleges and universities are working to expand programs or develop new programs. This results in hiring additional faculty and staff and accruing more resources (i.e., equipment, space) (Massy).

This study examined institutional expenditures over 10 years. Applying the revenue theory of cost and its accompanying "laws," it is likely that over the 10-year period, institutions will have increased their revenues and as a result, will have increased their institutional expenditures. However, based on the concepts of cost disease and growth force, it may not be surprising that although institutions will continue to increase their resource allocations, their productivity, as determined by retention and graduation rates, may not improve.

Approaches to Allocating Resources

One of the intended outcomes of this study is to provide institutional decision makers with information on the relationship of expenditures patterns and graduation and retention rates. This research does not attempt to examine the means by which resources are acquired or critique economic formulas that may guarantee effective resource allocation. For example, it will not investigate how funding formulas should be adopted in order for resources to be available. However, it is helpful to recognize that institutions have different approaches to allocating resources. The purpose of this study is to provide recommendations on how institutions allocate their resources, but these recommendations also must recognize the various ways institutions approach the task of allocating resources. This section will

highlight four of the most common resource allocation strategies: line-item budgeting, performance responsibility budgeting, revenue responsibility budgeting, and value responsibility budgeting.

Line-item Budgeting

The most traditional form of budgeting is line-item budgeting. In this approach, a central office is responsible for allocating the institution's general funds (Massy, 1999d). The budget is divided into specific categories (i.e., salary, equipment, travel, etc.) called lines. Each line is allocated resources on an annual basis, and decreases or increases in resources tend to occur uniformly. If budget allocations for the college were decreased by 3%, every department at the college would experience a 3% decrease. Similarly, if revenues were higher than expected, resources would be allocated equally across all departments. Typically, only lines that are proposed as additions or deletions are closely examined; a broad review of the entire budget usually does not occur (Massy).

One of the assumptions of line-item budgeting was that efficiency would occur since all expenditures were controlled through a central administrative unit (Massy, 1999d). Since they would have a view of the entire budget, central administrators could make wise decisions about where to allocate additional resources or decide where resources should be decreased.

In the past, when institutions were able to garner resources to meet their needs, the line-item budgeting approach was adequate (Benjamin & Carroll, 1998). However, as institutions struggle with having sufficient resources, this centralized system of budgeting increasingly becomes difficult. As departments make claims for increased funding but limited resources are available, central administration is put in the middle to determine which

requests are most important. When central administration is forced to say "no," it has, as a consequence, the risk of lowering faculty morale, losing faculty or both. Therefore, instead of making cuts, administrators are more likely to find new funding sources (Massy, 1999d). This strategy as Massy described, "transforms resource allocation from an exercise in investment, where scarce resources are put to the best possible uses, to an exercise in coping and conflict management" (p. 31).

Whalen (1991) also recognized problems when too many decisions are centralized. Although Whalen recognized that decentralization of resources might result in duplication of activities, many times when all budgeting is centralized, "problems outside the immediate environs...do not seem important, do not receive attention, do not get corrected" (p. 11). As a result, Whalen recommended that responsibility for budgeting should be more decentralized, thus putting the decisions of resource allocations into the hands of those most closely affected by them.

Performance-Responsibility Budgeting

In performance-responsibility budgeting, central administration allocates resources to specific unit leaders who in turn determine how best to use the resources (Massy, 1999d). The task of line-item budgeting still occurs but it is shifted to those persons closest to the deliverable service or function. As the term implies, revenues given to departments are based on judgments about the units' plans and performance. Those units that are evaluated as meeting institutional goals will receive additional funding (Massy). In their in-depth study of performance-responsibility budgeting at one public university, Casper and Henry (2001) acknowledged the importance of developing criteria for performance goals. They concluded that performance budgeting is most effective when goals are clearly defined.

The disadvantage of this strategy is that it tends to overlook market fluctuations. For example, a computer science department may need to increase its faculty salaries in order to retain faculty members who otherwise may be hired away by a private corporation. The constraints of the performance responsibility budgeting may not provide enough additional revenues for departments to do this (Massy).

Revenue Responsibility Budgeting

Revenue responsibility budgeting is a more complex model where individual departments are responsible for revenues and expenditures. In this system, individual units are required to produce some of its own revenue. For instance, if enrollment in a certain department increased, a department would be given more revenues, whereas if enrollment declined, a department may receive fewer resources. These units are then free to spend their revenues in ways that they see fit (Massy, 1999).

To protect departments from market forces such as a declining interest in foreign languages and increased interest in computer science, each unit is subject to "taxes" or subventions. Taxes are assigned based on the percent of revenues and are used for central administrative operations or for subventions. Subventions are resources given to departments that are considered important (i.e., foreign languages) but may not be able to generate revenue that is needed (Massy, 1999d).

In this form of budgeting, units are able to carry forth surpluses from year to year and are responsible for making up any deficits they incur. By doing so, units are encouraged to develop a more long-term approach to budgeting versus a year-to-year approach where budgets tend to start over at the beginning of a new fiscal year.

This form of budgeting is similar to Whalen's (1991) description of responsibility-centered budgeting. However, in Whalen's (1991) approach, the institution is organized around specific centers that may include several departments. In this system, each center is given a specific allocation to its general fund, but additional revenues are determined by factors such as enrollment in specific courses or user fees for items such as counseling center services. One of the advantages of this system is that units are much more aware of the need to generate revenue and control costs (Strauss, Curry, & Whalen, 1999). According to Whalen (1991), when individual departments are most cost-conscious, institutions frequently notice a decline in overall institutional costs.

One disadvantage of this system is that it tends to value market forces over institutional goals. There may be more of a tendency, for example, for departments to develop curricula that require more classes within the major and decrease courses from other areas so that individual departments can improve student credit hours and thus, increase revenue (Massy, 1999d).

One of the greatest advantages of performance responsibility budgeting is that it challenges departments to focus on achieving institutional goals. The primary advantage of revenue responsibility budgeting is its ability to have departments take increased ownership of their revenues and costs, thereby limiting institutional spending (Massy, 1999d). A new form of budgeting, value-responsibility budgeting, combines the positive aspects of the performance-responsibility budgeting and revenue responsibility budgeting.

Value-Responsibility Budgeting

In value-responsibility budgeting, a percentage of revenues is provided by central administration but units must develop other forms of revenues. Units will be required to

generate revenue for sponsored research, but also are shielded from huge market fluctuations. Value-responsibility budgeting also rewards departments that meet or exceed institutional goals, thus creating another source of revenue. The advantage of this approach is that it balances an institution's intrinsic values, such as mission, with the market forces (Massy, 1999e). In other words, it balances the goals of internal stakeholders and external stakeholders. The disadvantage of this approach is that it is much more complex than a simple line-item budgeting approach.

As mentioned earlier, this study will not analyze the strategies institutions use to allocate resources. However, any recommendations that may arise from this study will need to take into account how these various strategies may influence an institution's ability to implement changes in their expenditure patterns.

Expenditure Patterns

Institutions implement different approaches to allocating resources. Similarly, institutions also significantly vary in the amount of money and the patterns in which they allocate money. This section illustrates trends in institutional expenditures at baccalaureate colleges and universities and examines differences in expenditures among higher education institutions.

The majority of college expenditures are considered Education and General (E & G) expenditures. These expenditures are used for the daily operation of an institution's activities. (Cunningham, Wellman, Clinedinst, & Meristois, 2001). E & G expenditures include "instruction, research, public service, academic support, student services, institutional support, scholarships and fellowships, mandatory and nonmandatory transfers" (Cunningham, et al., 2001, p. vi). This study analyzed the relationship between the majority

of these subgroups of institutional expenditures and retention and graduation rates. Since public service, research, operation/maintenance of plant, and nonmandatory and mandatory expenditures were minimal for the sample studied, they were not included in this study (NCES, 2002a).

In a study of 268 institutions, Bowen (1980) delineated differences in institutional expenditures among institutions. Bowen found that institutions varied widely in how they allocated their resources. Even institutions that were similar in size and missions reported vast differences in their resource allocation patterns. The only consistency Bowen found was that more affluent institutions spent more in every area than their less affluent counterparts. Bowen's study reflected the results of prior research (see, for example, Bowen & Douglas, 1971) that ultimately led Bowen to conclude, "Even if one could select tiny groups of comparable institutions so homogeneous as to eliminate all cost differences, one would not change the reality that the cost of carrying out essentially the same services varies widely among American colleges and universities" (p. 120). Based on this research, it is likely that this study that focused on Baccalaureate institutions also will find significant differences in expenditures among this group of institutions.

Bowen (1980) found that although affluent institutions have more of everything than their less affluent counterparts, their spending patterns were different. More affluent institutions tended to spend less money on educational purposes and physical plant and more on student services and financial aid. More affluent institutions also hired more nonacademic staff than their less affluent counterparts. Since resource allocation strategies may not be geared toward educational outcomes, less affluent institutions possibly could achieve similar, if not better, outcomes than their counterparts who have more financial resources (Bowen).

NCES (2002a) has collected longitudinal data on E & G expenditures for institutions of higher education that make it possible to observe trends in institutional expenditures. The following data is based on a summary of all 4-year non-profit institutions. Since 1980, the percentages of expenditures devoted to the various subgroups (instruction, academic support, etc.) have changed (NCES). For instance, in 1980, 32.4% of an institution's E & G expenditures were devoted to instruction. In 1996, the percentage dropped to 30.4%. The percentage of expenditures devoted to academic support increased from 6.7% to 7.0% although library expenditures declined (2.7% to 2.3%). Percentages devoted to student services and institutional support increased (4.5% to 5.1%; 9.0% to 9.6%, respectively). The most significant change in expenditures was in institutional grants. From 1980 to 1995, the percentages devoted to institutional grants almost doubled from 3.9% to 6.9% (NCES).

Other studies have examined trends in institutional expenditures at four year private colleges. Blasdell, McPherson, and Shapiro (1996) analyzed trends in institutional expenditures from 1978-79 to 1988-89. At four-year private colleges, they found that the percentage of expenditures devoted to instruction, libraries, and facilities decreased. Between 1978-79 and 1988-89, instruction expenditures decreased from 43.9% to 41.3%, and library expenditures decreased from 4.5% to 3.4%. Expenditures for academic support, student services, and institutional support increased. Academic support increased from 4.4% to 6.0%, student services increased 9.7% to 11.3% and institutional support increased from 19.4% to 20.9%. Blasdell et al. did not analyze expenditures for scholarships and fellowships.

Continuing research on institutional trends, Cunningham et al. (2001), did an in-depth analysis of institutional expenditures at all colleges and universities from 1988-89 to 1995-

96. Similar to Blasdell et al.'s (1996) study, they found that expenditures for instruction constituted the largest percentage of E & G expenditures but "remained flat or decreased as a proportion of E &G expenditures" (p. vi.). Cunningham et al. did examine expenditures for scholarships and fellowships and found that this category of expenditures was one of the fastest growing expenditures categories.

Cunningham et al. (2001) specifically examined private Bachelor's institutions, a subgroup that is closely related to the sample used in this study. Instruction expenditures consistently were the largest proportion of E & G expenditures but they decreased from 29.1% in 1988-89 to 28.3% in 1995-96. The proportion of expenditures devoted to academic support and institutional support also decreased. The proportion of student services expenditures remained the same and the percentage of expenditures devoted to institutional grants increased almost 5%. Appendix A provides a more detailed listing of the trends in institutional expenditures from 1998-89 to 1995-96.

The conflicting results of these studies can be attributed to differences in data sets and the time period in which these data were analyzed. The NCES data tracked institutional expenditures for all four-year institutions from 1980 to 1996. Blasdell et al. (1996) focused on all four-year private colleges from 1978 to 1989 and Cunningham et al. (2001) examined subgroups of 4-year colleges (i.e., research, doctoral, bachelor's, etc.) from 1988 to 1996. Nevertheless, a few conclusions are worth noting. One, since the late 1970s, institutions are devoting less financial resources to instruction. Two, although expenditures on academic support are rising, expenditures for libraries are declining. Finally, institutions increasingly are putting more money toward student financial aid in the form of scholarships and grants.

How might these trends impact current and future retention and graduation rates? One of the outcomes of this study is to provide institutional decision makers with information on how their resource allocation decisions may impact retention and graduation rates. Through its analysis of expenditure patterns and retention and graduation rates, this study provides insight into how resource allocation expenditure patterns may enhance or detract from retention and graduation.

Resource Allocation Strategies and Institutional Effectiveness

According to Bowen's (1980) revenue theory of costs, institutions consistently are working to increase their revenues and then they spend them. Inherently, the institutional nature of continual accrual of resources and subsequent expenditures is neither good nor bad. What is problematic, however, is that few institutional leaders develop strategies for allocating resources that can enhance institutional goals. Institutions may have procedures in place that determine how resources are allocated, but rarely have they developed strategies that can improve institutional effectiveness. Astin and Scherrei's (1980) study of management styles at 49 private colleges illustrated this concern:

> Academic administrators have traditionally been more concerned about the acquisition of resources . . . than about their effective use . . . Recent concerns . . . have focused on how to conserve limited resources rather than on how to reallocate them for the enhancement of student and faculty development. (p. 2)

In his study investigating the relationship between institutional finances and planning, Hearn (1988) concluded that resource allocation decisions rarely are incorporated into strategic plans. He concluded that, in general, strategic plans don't address financial implications of institutions nor do institutional leaders link strategies to resource allocations.

Hearn's conclusion is consistent with Peterson's (as cited in Hearn, 1988) assessment that financial planning is more reactive than active and that, traditionally, it has focused on the techniques of how to do planning rather than emphasizing strategies that could lead to institutional change.

While few institutions develop strategic plans related to institutional expenditures, even fewer colleges and universities know how their expenditures impact institutional quality. Institutions consistently are working to increase the amount of money they have; however, they do not know if these additional funds result in a higher quality education. More research needs to be conducted to understand this relationship. As Bowen (1980) observed, "One of the most lamentable blind spots in the study of higher education is the lack of reliable information on the relationship between the educational expenditures of colleges and universities and their educational results" (p. 152).

This study attempted to fill this gap by examining how educational expenditures influence educational results as measured by retention and graduation rates. In this study, expenditures are examined from two perspectives: the amount of money spent per student and the percentage of institutional expenditures per student. Research suggested that these two views of expenditures are needed to comprehend more fully the nature of the relationship between expenditures and retention and graduation rates.

Organizational Behavior

This study focused on resource allocation strategies and their impact on retention and graduation rates. Resource allocation activities are a form of organizational behavior inherent in all higher education institutions. Institutions acquire financial resources from a variety of sources and need to determine how funds should be allocated. Similar to other organizational

behaviors, resource allocation strategies impact the culture of an institution, its processes, and the leadership skills needed to manage it effectively (Birnbaum, 1988; Hearn, 1988). Institutional leaders significantly differ in how they choose to allocate their resources; that, in turn, impacts other institutional behaviors and outcomes (Bowen, 1980). Therefore, to better understand differences in resource allocation strategies and their impact, it is important to understand theories of organizational behavior as they pertain to institutions of higher education.

Organizational behavior has been studied in a variety of environments: corporate, not-for-profit agencies, and educational organizations and has resulted in the development of several theories of organizational behavior (Pfeffer, 1997). Theories of organizational behavior surfaced at the end of the nineteenth century when businesses and industries changed from relatively simple to more complex organizations (Astin & Scherrei, 1980). As early as 1918, critics recognized the potential difficulties in applying concepts of business and industry to college and universities, but it was not until the last quarter of the 20th century that theories of organizational behavior incorporated the unique characteristics of colleges and universities (Astin & Scherrei). For purposes of this study, organizational behavior theories that specifically address institutions of higher education were examined.

Colleges and Universities as Loosely-Coupled Organizations

One of the most commonly acknowledged theories of higher education organizations is the concept of institutions as loosely-coupled systems. Glassman (as cited in Weick, 2000) first used the term "coupling" as a way to describe the degree that subsystems within an organization share variables. Weick (2000), applying the concept of coupling to educational organizations, ascertained that most educational organizations are loosely-coupled: events

are "somehow attached, but ... each retains some identity, and separateness and ... their attachment may be circumscribed, infrequent, weak in its mutual affect, unimportant, and /or slow to respond" (p. 38). A loosely coupled system is one that has decentralized coordination, little communication among all parts of the whole, and weak, if any, connection between the various people, departments and their goals. What one department chooses to do may have little effect on another (Weick).

Goal ambiguity is a common characteristic in loosely-coupled systems. A few agreed-upon core values may exist such as academic excellence, but there is not a detailed set of goals that defines everyone's work (Kuh & Whitt, 1991). In some instances, institutional goals may conflict. Increasing faculty members' teaching load may conflict with the goal of research productivity. Expanding professional programs may detract from the liberal arts curriculum.

Loosely-coupled systems have many advantages. Loosely-coupled systems can undergo significant changes in a variety of areas and yet preserve their "cultural insurance" (Weick, 2000, p. 40). Loose-coupling allows for elements of the organization to implement new strategies and ideas without radically changing the entire system. Similarly, if problems arise in one area of the organization, they can be isolated and sealed off so as not to significantly disturb the entire system (Weick). For instance, a department within an institution could try a new approach to allocating resources. If this approach failed, it would affect the individuals in that department but would have little impact on the rest of the institution.

However, loosely-coupled systems also pose difficulties for leaders within the systems (Weick, 2000). Universities rely on professionals to carry out the necessary

functions of teaching, research, and service. Although employed by the institution, these professionals also may have a strong loyalty to their discipline, their professional organizations, or the funding agency of their grants. In a system characterized by goal ambiguity and mixed loyalties among its workforce, it can be difficult to make broad, sweeping changes.

Loose-coupling has implications for this study. The loosely-coupled nature of an organization affects how resources are allocated, who allocates the resources, and the intended goals of the institution (Birnbaum, 1988). Institutional leaders, who may want to make significant changes in resource allocations, will need to recognize their organizational constraints. To make significant changes, institutional leaders must first make the goal of retaining and graduating students a priority.

Organizational Cultures

Although loose-coupling is an aspect of all colleges and universities, other elements of organizational culture affect the degree of coupling at specific institutions. In *How Colleges Work* (Birnbaum, 1988) described five distinct institutional cultures: bureaucratic, collegial, political, anarchical, and cybernetic. Each of these cultures possesses various degrees of coupling that can influence resource allocation strategies.

Bureaucratic

A bureaucratic institution is one that is characterized by formalized rules and structures designed to manage large numbers of people. In this type of institution, there is a formal hierarchy that serves to define authority and lines of communication (Birnbaum, 1988). Bureaucratic institutions rely on a rational model of decision making (Baldridge, et al., 2000). This form of decision making is a step-by-step procedure that involves

recognizing the problem, setting goals to address the problem, developing a list of solutions to meet the goals, assessing the consequences of each goal, choosing the best goal, and then implementing the goal (Baldridge, et al.). In essence, rational decision-making attempts to "link means to ends, resources to objectives, and intentions to activities" (Birnbaum, p.113).

In bureaucratic institutions, tight coupling occurs within specific departments and loose coupling among the departments. Birnbaum (1988) suggested that the hierarchical chart can provide insight into the degree of coupling among different areas. The vertical lines of a hierarchical chart indicate a tighter coupling whereas those areas that are not connected with any organizational line can be assumed to be less coupled with one another. For example, the offices such as Financial Aid, Student Activities, and Admissions that are located under the office of Vice-President of Student Affairs will be tightly coupled with one another. Conversely, there will be loose-coupling between these offices and the offices of Accounts Payable and Human Resources that report to the Vice-President of Business.

Two assumptions regarding resource allocation strategies can be made about the bureaucratic organization. One, resources are allocated using the rational decision process and financial resources are dedicated to those areas that are seen to accomplish specific sets of goals. In the loosely-coupled nature of the organization where different goals exist, resource allocation tasks are decentralized so that each distinct area may have control over their budgets and thus dedicate resources to meet their individual goals (Birnbaum, 1988).

Collegial

A second institutional culture is collegial. Also know as clan-like culture, (Cameron & Ettington, 1988), collegial institutions promote a sense of community with shared values and beliefs. In these institutions, all disciplines are considered equally worthy and important

and all members of the community are expected to participate. Consensus building and informal relationships replace the bureaucratic culture's formalized rules and structures. Collegial institutions are more tightly coupled due to their shared sense of values and goals (Birnbaum, 1988). In this culture, it is more likely that resource allocation tasks are done from a central location and allocation decisions are based upon the shared values of the community (Birnbaum).

Political

Political institutions tend to be institutions that are growing rapidly and becoming diverse. These institutions may include a small college trying to expand the number of majors offered or an institution wanting to upgrade from a college to a university. In political institutions, there are subgroups of individuals with specific interests who are competing for limited resources (Baldridge et al., 2000; Birnbaum, 1988). The relationship between subgroups, as Birnbaum described, is that they "operate autonomously but in other ways remain interdependent" (p. 132). Tight coupling occurs within each subgroup but loose-coupling occurs among the special interest groups. Although communities based on discipline exist, other subgroups are focused on specific issues such as communities of non-tenured faculty or communities of nonacademic staff (Birnbaum, 1988; Kerr, 2001).

In collegial institutions, everyone is expected to participate; in bureaucratic institutions, participation is determined by rules and procedures. In political institutions, participation is based on the interest of the subgroups. In general, inactivity in subgroups prevails unless a decision affects the subgroup and calls for participation (Baldridge et al., 2000). When a subgroup's interest is at stake, representatives appointed by subgroups, rather than all of its members, make decisions (Birnbaum, 1988). Resource allocation decisions are

based on the needs and wants of the most influential group of stakeholders (Birnbaum). Additionally, as new groups of stakeholders gain power, resource allocations may be altered.

Anarchical

Anarchical institutions are characterized by problematic goals, unclear technology, and fluid participation. In these types of institutions, there are wide disagreements about goals. If certain goals can be agreed upon (i.e., academic excellence), it is unclear how to best achieve the goals. For instance, academic excellence may be achieved by offering more courses with larger class sizes or fewer courses with small class sizes. By offering more courses, students have more of an opportunity to enroll in courses that meet their educational goals. However, small class sizes may allow more interaction with faculty that could result in enhanced learning of course material. Similar to the political model, in anarchical institutions, members inconsistently are involved in the decision-making process. (Birnbaum, 1988; Cohen & March, 1974)

Anarchical institutions allow "people to go in different directions without coordination by a central authority" (Baldridge, et al., 2000, p.131). Loose-coupling is the norm in these institutions. Not only are subgroups and departments loosely-coupled as is the case with political and bureaucratic institutions, but individuals within these subgroups or department also may lack little connection with one another. Tight coupling occurs around specific issues or activities that may bring various individuals or departments together. However, when the issue or activity is no longer relevant, the tight coupling also diminishes (Birnbaum, 1988).

In anarchical institutions, resource allocation decisions are decentralized. Subgroups or departments are provided a certain amount of resources but are given the ability to decide

how to best spend the money in their area (Birnbaum, 1988). The Vice-President of Student Affairs will be given resources and the authority to decide how to allocate these resources. Similarly, the Dean of Humanities is asked to allocate resources among departments as he/she sees fit.

Cybernetic

The fifth culture described by Birnbaum (1988) is a combination of the first four cultures. The cybernetic organization is bureaucratic in that it has hierarchical structures with formalized rules and structures. It is anarchical in that there are several goals and decision makers within one system; the different subgroups vying for resources add the political element. Despite the complexity of the organization, collegial aspects of the organization are evident in that there is another system of controls based on "shared attitudes and concern for group cohesion" (p. 182).

In cybernetic institutions, conflicting goals are resolved by assigning different units the responsibility for meeting goals. For instance, improving students' leadership skills may be given to the Student Affairs Office or the goal of challenging high ability students may be created by developing an Honors Program (Birnbuam, 1988). In this system, those units that are working toward the same goals are tightly coupled, but there is loose-coupling among units who are working on divergent goals. In this system, resources would be allocated so as to allow the units to meet their designated goals. Resources likely would be applied to enhance retention and graduation of students only if retention and graduation were goals of the unit.

Summary

Organizational behavior provides a framework that influences institutional processes. As a result, the type of organizational culture within an institution is likely to impact activities such as resource allocation strategies. The previous section described different organizational cultures and described how resource allocation decisions may be affected by these cultures. Although this study will not look at the role of organizational cultures on resource allocation strategies per se, the results of this study and subsequent discussions also must recognize how organizational behaviors may enhance or impede resource allocation strategies. For example, it may be easier to make significant changes in resource allocations at collegial institutions if retention and graduation are strongly held values. Institutional change may be more difficult at anarchical institutions where many different people make budgetary decisions.

Retention and Graduation

Much work has been done in analyzing factors related to student retention and progress toward graduation. Yet despite all of this research, many questions surrounding student departure still remain. This section highlights some of the key literature related to retention and graduation and discusses how this study supplements the existing literature.

Two primary lenses are available through which retention and graduation have been studied: the individual perspective and the organizational perspective (Braxton & Brier, 1989). Studies on student persistence most commonly have been viewed from an individual perspective. A significant body of literature has examined the impact of precollege traits on student persistence. Characteristics such as gender, race, high school GPA, and scores on

college entrance exams have been analyzed to determine the influence of these traits on student persistence (Reason, 2001).

Other factors, such as student financial aid, have been analyzed to determine impact on retention and graduation. In *Leaving College,* Tinto (1993) concluded that financial aid was not related to persistence. However, Cabrera et al., (1992) found that students with financial aid, specifically grants and scholarships, were more likely to become academically and socially integrated into their college environment and, as a result, were more likely to persist. In their review of studies on students' economic factors and persistence and graduation rates, St. John, Cabrera, Nora, and Asker (2002) found support indicating that financial factors do impact student retention. The authors suggested that continued research be done to explore the role of student aid and student persistence.

The most common theories related to retention have focused on students' experiences once they are enrolled in college. A foundational theory focused on students' experiences is Tinto's (1993) interactionalist theory of student departure. Tinto's theory examined the relationship between a student and his/her environment and its impact on student persistence. Tinto proposed that the more students interact with their academic and social environments, the more they are likely to persist. Tinto also ascertained that students' perceptions of their acceptance and involvement in their environment were just as influential as their actual involvement.

Astin's (1984) theory of student involvement illustrated similar conclusions although Astin primarily analyzed student behaviors rather than student perceptions. Astin suggested that the more students are involved with their college environment, either through classwork or extracurricular activities, the more likely students are to persist. Berger and Milem (1999)

expanded Astin's and Tinto's (1993) work by examining actual measures of persistence. Whereas Astin and Tinto measured the relationship between student involvement and students' intent to persist, Berger and Milem measured student involvement, students' intention to persist and then recorded if these students persisted the following year. They found that students' intent to persist was correlated significantly with their actual behavior and that student involvement was postively correlated with intent to persist and actual persistence (Berger & Milem).

Most researchers would agree that students who are socially and academically involved in their institution are more likely to persist and graduate than those students who are not as involved. As a result of this belief, institutions have been reevaluating their programs and developing new initiatives with the goal of increasing student involvement (Stodt, 1987). A number of approaches to improving persistence and graduation rates have been undertaken that have resulted in empirically demonstrated success, including learning communities (Lenning & Ebbers, 1999), residentially-based academic programs (Pascarella, Terenzini, & Blimling, 1994), undergraduate student-faculty research partnerships (Nagda, Gregerman, Jonides, von Hippel, & Lerner, 1998), and service learning programs (Eyler & Giles, 1999).

Although not directly stated in research studies, increasing student involvement implies targeting resources devoted to new ways of involving students, namely in the areas of instruction, academic support, student services, and institutional grants. However, little research has been conducted that examines how differences institutional expenditure patterns impact retention and graduation rates.

Organizational Behavior Perspective

Examining organizational behavior is another, less common approach to understanding student retention. It is this approach that provided the theoretical framework for this study. Berger (1997) recognized that "few studies examine how facets of organizational behavior affect undergraduate students" (p. 4) and his dissertation supported the premise that organizational behavior is a relevant context in which to view student outcomes.

In *Involving Colleges*, Kuh, Schuh, Whitt and Associates (1991) examined how organizational behavior can create effective out-of-classroom learning environments for students. They analyzed the college environments of 14 institutions that effectively developed strategies for students to become involved within their institution and suggested how these strategies could be implemented within other colleges and universities.

In an earlier study, Bean (1983) surveyed 1,711 first year students and found a relationship between students' perception of involvement and student satisfaction. Bean found that students were more satisfied with their college experience if they felt they could get involved in the academic and social life of the institution. Bean also found that other institutional qualities such as fairness, and effective communication between the organization and the student impacted student satisfaction. Braxton and Brier (1989) randomly selected students from a Midwestern, urban commuter university and found similar results. Assuming that student involvement and student satisfaction are related to retention (Tinto, 1993), these organizational behaviors could impact retention and graduation.

Berger and Braxton (1998) elaborated on Tinto's interactionalist theory by proposing that organizational characteristics within institutions may enhance or detract from a student's

ability to get involved, thus impacting retention and graduation. Berger and Braxton conducted a path analysis that examined student background characteristics, institutional commitment, organizational attributes, social integration, and withdrawal decisions and the impact these variables had on student persistence. The authors found that organizational attributes had direct effects on student satisfaction and indirect effects on students' intent to persist, both of which can impact student persistence.

Several researchers have highlighted the need to investigate the relationship between organizational behavior and retention and graduation rates. Braxton and Brier (1989) suggested this approach as a way to make improvements through institutional change: "Organizational models are especially appealing to institutional planners concerned with the restructuring of organizations to achieve greater institutional effectiveness for they focus on organizational attributes that are directly alterable by administrative action" (p. 49).

Although Tinto's theory views retention from the individual student perspective, he acknowledged the importance of studying organizational behavior since these characteristics "necessarily impact on the satisfaction all members within the organization, students as well as faculty and staff" (Tinto, 1993, p. 89). Braxton, Sullivan, and Johnson (1997) reiterated this belief, stating that organizational behavior is an important way to enhance a student's integration to his/her institution: "The environmental perspective and specifically the economic and organizational constructs, appears to offer the greatest potential for future integrative efforts" (p. 156).

Examining retention and graduation rates through organizational behavior contributes significant pieces to the student departure puzzle (Braxton, 2002). Berger's (1997) research on the relationship between organizational behavior and community service and humanistic

values verified that organizational behavior is a critical framework in which to study student outcomes. In a subsequent journal article, Berger (2001-2002) stated, "...Colleges and universities are organizations and subsequently ... the organizational perspective is an appropriate framework for gaining useful insights into how undergraduate retention can be improved on college and university campuses" (p. 3). In this study, colleges are perceived as organizations that can exhibit patterns of behavior (specifically by how they allocate resources) that can have "important consequences for the retention of undergraduate students" (Berger, p. 19).

Retention and Graduation - Institutional Selectivity

This study examined if the relationship between institutional expenditures and retention and graduation rates differed at highly selective and less selective institutions. Institutional selectivity, a measure of the competitiveness of an institution's admissions policies, is largely determined by students' academic ability (Barron's, 2000). Highly selective institutions require incoming students with higher standardized test scores, high school grade point averages (GPA), and high school rank than less selective institutions (Barron's). A substantial amount of research has concluded that students who rank higher in these areas (test scores, GPA, etc) are more likely to persist in college than students with lower test scores or high school GPAs.

Astin et al. (1987) conducted a comprehensive study of 8,000 students to examine characteristics that predicted retention and graduation. The authors found that SAT scores and high school GPA were correlated with retention and graduation rates. Sixty-eight percent of students with an SAT above 1300 were likely to have a bachelor's degree after four years compared to 10% of students who had an SAT below 700. Students with an "A" average in

high school were more likely to graduate than their peers with "C" averages in high school (Astin, et al.). Similarly, between 1991 and 1995, Murtaugh, Burns, and Schuster (1999) tracked 8, 867 first-year students and found that grade point averages and SAT/ACT scores significantly were correlated with student persistence.

Levitz et al. (1999) examined the relationship between the average SAT/ACT scores of incoming students at institutions and retention and graduation rates. They also found a direct relationship between average SAT scores and retention and graduation rates. The higher the composite SAT scores of the incoming class, the higher the institutions' retention and graduation rates (Levitz, et al.). Levitz's examination of the measure of average institutional SAT/ACT composite scores is similar to measures of institutional selectivity since institutional selectivity is highly correlated with SAT/ACT composite scores.

The results of these studies highlight the direct relationship between students' academic ability and retention and graduation rates. Institutions that enroll students with high academic ability will have high retention and graduation rates. Since institutional selectivity primarily relies on measures of academic ability, it can be assumed that an institution with a high selectivity rating will enroll students with high academic ability who, in turn, are more likely to persist toward graduation (Mayer-Foulker, 2002).

This study sought to examine if resource allocation strategies and retention and graduation rates differed based on a college or university's institutional selectivity rating. In other words, if an institution were looking at improving retention and graduation through institutional expenditures, would their selectivity rating (which also provides insight into student ability) influence how resource allocation strategies are implemented?

Summary

Thus far, this chapter has provided a foundational understanding of resource allocation strategies, organizational behavior, and research related to retention and graduation. The remainder of this chapter will describe studies that have looked at the relationships among these variables.

Organizational Behavior and Student Outcomes

Organizational behavior has been found to affect student outcomes. This section describes some of the research that has examined the relationship between organizational behavior and student outcomes and explains how past research informed this study.

Chapman and Pascarella (1983) explored the relationship between institutional type and size and academic and social integration at 11 institutions. They found that students enrolled in residential institutions were more likely to be academically and socially involved than their peers who attended commuter institutions. Students in larger institutions were more socially involved in their institution but had less contact with faculty than students in smaller institutions. Although it is difficult for institutions to dramatically change their size or shift from commuter to residential, this study does suggest that institutional environment and behavior do impact student outcomes.

Godwin and Markham (1996) conducted a qualitative study of first-year students' experiences with campus bureaucracy and found that in general, first-year students adapt to the rules and regulations established by colleges and universities. Through non-participant observation and semi-structured interviews they concluded that although first-year students were frustrated with campus bureaucracy, they defined bureaucracy as "the natural order of

things and as relatively efficient"(Godwin & Markham, p. 687). Students may not always agree with the policy and rules, but they quickly conform to them.

Astin and Scherrei (1980) conducted a five-year study of management and administrative styles at 49 private colleges and universities. They acknowledged two principles of administrative behavior: a) administrative behavior most directly impacts attitudes of faculty and staff, and b) administrative behavior only indirectly affects student outcomes. Institutional leaders' job security more commonly is based on faculty and staff attitudes rather than student performance (Astin & Scherrei). A leaders' success may be measured more by the morale of the faculty than by student graduation rates. As a result, most administrators are more likely to put efforts into activities that positively impact attitudes of faculty and staff and focus less on efforts at improving student outcomes (Astin & Scherrei).

A primary purpose of Astin and Scherreri's (1980) study was to determine if relationships between administrative styles and student outcomes existed. They examined if three administrative styles, bureaucratic, egalitarian, and political, influenced student satisfaction. These styles are similar to Birnbaum's (1988) definitions of bureaucratic, collegial, and political organizational cultures. The researchers found that the bureaucratic style of leadership was correlated with student dissatisfaction with administrative services and procedures. If, as Tinto (1993) postulated, student dissatisfaction is negatively correlated to student persistence, students are less likely to persist in institutions exhibiting bureaucratic styles of leadership.

Other studies looking at the relationship between bureaucratic style and persistence had contradictory results. Blau (1973) studied how administrative organization affects

students' academic work and found that multi-level administrative hierarchy is negatively correlated with student progress. However, Kamens (1971) found that students at bureaucratic institutions were more likely to persist.

Administrative styles that were more collegial and egalitarian were correlated with higher students' satisfaction, specifically in the areas of faculty interaction and quality of advisement (Astin & Scherreri, 1980). Other research studies have found that the more satisfied students are with their faculty interaction, the more likely they are to persist (Tinto, 1993). Therefore, it may be inferred that collegial environments are correlated with persistence. Berger (2001-2002) found that institutions that had distinctive missions, consistency of patterns and norms, and shared meaning were more likely to retain students. Since these characteristics are more common at collegial institutions, these results echo Astin and Scherreri's (1980) findings.

Students enrolled in political institutions are much less likely to persist (Berger, 2001-2002). As mentioned earlier, in political institutions, there is strong competition for scarce resources. Therefore, it is difficult to determine if it is the political environment per se that influences retention or the lack of resources. It may be that resource scarcity also impacts quality of facilities, faculty, and/or financial aid and " that attrition is a result of resource scarcity rather than the result of political behavior" (Berger, p. 13).

How does information on the relationship between organizational culture and student outcomes inform this study? First, the results of these studies suggest that organizational behavior does impact retention and graduation rates. Since resource allocation strategies are an aspect of organizational behavior, it is likely that these strategies may affect retention and graduation rates. As Tinto (1993) observed, "These [organizational behavior] models

should... be appealing to researchers interested in the comparative analysis of institutional retention since they enable us to highlight how different organizational structures are related to different retention outcomes among relatively similar student bodies" (pp. 89-90). This study will investigate if this relationship exists.

Astin and Scherreri (1980) acknowledged that in most higher education institutions, administrators tend to be rewarded for means and not ends. In other words, administrators' success comes from bringing in more funding, more prestigious faculty, or higher ability students rather than the impact that these resources have on educational outcomes. This observation led Astin and Scherreri to recommend that administrative behavior focus on outcomes such as student persistence or graduation. For this to occur, research needs to be conducted that will provide information on how administrators can make wise decisions that will impact retention and graduation.

Resource Allocation and Student Outcomes

The effect of institutional expenditure patterns on desired institutional goals has been reported in the literature. Pace (1974) sampled juniors and seniors in 67 public and private institutions and found that the students' perceived benefits of college were related to institutional expenditures. Those students who attended institutions that had higher expenditures reported more benefits from the college experience. Cameron (1978) and Clark (1972) also investigated institutional effectiveness and expenditures and found a direct correlation between the two. Kuh (2001-2002) found that there were differences in the relationship between expenditures and retention rates and the relationship between expenditures and graduation rates. His study found that putting significant resources toward the first years of college increased retention but did not necessarily increase graduation rates.

Smart, Ethington, Riggs, and Thompson (2002) examined the relationship between institutional expenditures and students' perceptions of their leadership abilities. The researchers found that expenditures on instruction and student services had a significant influence on students' leadership abilities. Interestingly, student services had a positive impact on students' leadership competencies while expenditures on instruction had a negative impact on students' leadership competencies.

Meeth (1974) compared educational and general expenditures and student outcomes at two nonselective private baccalaureate institutions of similar size. He found that the institutions differed in their educational and general expenditures. Based on Bowen and Douglas' (1971) previous research on private, liberal arts institutions, this is not surprising. What was surprising, however, is that the institution that spent less per student on education and general expenditures attracted higher ability students and had a higher retention rate.

In conducting a closer examination of expenditures, Meeth (1974) found that expenditures for instruction were similar between the institutions but the differences in expenditures were related to administrative areas and student services. Higher overall expenditures were the result of additional spending in administrative areas and student services. Additional expenditures in these areas did not impact retention rates positively or attract higher ability students. Meeth's (1974) study challenges the perception that more is always better and added a level of complexity by asking what resources may or may not impact institutional goals.

This study expanded Meeth's (1974) work by examining specific categories of institutional expenditures and their relationship to retention and graduation rates. The results

of this study could provide additional information by suggesting how resource allocation strategies could meet institutional goals such as improved retention and graduation rates.

Summary

This chapter provided an overview of the literature and research studies that are applicable to this study. Issues such as productivity and efficiency illustrate the importance of this study in the current higher education environment. Other factors that impact productivity and efficiency also were explored. Approaches to resource allocation, institutional expenditure patterns, and organizational cultures were highlighted as a way to illustrate differences among institutions and how these differences may affect this study's findings. An overview of research related to retention and graduation was provided and studies that have looked at the relationship between organizational behaviors and retention and graduation rates were cited. Based on the review of literature, it is evident that by examining the relationship between resource allocation strategies and retention and graduation rates, this study will add to the current understanding of organizational factors that influence institutional retention and graduation rates.

CHAPTER 3: METHODOLOGY

This study examined the relationship between retention and graduation rates and institutional expenditures related to instruction, academic support, student services, institutional support, and institutional grants at private Baccalaureate Liberal and General colleges and universities. The goals of this study were: a) to understand the relationship between institutional expenditures and retention and graduation rates, b) to understand the relationship of institutional selectivity, institutional expenditures and retention and graduation rates and c) to investigate if these relationships have changed in the past ten years (1992 - 2002). The primary objective of this study was to provide insight into those expenditures that contribute to retention and graduation rates at private baccalaureate colleges and universities.

Integrated Postsecondary Education Data Systems (IPEDS) and *US News and World Report's* (*US News*) "America's Best Colleges", and *Barron's Profiles of American Colleges of 2001 (Barron's) (2000)* provided the data for the study. Standard multiple regression was used to analyze the data.

Inquiry Paradigm

This study, with its emphasis on quantitative data collection and analysis methods, assumed a positivistic approach to research. Characteristics of a positivistic paradigm include: a) a detached, objective role played by the researcher, b) generalization of results to similar phenomena, c) a focus on measurement and quantification, and d) use of procedures to correlate and predict phenomena (LeCompte & Priessle, 1993; McMillan & Schumacher, 1997).

In this study, the researcher role was that of objective observer. Data were collected and analyzed through quantitative databases and statistical procedures; there was no interaction between the researcher and the institutional leaders who provided the data. The goal of this study was to generalize findings to other similar higher education settings. To achieve this goal, variables were quantified: institutional productivity and quality were quantified through the use of first-year retention rates and 6-year graduation rates. Standard multiple regression, a statistical tool used for purposes of correlation and prediction, was employed to analyze the data.

Variables

This study focused on a category of institutional expenditures commonly referred to as Education and General Expenditures (E & G) (NCES, 2002a) and first-year retention and 6-year graduation rates. E & G expenditures include several sub-categories of institutional expenditures: instruction, academic support, student services, operation/maintenance of plant, institutional support and institutional grants, research, public service, and nonmandatory and mandatory transfers (NCES). Table 1 lists the independent variables used for this study and Table 2 presents the dependent variables used for the study.

This study examined the expenditures devoted to instruction, academic support, student services, institutional support and institutional grants. According to the National Center for Education Statistics (NCES, 2002a), the aforementioned areas encompass the majority of expenditures at private, not-for-profit baccalaureate institutions. Since public service, research, nonmandatory, and mandatory expenditures were minimal, they were not included in this study. In 2002, operation and maintenance of plant expenditures were no longer included as a separate expenditure item, but these expenses were subsumed within the

other categories such as instruction or academic support (C, Stratham, personal communication, October 23, 2003).

Table 1. Independent Variables, Variable Codes, and Research Questions

Variables	Variable Code	Research Questions
Instruction Expenditures per Student	IES	1,3, 4, 9
Academic Support Expenditures per Student	ASES	1,3, 4,9
Student Services Expenditures per Student	SSES	1,3, 4,9
Institutional Support Expenditures per Student	ISES	1,3, 4,9
Institutional Grants Expenditures per Student	IGES	1,3, 4,9
Average Instruction Expenditures per Student	AVIES	2,3, 4, 9
Average Academic Support Expenditures per Student	AVASES	2,3, 4,9
Average Student Services Expenditures per Student	AVSSES	2,3, 4,9
Average Institutional Support Expenditures per Student	AVISES	2,3, 4,9
Average Institutional Grants Expenditures per Student	AVIGES	2,3, 4,9
Percentage of Expenditures for Instruction	PEI	5, 7, 8, 10
Percentage of Expenditures for Academic Support	PEAS	5, 7, 8, 10
Percentage of Expenditures for Student Services	PESS	5, 7, 8, 10
Average Percentage of Expenditures for Institutional Support	PEIS	5, 7, 8, 10
Percentage of Expenditures for Institutional Grants	PEIG	5, 7, 8, 10
Average Percentage of Expenditures for Instruction	AVPEI	6, 7, 8, 10
Average Percentage of Expenditures for Academic Support	AVPEAS	6, 7, 8, 10
Average Percentage of Expenditures for Student Services	AVPESS	6, 7, 8, 10
Average Percentage of Expenditures for Institutional Support	AVPEIS	6, 7, 8, 10
Average Percentage of Expenditures for Institutional Grants	AVPEIG	6, 7, 8, 10
Institutional Selectivity	INS SELECT	3, 7

Table 2. Dependent Variables, Variable Codes, and Research Questions

Variable	Variable Code	Research Questions
First-Year Retention	RETEN	1, 3, 4, 5, 7, 8, 9, 10
6-year Graduation Rates	GRAD	2, 3, 4, 6, 7, 8, 9, 10

Appendix A lists the percentage composition of these subcategories of E & G expenditures for private, not-for-profit baccalaureate colleges and universities. Although the data are from 1995-96, it is the most current information that has been analyzed (Cunningham, et al., 2001). Because percentages of expenditures relatively have been stable over the past 10 years, one can assume that these data provide an accurate reflection of how institutions currently allocate expenditures.

Expenditures devoted to instruction, academic support, student services, institutional support, and institutional grants were the independent variables. Using these categories of expenditures as independent variables is common in studies of cost measurement and allocation studies (Stringer, et al., 1999). Although these categories are quite broad and cover a wide variety of activities, Bowen (1980) conceded that for lack of better data, "cost studies are usually confined to the educational function for which a tenable measuring unit is available" (p. 5).

Institutional expenditures must also consider student enrollment (Stringer, et al., 1999). For instance, an institution that spends $500,000 on instruction and has an enrollment of 500 will spend $1000 per student whereas an institution that spends $500,000 on instruction but has an enrollment of 5000 will spend $100 per student. Differences in allocation amounts per student may account for differences in productivity (Bowen, 1980).

Therefore, as Stringer, et al. (1999) recommended, "Even when cost analysis is limited to educational function, the basis for student units must be determined" (p. 11).

For this study, student units were defined as the total number of full-time equivalent (FTE) undergraduates enrolled in a specified year. FTE factors in differences between students who are enrolled part-time and full-time (see Stringer, et al., 1999). FTE was calculated in a two-part process. First, to reflect that part-time students do not enroll in as many courses as full-time students, the total number of part-time students was multiplied by .33. The product resulting from the part-time student calculation was then added to the number of full-time undergraduates to reflect the total number of FTE undergraduates. This formula for computing full-time equivalent status was consistent with similar studies on productivity and efficiency (see, for example, Taylor & Massy, 1996).

When the relationship between the amount of money that was spent per student on instructional expenditures and first-year retention rates was examined the independent variables were: instruction expenditures per student (IES), academic support expenditures per student (ASES), student services expenditures per student (SSES), institutional support expenditures per student (ISES), and total institutional grant (scholarships, fellowships) expenditures per student (IGES). Expenditures per student were computed by dividing the amount of expenditures in each category (i.e. instruction, academic support, etc.) by the institution's undergraduate FTE resulting in, for example, expenditures per student on instruction, academic support, and so on.

When 6-year graduation rates (GRAD) was the dependent variable, average institutional expenditures for a six-year time period were calculated. For instance, for 2002, average expenditures were calculated by first calculating the expenditures per students for

1996 to 2002 and then dividing by six to get average expenditures per student. For research questions that examined amount of institutional expenditures per student and 6-year graduation rates, the independent variables were average institutional expenditures per student for instruction, (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), and institutional grants (AVIGES).

In addition to examining the amount of institutional expenditures, this study also considered the percentages of resources that are allocated to specific areas. This latter approach is important for two reasons. One, solely examining costs does not provide a complete picture of resource allocation practices. For example, according to the Cunningham et al., (2001) private, not for profit institutions increased their spending for instruction by 2% between 1988-89 and 1995-96. This statistic may lead one to conclude that institutional leaders are continuing to put more money toward instruction. However, the change in instruction as a proportion of total expenditures declined by .8%. Therefore, the more accurate conclusion is this: although institutions continue to spend more money on instruction, this expenditure is a smaller part of the overall budget. In other words, in 1995-96 institutions were less likely to allocate resources to instruction than other areas compared with seven years earlier (Cunningham et al.).

A second reason to examine percentages of institutional expenditures is because it attempts to level the playing field between affluent and less affluent institutions and provide more information within the leader's control (Bowen, 1980). For example, a wealthy institution that can spend $10,000 per student on instruction will have the ability to accomplish more than an institution that spends $5000 per student. Based on Bowen's laws of higher education, it is highly unlikely that less affluent institutions will ever be able to spend

as much per student as their wealthy counterparts. However, less affluent institutions could possibly achieve similar, if not better, outcomes than their counterparts who have more financial resources if they were able to strategically dedicate their limited resources in areas that impact retention and graduation. By examining percentage of expenditures, this study attempted to provide insight into how differences in resource allocation contribute to retention and graduation rates.

The independent variables used to investigate the relationship between the percentage of institutional expenditures and first-year retention were: percentage of expenditures for instruction (PEI), percentage of expenditures for academic support (PEAS), percentage of expenditures for student services (PESS), percentage of expenditures for institutional support (PEIS), and percentage of expenditures for institutional grants (PEIG).

When 6-year graduation rates (GRAD) was the dependent variable, an average percentage of institutional expenditures for a six-year time period was calculated. For research questions that examined percentage of institutional expenditures and 6-year graduation rates, the independent variables were percentage of expenditures for instruction (AVPEI), percentage of expenditures for academic support (AVPEAS), percentage of expenditures for student services (AVPESS), percentage of expenditures for institutional support (AVPEIS), and percentage of expenditures for institutional grants (AVPEIG).

The dependent variables were first-year retention rates (RETEN) and 6-year cohort graduation rates (GRAD). These measures were chosen since they are quantifiable (McPherson, Shapiro, & Winston, 1996). Also, institutions have been reporting these data for several years and they frequently are used as measures of accountability (Burke, 1998). In addition, in the Reauthorization of the Higher Education Act, Congress has suggested that

retention and graduation rates be used as benchmarks for institutional quality (Wolanin, 2003). It appears that in the near future retention and graduation rates will continue to be emphasized and institutions will need to continue to assess and improve in these areas.

The relationship between the independent and dependent variables will be analyzed from three perspectives: a) recent data on institutional expenditures and retention and graduation rates, b) the role of institutional selectivity in the relationship between institutional expenditures and retention and graduate rates, and c) longitudinally (1992, 1997, 2002).

Although this study primarily examined the relationship of resource allocation and expenditures and retention and graduation rates, it also considered the potential influence of the institutional selectivity on this relationship. Institutional selectivity is a measure of admissions competitiveness: the likelihood that a prospective student will be admitted into a specific institution (Barron's, 2000). Selectivity scores primarily are based on the overall academic qualities of the student population. Institutions with high selectivity rankings enroll students with above average standardized test scores, high school GPAs, and high school rank (Barron's). Prior research has concluded that these factors, standardized test scores, GPA, and high school rank, are directly related to retention (Astin, et al., 1997; Levitz, et al., 1999). The higher the average ACT/SAT scores and high school GPA of the incoming class, the higher the first-year retention rate (Levitz et al., 1999).

On average, highly selective institutions enroll students with higher academic ability than less selective institutions. As a result, highly selective institutions tend to have higher retention and graduation rates (Mayer- Foulker, 2000). Therefore, it was important to consider the role of institutional selectivity in this study because regardless of institutional

expenditures or resource allocation strategies, highly selective institutions may have higher retention and graduation rates than their less selective peers simply because they enroll students with higher academic ability.

The role of institutional selectivity was examined in two ways. First, the variable of institutional selectivity was added to the variables of institutional expenditures (instruction, academic support, etc.) to investigate if institutional selectivity and institutional expenditures significantly contributed to first-year retention and 6-year graduation rates. This study sought to examine if institutional selectivity contributed significantly to retention and graduation rates or if it altered the ability of other institutional expenditures to significantly predict retention and graduation rates. In other words, is institutional selectivity a more powerful predictor of retention and graduation rates than other institutional expenditure variables?

Secondly, this study investigated if institutional expenditures accurately predicted retention and graduation rates at institutions with different selectivity ratings (high and low) . Prior research has suggested that institutional selectivity impacted how institutions spend their money. For instance, Stringer, et al., (1999) found that "greater subsidization attracts a greater number and/or higher quality of students" (p. 9). In essence, institutions that have higher selectivity ratings may tend to allocate more money to institutional grants.

Within the past decade, the cost of attending college has surpassed the rate of inflation, and public demand for institutional accountability has intensified (Trow, 1998). During the 1990s, there was a intensified focus on student retention and graduation (Braxton, 2001-2002). Have institutions responded to pressure to curb costs and/or increase productivity? This study attempted to provide insight into this question by investigating the relationship between institutional expenditures and retention and graduation rates over the

past decade. The year 2002 was chosen because it provided the most recent data available and, therefore, can be used to assess the current environment of higher education institutions. Using 2002 as a focal point, this study looked backward in 5-year increments to assess if the relationship between institutional expenditures and retention and graduation rates has changed over time.

Sampling

A target population consisting of all private Baccalaureate Liberal and General colleges and universities as defined by the 2000 Carnegie Classification system was chosen for this study. There are 466 private Baccalaureate Liberal and General institutions that enroll approximately 6% of students of higher education.

This set of institutions has been chosen as a valid population for three fundamental reasons. One, Baccalaureate Liberal and General institutions focus on undergraduate education. Other types of institutions, such as institutions categorized as Research and Doctoral, use expenditures to educate both graduate and undergraduate students (NCES, 2002). In many instances, such as instruction or library expenditures, it is difficult to make distinctions between expenditures that benefit undergraduate students and those expenditures that more directly may benefit graduate students. Also, since there are differences between the costs and experiences of graduate and undergraduate education (Stringer, et al., 1999), Bowen (1980) recommended that researchers distinguish between graduate and undergraduate costs. Since the focus of this study is on undergraduate education, examining institutions that have the education and retention of undergraduates as their primary mission may help to provide more beneficial information.

Secondly, the relatively small enrollments of Baccalaureate Liberal and General institutions are more sensitive to fluctuations in student numbers than their counterparts at larger Doctoral or Research Universities. The loss of even a few students can be translated into thousands of dollars of lost revenue resulting in negative implications for institutional quality (Levitz, et al., 1999). As a consequence, institutional leaders at Baccalaureate Liberal and General institutions have a continued and justifiable concern for improving retention and graduation rates.

Third, little is known about the relationship of resource allocation and expenditures at these institutions. Many institutions do not have the financial or personnel resources to invest in wide-scale research examining the relationship between resource allocation and retention (Taylor & Massy, 1996). Much of the research on productivity and accountability has focused on larger institutions or public institutions with minimal attention paid to the small, private institutions (Massy, 1999b).

This study focused on private, rather than public Baccalaureate Liberal and General institutions in an attempt to minimize the influence of state funding and control. Although private institutions receive funding from state governments, in general they tend to have more direct control than their public counterparts in determining institutional expenditures (Bowen, 1980).

This study excluded public institutions for methodological and practical reasons. In their recommendations for research using the IPEDS database, researchers at the National Center of Education Statistics recommend that public and private not-for-profit institutions should be modeled separately since they operate in distinct circumstances (NCES, 2002a). However, since there is a relatively small number of public Baccalaureate Liberal and

General institutions (N=76), (Carnegie Classification, 2002), developing a new model using this sample size was not beneficial.

Instrumentation and Data Collection

Three instruments were used to collect data for this study: a) Integrated Postsecondary Education Data System (IPEDS), a survey of postsecondary institutions that is designed and administered by the US Department of Education's National Center for Education Statistics, b) *US News and World Report's* "America's Best Colleges", and c) *Barron's Profiles of American Colleges of 2001* (Barron's, 2000).

The IPEDS database is available on-line at *www.nces.ed.gov/ideps*. IPEDS gathers a variety of higher education institutional data through separate surveys and includes data from 1984 to the present. As is stated on its website, NCES requires that all institutions complete the IPEDS (NCES, 2003) surveys:

> **Mandatory reporting requirement**: The completion of all IPEDS surveys, in a timely and accurate manner, is mandatory for all institutions that participate or are applicants for participation in any Federal financial assistance program authorized by Title IV of the Higher Education Act of 1965, as amended. The completion of the surveys is mandated by 20 U.S.C. 1094(a)(17).

This study utilized data from the IPEDS Institutional Characteristics Survey, Finance Survey, and Fall Enrollment Survey. IPEDS was used to identify private Baccalaureate Liberal and General institutions, institutional expenditures per student and percentage of institutional expenditures for 1992, 1997, and 2002.

In 1983, *US News and World Report* first published their rankings of colleges and universities as a component in the *US News* magazine. A separate guidebook was first published in 1987. Originally, rankings were based solely on college reputation but since 1988, rankings have been based on reputation and statistical data (Britz & Lawlor, 2001).

To be included in *US News'* "America's Best Colleges," a college or university must be regionally accredited and have a total enrollment of at least 200 students. Using a questionnaire developed by *US News*, institutions report a majority of the data. To supplement data that may be missing, *US News* gathers data from other organizations such as the Council for Aid to Education, the National Collegiate Athletic Association, and Wintergreen/Orchard House Inc., as well as data collected in previous years by *U.S. News* (*US News*, 2003). *US News* was used to collect data on retention and graduation rates for 1992, 1997, and 2002 *(US News).*

Both instruments publish data on an annual basis, but each instrument differs in how they collect and report data. For instance, the 2002 IPEDS Enrollment Survey reports the fall enrollment for Fall, 2002 but the 2002 IPEDS Finance Survey reports expenditure for Fall 2001 - Spring 2002. The 2002 edition of *US News'* "America's Best Colleges" utilizes data from Fall, 2000. As a result, appropriate survey instruments were chosen to ensure that the data that were collected pertained to the year being examined. Appendix B provides tables that outline the definition, calculation procedures, description of the database and categories used to locate the variables for each research question.

Data Sets

As mentioned earlier, the target population for this study was private Baccalaureate Liberal and General colleges and universities, but many of these institutions did not provide data for all variables. For instance, some institutions provided data for graduation rates but not retention rates. Therefore, to maximize the number of institutions that could be included for analysis, a separate data set was created for each research question. Institutions that did not provide data on either the dependent or independent variables were omitted from the study. When institutional selectivity scores were analyzed (Research Questions 3, 4, 7 and 8), institutions that did not provide data on institutional selectivity were not included in the sample. In examining longitudinal data (Research Questions 9 and 10), only institutions that provided data for all three years were included.

Data Analysis

Descriptive and inferential statistics were used to analyze the data and make inferences about the relationship between institutional expenditures and retention and graduation rates. Discriminant analysis was used to classify institutions into two selectivity groups: high selectivity and low selectivity. This study employed multiple regression to determine if the independent variables significantly predicted retention and graduation rates and to examine, which, if any, of the independent variables significantly predicted retention and graduation rates.

Multiple Regression

Multiple regression, a frequently used method in studies analyzing prediction, was an appropriate regression method to use since the independent variables and dependent variables (graduation and retention) were quantitative (Mertler & Vannatta, 2001). *Statistical Package*

for the Social Sciences 11.5 (SPSS) was used to pre-screen the sample for missing data, test assumptions related to the statistical methods, and perform multiple regression.

Prior to conducting the multiple regression analysis, the data set was examined for missing data and outliers (Mendenhall & Sincinch, 1996). Institutions that did not provide complete data for the research question being examined were omitted. Data also were scanned for univariate and multivariate outliers (Mertler & Vanatta, 2001). It was important to scan for univariate outliers since a few institutions with extreme data can significantly distort research findings (Mendenhall & Sincinch, 1996). Data were transformed into *z*-scores. Any *z* value that was greater than 4.00 or less than -4.00 was considered an outlier and an institution containing a z-value of $\pm$ 4.00 was omitted (Stevens, 1996).

Mulivariate outliers were identified by two measures: the Mahalanobis distance and Cook's distance. Mahalanobis distance was used to identify institutions that have "unusual combinations or scores on two or more variables" (Mertler & Vanatta, 2001, p. 29). First, the Mahalanobis distance for each institution was calculated. Institutions that had a Mahalanobis distance that exceeded the chi-square critical value were eliminated (Mertler & Vanatta). Cook's distance is a statistical method used to determine the extent of influence one variable has on the entire data set. Institutions that had a large Cook's distance value and therefore had the potential of significantly influencing the data set were eliminated (Mendenhall & Sincinch, 1996).

To apply multiple regression methods correctly, three general assumptions must be met: a) normality, b) linearity and c) homoscedasticity (Mertler & Vanatta, 2001). The assumption of normality in multiple regression is the "extent to which all observations in the sample for all combinations of variables are distributed normally" (Mertler & Vannatta,

p. 30). Because this is difficult to assess (see Stevens, 1996), this study utilized a procedure recommended by Mertler and Vannatta: each variable was tested for normality through the use of histograms (i.e., instruction, academic support, retention, etc.). When it was assessed that each variable had a normal distribution, scatter plots for each pair of variables (i.e., instruction and retention) were run to assess normality.

The assumption of linearity posits that a straight-line relationship exists between two variables or a combination of variables (Tabachnick & Fidell, 1983). Homoscedasticity is the assumption that the "variability in scores on one variable is roughly the same for all values of the other variables" (Tabachnick & Fidell, p. 81). Although several methods could be used to test these assumptions, this study evaluated linearity and homoscedasticity by running scatter plots of residuals for each data set (Tabachnick & Fidell). Data transformation techniques were employed to restore any violations of linearity. Variance-stabilizing techniques were employed to restore any violations of homoscedasticity (Mendenhall & Sincinch, 1996).

Several types of multiple regression methods exist, but this study employed standard multiple regression techniques. In standard multiple regression all independent variables simultaneously are entered into the model and their influence on the dependent variables is calculated (Tabachnick & Fidell, 1983). This method is appropriate for a study such as this one that is exploratory in nature and is trying to "simply assess relationships among variables and answer the basic question of multiple regression" (Tabachnick & Fidell, p. 105).

Standard multiple regression was conducted to determine the extent to which the independent variables predicted the dependent variables and to assess which, if any, of these variables are most influential in predicting retention and graduation rates. An alpha of .05 was chosen as the level of significance. Research studies in education and behavioral

sciences commonly use either significance levels of .05 or .01. Since the sample for this study was relatively large, .05 was an acceptable significance level (Stevens, 1996). Any values of .05 level or lower resulted in rejection of the null hypothesis (Mertler & Vanatta, 2001).

To test the null hypotheses, four measures associated with multiple regression were analyzed: the F-test, R^2, R^2_{adj} and β. The F-test examined the extent to which the relationship between the independent and dependent variable were linear. An F-test that is significant ($p \leq .05$) demonstrates that institutional expenditures significantly predict the dependent variable (retention and/or graduation rates) (Mertler & Vannatta, 2001).

The R^2 statistic, also called coefficient of determination, is the proportion of the variance in the dependent variable (retention and graduation rates) that can be explained by institutional expenditures. R^2_{adj}, is similar to R^2 but also takes into account the sample size and number of independent variables. The higher the R^2 and R^2_{adj}, the more influence institutional expenditures have on predicting retention and graduation rates (Mendenhall & Sincinch, 1996). Finally, β or standardized regression coefficients, illustrate the amount of influence each individual independent variable has on predicting the dependent variable. T-tests were conducted on each standardized regression coefficient. It was concluded that variables with significance level of $p \leq .05$ significantly contributed to the dependent variable (retention or graduation rates) (Mendenhall & Sincinch, 1996).

In addition, tolerance statistics were run to test for multicollinearity. Multicollinearity occurs when there is a high intercorrelation among the independent variables. Multicollinearity poses a problem because when variables are highly intercorrelated, the R^2 statistic may be limited since one or more variables may be measuring the same

phenomenon. When variables are intercorrelated it also makes it difficult to determine the influence of a specific independent variable on the dependent variable (Tabachnick & Fidell, 1983).

Data Analysis

Research Question 1: *Did the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates at private Baccalaureate Liberal and General institutions?* This question was answered using the 2002 IPEDS survey year, expenditures per student were computed by dividing the amount of expenditures in each category (i.e. instruction, academic support, etc.) by the institution's undergraduate enrollment, resulting in, for example, expenditures per student on instruction, academic support, and so on. Standard multiple regression was conducted to determine if the amount of expenditures per student in each category (i.e. instruction, academic success, etc.) predicted retention rates.

Research Question 2: *Between 1996-1997 and 2001-2002, did the amount of money that was spent per student for instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?*

This question investigated the relationship between expenditures and six-year graduation rates. Since institutional expenditures over the course of a student's' enrollment would impact graduation rates, a mean expenditure value was obtained by calculating expenditures per student for six years prior to Fall 2002, summing these results, and dividing

by six. Standard multiple regression was used to determine if the amount of expenditures per student predicted graduation rates.

Research Question 3: Did institutional selectivity and the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants significantly predict first-year retention rates and 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Prior research indicated that institutional selectivity influenced retention and graduation rates. Therefore, for Research Question 3, institutional selectivity was added as an independent variable. *Barron's Profiles of American Colleges of 2001* (Barron's, 2000)) ranks institutions on a selectivity scale from most competitive to least competitive. Definitions for each selectivity ranking are included in Appendix C. Institutions were coded from 1- 6 with 1 being not competitive and 6 being most competitive. Standard multiple regression was performed on two sets of data. The first data set regressed the independent variables of institutional expenditures of instruction, academic support, student services, institutional support, institutional grants, and institutional selectivity on first-year retention rates. The second multiple regression procedures regressed average institutional expenditures (instruction, academic support, etc.) and institutional selectivity on 6-year graduation rates.

Research Question 4: For institutions with differing levels of institutional selectivity, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants predict first-year retention and 6-year graduation rates?

As mentioned above, institutions were categorized into six different levels of institutional selectivity. The purpose of this research question was to determine if the amount

of money allocated to each category of expenditures accurately predicted retention and graduation rates at institutions with differing levels of institutional selectivity. Ideally, the most thorough approach to answering this question would be to use standard multiple regression to develop prediction models for each level of institutional selectivity. However, conducting a multiple regression analysis on each subgroup was not feasible because of the low numbers within some of the subgroups. For reliable results that can be generalized to larger populations, the sample size must be adequate (Mertler & Vanatta, 2001). Tabachnick and Fidell (1983) provide two simple equations for determining the adequacy of a sample size: $n > 50 + 8k$ and $n > 104 + k$ where n is the sample size and k represents the number of independent variables. Tabachnick and Fidell recommend calculating both equations and developing a sample size that is larger than the value of either equation.

The sample size for institutions categorized as "very competitive" or "less competitive" was less than 100. The sample size for the subgroup of institutions that were categorized as "highly selective" was less than 50, and the sample size for institutions that were categorized as "most competitive" or "non competitive" was less than 25. The subgroup of institutions designated as competitive had a sample size of 123. Based on Tabachnick and Fidell's (1983) recommendation, only this subgroup would have a sample size that would provide reliable results.

To overcome the limitations imposed by inadequate sample sizes, it was necessary to merge some of the subgroups into larger groups. To accomplish this, discriminant analysis procedures were employed. One of the purposes of discriminant analysis is to "determine dimensions that serve as the basis for reliably classifying subjects into groups " (Mertler &

Vanatta, 2001, p. 281). As it relates to this study, discriminant analysis was used to reliably classify smaller subgroups into larger groups.

Using the variables of institutional expenditures and retention and graduation rates, discriminant analysis procedures were utilized to identify similarities and differences among the six levels of institutional selectivity. The goal of discriminant analysis was to analyze the similarities and differences among the six groups in order to combine one or more of the six subgroups into larger groups. For example, if discriminant analyses results concluded that institutions designated as noncompetitive and less competitive were similar, these two subgroups would be combined.

Prior to conducting discriminant analysis, data were screened for missing variables and outliers. Next, two procedures, a Test of Equality of Group Means and Box's M were analyzed to determine if there were significant differences in institutional expenditures and retention and graduation rates based on institutional selectivity. The Test of Equality of Group Means produced an ANOVA table that included Wilks Lambda statistics, F-test, degrees of freedom, and p values; p-values that were at least at the .05 levels indicated that there were significant differences in the variables based on institutional selectivity. Box's M test is an indicator of significant differences in the covariant matrices among the groups. An *F* value that is significant at the .001 level suggests that the groups are significantly different (Mertler & Vanatta, 2001). Significant results for the ANOVA analysis and Box's M were important. If there were no significant differences among these variables based on institutional selectivity, it would be difficult to correctly classify the subgroups (Mertler & Vanatta, 2001).

Although discriminant analysis provides additional information on covariance and correlation matrices, this study focused on classification results of predicted group membership that was generated by the analysis. These classification results provide "an assessment of the adequacy of classification" (Mertler & Vanatta, 2001, p. 285.) Using unstandardized coefficients, original classifications were compared to the predicted classification. As it related to this study, the classification results compared the level of institutional selectivity as reported in *Barron's Profile of American Colleges of 2001* (2000) to the predicted institutional selectivity based on the discriminant analysis results.

Classification results of predicted group membership were analyzed in two steps. First, results were reviewed to identify the predicted levels of institutional selectivity for each original level of selectivity. Secondly, results were examined across all levels of institutional selectivity to identify any similarities and differences among the levels of selectivity. Based on these patterns, the six subgroups were merged into two larger subgroups. Standard multiple regression was then performed on each subgroup.

The next four questions examined the accuracy of percentage of institutional expenditures to determine retention and graduation rates. Research Questions 5 - 8 were:

Research Question 5: Did the percentage of institutional expenditures in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates at private Baccalaureate Liberal and General institutions?

Research Question 6: Between 1996-1997 and 2001-2002, did the percentage of institutional expenditures for instruction, academic support, student services, institutional

support, and institutional grants predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Research Question 7: Did institutional selectivity and the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants significantly predict first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Research Question 8: For institutions with differing levels of institutional selectivity, did the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention and 6-year graduation rates?

The independent variables for Research Questions 5 - 8 were percentages of expenditures per student. Percentage of institutional expenditures was calculated by first calculating total E & G expenditures per student. Total E & G expenditures per student were computed by dividing the institution's undergraduate enrollment by the total amount of expenditures spent on education and general expenses. Percentages of expenditures for each category were calculated by dividing each category of institutional expenditures (i.e., instruction, academic support, etc.) per student by the total institutional expenditures per student and multiplying by 100. For example, if an institution allocated $5000 for instruction and its total expenditures per student were $20,000, then the percentage of expenditures per student on instruction would be .25 or 25%. The relationship between percentage of expenditures and graduation rates was examined in Research Question 5. Calculating the percentage of expenditures per student for six years prior to Fall 2002, summing these

results, and dividing by six, obtained a mean of the percentage of expenditures for each category.

To address Research Questions 5 - 8, similar procedures as those outlined for Research Questions 1 - 4 were utilized to conduct the analysis and to factor in the role of institutional selectivity.

The final two research questions involved investigating institutional expenditures and retention and graduation rates over a 10-year period: 1992, 1997, and 2002:

Research Question 9: For private Baccalaureate Liberal and General institutions, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants predict first-year retention and 6-year graduation rates for 1992, 1997, and 2002?

Research Question 10: For private Baccalaureate Liberal and General institutions, did the percentage of institutional expenditures on instruction, academic support, student services, institutional support, and institutional grants predict first year retention and 6-year graduation rates for 1992, 1997, and 2002?

Baccalaureate Liberal and General colleges and universities were identified using the 2000 Carnegie Classification system. The sample consisted of those Baccalaureate Liberal and General institutions that provided data on institutional expenditures, retention and graduation rates for 1992, 1997, and 2002. As a result of the number of institutions with incomplete data, the sample size used to answer Research Questions 7 and 8 was lower than the sample size for the previous questions.

Data analysis procedures that were employed for Research Questions 1 and 2 were applied to the 1992, 1997, and 2002 data sets to address Research Question 9. Data analysis

procedures that were employed for Research Questions 5 and 6 were applied to the 1992, 1997, and 2002 data to address Research Question 10.

Summary

This quantitative study sought to determine if retention and graduation rates of private, Baccalaureate Liberal and General institutions could be predicted by institutional resource allocation activities. The independent variables were: instructional expenditures, academic support expenditures, student services expenditures, institutional support expenditures, and total institutional grants (scholarships, fellowships). The independent variables were calculated two ways: the actual dollars spent per student in each expenditure category and the percentage each category represented of the institution's total E & G expenditures. The dependent variables were first-year retention rates and 6-year cohort graduation rates. IPEDS, *US News'* "America's Best Colleges, and Barron's Profiles of American Colleges of 2001 provided the data for the study. This study examined these relationships longitudinally and it also investigated if there was a relationship institutional selectivity and retention and graduation rates. Standard multiple regression was the primary statistical method used for the study.

CHAPTER 4: RESEARCH FINDINGS

The purpose of this study was to examine the relationship between institutional expenditures related to instruction, academic support, student services, institutional support, and institutional grants and retention and graduation rates at private Baccalaureate Liberal and General colleges. This study had three goals: a) to understand the relationship between institutional expenditures and retention and graduation rates, b) to understand the relationship of institutional selectivity, institutional expenditures and retention and graduation rates and c) to investigate if these relationships have changed in the past ten years (1992 - 2002).

This study revolved around one primary question: What institutional expenditures contribute to first-year retention rates and 6-year graduation rates at private Baccalaureate Liberal and General institutions? This encompassing question was dissected into ten interrelated research questions. This chapter presents the findings for these research questions. Research questions 1-4 examined the relationship between per student institutional expenditures and retention and graduation rates. Research questions 5- 8 examined the relationship between the percentage of institutional expenditures and retention and graduation rates. The final two questions examined the longitudinal relationship of institutional expenditures and retention and graduation rates. This chapter presents the findings for this study. Specifically descriptive statistics such as the mean and standard deviation are provided as well as the discriminant analysis results and standard multiple regression results. The correlation matrices for each standard multiple regression analysis are included in Appendix C.

Institutional Expenditures Per Student and Retention and Graduation Rates

The first four research questions focused on the amount of money spent per student and retention and graduation rates at private Baccalaureate Liberal and General institutions. Research Question 1 examined the accuracy of institutional expenditures per student predicting first-year retention. Research Question 2 analyzed the accuracy of institutional expenditures per student in predicting 6-year graduation rates.

Research Question 3 examined the relationship between amount of institutional expenditures per student, institutional expenditures and retention and graduation rates. Research Question 4 investigated if the amount of institutional expenditures per student predicted retention and graduation rates for low selectivity and high selectivity institutions. For Research Questions 3 and 4, retention and graduation rates are listed together as dependent variables. However, for each question, two separate analyses were conducted: one analysis used retention as a dependent variable and the second analysis used graduation rates as a dependent variable.

For purposes of clarity, results will be organized according to the dependent variables: first-year retention rates and 6-year graduation rates. The first half of this section will examine the variables of the dollar amount of institutional expenditures per student, institutional selectivity, and first-year retention rates (Research Questions 1, 3 and 4). The second half of this section will investigate the variables of the dollar amount of institutional expenditures per student, institutional selectivity, and 6-year graduation rates (Research Questions 2, 3, and 4).

Amount of Expenditures Per Student and Retention Rates

Research Question 1: Did the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates?

The independent variables for this research question were institutional expenditures for instruction (IES), academic support (ASES), student services (SSES), institutional support (ISES), and institutional grants (IGES). First-year retention rate (RETEN) was the dependent variable for this question. Standard multiple regression was conducted to determine the accuracy of the independent variables predicting retention. Sixty-eight institutions were eliminated due to missing data. Examination of *z*-scores, Mahalanobis distance, and Cook's distance led to the elimination of 10 outliers. Evaluation of linearity led to the natural log transformation of the variables IES, ASES, SSES, ISES, and IGES. Multiple regression results indicated that the model was statistically reliable in predicting retention rates, $R^2 = .555$, $R^2_{adj} = .549$, $F(5,381) = 94.64$, $p < .001$ (see Table 3). The variables predicted over half of the variance of retention rates.

Table 3. Model Summary for Predicting First-Year Retention Rates

R^2	R^2_{adj}	F	$df1$	$df2$	p
.555	.549	94.64	5	381	.000

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN

Regression coefficients specified that four variables, instruction $\beta = .54$, $t(381) = 9.01$, $p < .001$; academic support $\beta = .12$, $t(381) = 2.31$, $p < .05$; student services $\beta = -.12$, $t(381) = -2.37$, $p < .05$; and institutional grants $\beta = .26$, $t(381) = 5.86$, $p < .001$, significantly

contributed to the model. There was a positive relationship between expenditures for instruction, academic support, institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. A summary of means, standard deviations, and regression coefficients for the model predicting retention is presented in Table 4.

Table 4. Means, Standard Deviations, and Regression Coefficients for Institutional Expenditures per Student and Retention Rates at Private Baccalaureate Liberal and General Institutions (N = 387)

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (IES)	$7972.90	298.21	29.43	3.27	.54***
Academic Support (ASES)	$2018.21	1494.46	4.40	1.90	.12*
Student Services (SSES)	$3412.79	1663.80	-6.15	2.59	-.12*
Institutional Support (ISES)	$4669.15	2296.40	-.32	2.43	-.01
Institutional Grants (IGES)	$5422.83	2838.68	9.49	1.62	.26***
Retention (RETEN) (%)	75.13	11.78			

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Amount of Expenditures Per Student, Institutional Selectivity, and Retention Rates

Research Question 3: Did institutional selectivity and the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants significantly predict first-year retention rates at private Baccalaureate Liberal and General institutions?

The third research question added institutional selectivity as an independent variable. Utilizing *Barron's Profile of American Colleges* (Barron's, 2000), institutions were assigned

a selectivity rating ranging from 1 - 6 with "1" assigned for the least competitive institutions and "6" the most competitive institutions (see Appendix D).

The variable of institutional selectivity (INS SELECT) was added to the independent variables from the previous model. The independent variables for this question were instruction (IES), academic support (ASES), student services (SSES), institutional support (ISES), institutional grants (IGES), and institutional selectivity (INS SELECT). The dependent variable was first-year retention rate (RETEN). Standard multiple regression was performed to determine the accuracy of the independent variables predicting retention. Seventy-nine institutions were eliminated due to missing data. Ten institutions were identified as outliers and were eliminated. Evaluation of linearity led to the natural log transformation of the variables IES, ASES, SSES, ISES, and IGES.

Regression results indicated that the model was statistically significant in predicting retention rates: $R^2 = .635$, $R^2_{adj} = .629$, $F(6,369) = 107.02$, $p < .001$. The model accounted for 63.5% of the variance in retention. Table 5 compares the summaries of the previous model that examined institutional expenditures only and the model that included institutional expenditures and institutional selectivity. In the model using institutional expenditures as independent variables, 55.5 % of the variance in retention was accounted for by institutional expenditures. When the variable of institutional selectivity was added to the institutional expenditure variables, the independent variables accounted for almost 64% of the variance in retention.

Table 5. Model Summary for Research Questions 1 and 3

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Retention						
Research Question 1[a]	.555	.549	94.64	5	381	.000
Research Question 3[b]	.635	.629	107.02	6	369	.000

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN
[b] Independent variables: IES, ASES, SSES, ISES, IGES, INS SELECT. Dependent variable: RETEN

The variables of instruction $\beta = .33$, $t(369) = 5.51$, $p < .001$; student services $\beta = -.13$, $t(369) = -2.82$, $p < .01$; institutional grants $\beta = .22$, $t(369) = -5.32$, $p < .001$; and institutional selectivity $\beta = .40$, $t(369) = 9.38$, $p < .001$ significantly contributed to the model. There was a positive relationship between expenditures of instruction and institutional grants and first-year retention rates and a positive relationship between institutional selectivity and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. Table 6 compares the regression coefficients from the model that examined institutional expenditures (Research Question 1) and the model that included institutional expenditures and institutional selectivity (Research Question 3). In both models, expenditures devoted to instruction, student services, and institutional grants significantly contributed to retention. Academic support expenditures significantly predicted retention in the first model, but when the variable of institutional selectivity was added to the model, academic support no longer significantly contributed to retention.

Table 6. Means, Standard Deviations, and Regression Coefficients for Research Question 1 (N = 387): Institutional Expenditures per student and Retention Rates and for Research Question 3 (N = 376): Institutional Expenditures per Student, Institutional Selectivity, and Retention Rates

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (IES)					
Research Question 1[a]	$7972.90	4298.21	29.43	3.27	.54***
Research Question 3[b]	$8073.40	4302.85	17.89	3.25	.33***
Academic Support (ASES)					
Research Question 1[a]	$2018.21	1494.46	4.40	1.90	.12*
Research Question 3[b]	$2053.12	1500.90	3.34	1.76	.09
Student Services (SSES)					
Research Question 1[a]	$3412.79	1663.80	-6.15	2.59	-.12*
Research Question 3[b]	$3439.88	1672.30	-6.68	2.37	-.13**
Institutional Support (ISES)					
Research Question 1[a]	$4669.15	2296.40	-.32	2.43	-.01
Research Question 3[b]	$4705.13	2309.17	-.23	2.23	-.00
Institutional Grants (IGES)					
Research Question 1[a]	$5422.83	2838.68	9.49	1.62	.26***
Research Question 3[b]	$5481.86	2829.62	8.00	1.50	.22***
Institutional Selectivity (INS SELECT)					
Research Question 3[b]	3.26	1.21	3.86	.41	.40***
Retention RETEN (%)					
Research Question 1[a]	75.13	11.78			
Research Question 3[b]	75.44	11.70			

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN
[b] Independent variables: IES, ASES, SSES, ISES, IGES, INS SELECT. Dependent variable: RETEN
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Research Question 4: For institutions with differing levels of institutional selectivity, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates?

The purpose of this research question was to determine if the amount of money allocated to each category of expenditures predicted retention rates at institutions with differing levels of institutional selectivity. Ideally, the best approach to answering this question would be to use standard multiple regression to develop prediction models for each level of institutional selectivity. However, conducting a multiple regression analysis on each level was not feasible due to the low numbers for some of the levels of institutional selectivity. To overcome the limitations imposed by inadequate sample sizes, it was necessary to merge some of the levels of institutional selectivity into larger groups. Discriminant analysis was conducted to accomplish this task.

Using the variables of institutional expenditures and retention rates, discriminant analysis procedures were utilized to identify similarities and differences among the six levels of institutional selectivity. Discriminant analysis techniques provide a significant amount of group classification data but three specific procedures were analyzed: Tests of Equality of Group Means, Box's M, and Classification of Predicted Group Membership. The first two analyses were conducted to verify that there were significant differences in institutional expenditures and retention rates due to institutional selectivity levels. The final analysis highlighted similarities and differences among institutional selectivity that were then used to merge the six smaller subgroups into two larger subgroups.

Discriminant analysis was conducted to examine if the variables of institutional expenditures per student for instruction (IES), academic support (ASES), student services (SSES), institutional support (ISES), institutional grants (IGES) and first-year retention rate (RETEN) predicted differences in the six levels of institutional selectivity.

Results of the Tests of Equality of Group means indicated that there were significant differences in institutional selectivity based on the predictor variables (see Table 7). Box's M test also indicated that the covariance matrices of the groups were significantly different: F (105, 242253.18) = 4.00, $p < .001$. These results confirmed that there were significant differences in institutional expenditures and retention rates due to institutional selectivity.

Table 7. Test of Equality of Group Means for Institutional Expenditures and Retention Rates

Variable	Wilks' Lamda	*F*	*df1*	*df2*	*p*
Instruction (IES)	.51	71.95	5	370	.000
Academic Support (ASES)	.68	34.89	5	370	.000
Student Services (SSES)	.76	23.32	5	370	.000
Institutional Support (ISES)	.79	19.72	5	370	.000
Institutional Grants (IGES)	.73	27.04	5	370	.000
Retention (RETEN)	.46	87.66	5	370	.000

Classification results for predicted group membership highlighted two patterns within the data. Institutions with selectivity levels of 1, 2, or 3 were most likely to be predicted as members of Level 1, 2, or 3. Eighty percent of Level 1 institutions (noncompetitive) were predicted to be members of Level 1, 2 or 3. Ninety-four percent of Level 2 institutions (less competitive) were predicted to be members of Level 1, 2, or 3, and 69% of Level 3 institutions (competitive) were predicted to be members of Level 1, 2, or 3.

Institutions with selectivity levels of 4, 5, or 6 were most likely to be predicted as members of Level 4, 5, or 6. Approximately 78% of Level 4 (more competitive) institutions

were predicted to be members of Levels 4, 5, or 6; 100% of Level 5 (highly competitive) institutions were predicted to be members of Levels 4, 5 or 6; and 100% of Level 6 institutions (most competitive) were predicted to be members of 5 or 6. Table 8 presents the results of the classification results for predicted group membership.

Table 8. Classification Results for Predicted Group Membership for Institutional Expenditures per Student, Retention Rates, and Institutional Selectivity

Original Level of Institutional Selectivity	Predicted Group Membership (%)					
	1	2	3	4	5	6
1 (low)	**25.0**	**30.0**	**25.0**	15.0	5.0	0
2	**22.6**	**51.2**	**20.2**	4.8	1.2	0
3	**19.8**	**17.5**	**31.7**	29.4	0	1.6
4	5.6	4.4	12.2	**60.0**	**15.6**	**2.2**
5	0	0	0	**5.4**	**81.1**	**13.5**
6 (high)	0	0	0	0	**10.5**	**89.5**

As a result of the classification of predicted group membership, institutional selectivity levels of 1, 2, 3 were combined to form one subgroup labeled "low selectivity" and institutions with selectivity levels of 4, 5 6, were combined to form another subgroup: "high selectivity."

Standard multiple regression was performed on each subgroup. For each subgroup, independent variables were instruction (IES), academic support (ASES), student services (SSES), institutional support (ISES), and institutional grants (IGES). The dependent variable was first-year retention rate (RETEN). Seventy-nine institutions were eliminated due to missing data. Ten institutions were identified as outliers and were eliminated. Evaluation of

linearity led to the natural log transformation of the variables IES, ASES, SSES, ISES, and IGES.

Results indicated that the independent variables significantly predicted retention rates for low selectivity: $R^2 = .323$, $R^2_{adj} = .307$, $F(5,224) = 21.34$, $p < .001$ and high selectivity institutions: $R^2 = .440$, $R^2_{adj} = .420$, $F(5,140) = 21.97$, $p < .001$ (see Table 9). For low selectivity institutions (N=230), the independent variables accounted for 32.3% of the variance in retention and for high selectivity institutions (N=146) the independent variables accounted for 44% of the variance.

Table 9. Model Summary of Low Selectivity and High Selectivity Institutions for Institutional Expenditures per Student and First-Year Retention Rates

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Retention[a]						
Low Selectivity	.323	.307	21.34	5	224	.000
High Selectivity	.440	.420	21.97	5	140	.000

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN.
$*p < .05$. $**p < .01$. $***p \leq .001$.

Regression coefficients for the low selectivity institutions indicated that the variables of instruction, $\beta = .42$, $t(224) = 5.58$, $p < .001$; student services, $\beta = -.20$, $t(224) = -2.77$, $p < .01$; and institutional grants $\beta = .32$, $t(224)$ 4.93, $p < .001$ significantly contributed to the model. There was a positive relationship between expenditures for instruction and institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. For the high selectivity institutions, instruction, $\beta = .35$, $t(141) = 3.06$, $p < .01$ and academic support, $\beta = .36$, $t(141) = 3.44$, $p < .001$ positively and significantly contributed to this model.

The average retention rate for low selectivity institutions was approximately 70% and the average retention rate for high selectivity institutions was almost 85%. The standard deviations for institutional expenditures were higher at high selectivity institutions than low selectivity institutions. The standard deviation for retention rates was higher at low selectivity institutions than high selectivity institutions. This indicates that there was larger variability in the institutional expenditures at high selectivity institutions but larger variability in retention rates at low selectivity institutions.

On average, high selectivity institutions spent more money in each category of expenditures than low selectivity institutions. High selectivity institutions spent almost twice the amount in the area of academic support than low selectivity institutions ($2964.37 vs. $1474.67). High selectivity institutions spent more than $5000 per student than low selectivity institutions ($11230.51 vs. $6069.33) on instruction and more than $3000 per student than low selectivity institutions ($7447.94 vs. $4233.82) in the area of institutional grants. Table 10 provides the means, standard deviations, and regression coefficients for low selectivity and high selectivity institutions for institutional expenditures and retention rates.

Table 10. Summary of Means, Standards Deviations, and Regression Coefficients for Institutional Expenditures per Student and First-Year Retention Rates for Low Selectivity Institutions (N=230) and High Selectivity Institutions (N=146)

Variable	*Mean*	*SD*	*B*	*SE B*	β
Instruction (IES)					
Low Selectivity	$6069.33	2498.80	24.88	4.46	.42***
High Selectivity	$11230.51	4649.12	15.25	4.98	.35**
Academic Support (ASES)					
Low Selectivity	$1474.67	926.86	1.37	2.39	.04
High Selectivity	$2964.37	1761.36	9.75	2.83	.36***
Student Services (SSES)					
Low Selectivity	$2835.93	1257.67	-9.65	3.48	-.20**
High Selectivity	$4391.31	1801.25	-1.41	3.23	-.04
Institutional Support (ISES)					
Low Selectivity	$3985.87	1888.22	.78	2.96	.02
High Selectivity	$5838.21	2458.89	-4.52	3.74	-.10
Institutional Grants (IGES)					
Low Selectivity	$4233.82	2251.54	9.52	1.93	.32***
High Selectivity	$7447.94	2517.56	5.69	2.92	.15
Retention (RETEN) (%)					
Low Selectivity	69.56	9.67			
High Selectivity	84.71	8.05			

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Amount of Expenditures Per Student and Graduation Rates

Research Question 2: Between 1996-1997 and 2001-2002, did the amount of money that was spent per student for instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Institutional expenditures over the course of a student's' enrollment could influence 6-year graduation rates; therefore, a mean expenditure value was obtained by calculating expenditures per student from 1996-2002, summing these results, and dividing by six. The independent variables were average institutional expenditures per student for instruction, (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), and institutional grants (AVIGES). The dependent variable was 6-year graduation rate (GRAD).

Standard multiple regression was performed to determine the accuracy of the independent variables predicting graduation rates. Data were screened for missing variables and outliers. Seventy-nine institutions were eliminated due to missing data and 7 institutions were identified as outliers and subsequently, removed from the data set. Evaluation of linearity led to the natural log transformation of the variables AVIES, AVASES, AVSSES, AVSES, and AVIGES. Multiple regression results indicated that the model was statistically reliable in predicting graduation rates, $R^2 = .588$, $R^2_{adj} = .582$, $F(5,373) = 106.27$, $p < .001$. The variables predicted over half of the variance of graduation rates (see Table 11).

Table 11. Model Summary Predicting 6-year Graduation Rates

R^2	R^2_{adj}	F	$df1$	$df2$	p
.588	.582	106.27	5	373	.000

[a] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD

Regression coefficients specified that four variables significantly contributed to the model: instruction β = .57, $t(373) = 10.14, p < .001$; academic support β = .21, $t(373) = 4.31$, $p < .001$; institutional support β = -.13, $t(373) = -2.92, p < .01$; and institutional grants β = .21, $t(373) = 4.58, p < .001$. There was a significant positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a significant negative relationship between institutional support expenditures and 6-year graduation rates. There was no significant relationship between student service expenditures and graduation rates. Table 12 provides the means, standard deviations, and regression coefficients for the model predicting graduation.

Table 12. Means, Standard Deviations, and Regression Coefficients for Institutional Expenditures per Student Variables and Graduation Rates at Private Baccalaureate Liberal and General Institutions (N = 379)

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (AVIES)	$7112.45	3547.29	51.50	5.08	.57***
Academic Support (AVASES)	$1744.52	1165.71	13.63	3.17	.21***
Student Services (AVSSES)	$2953.31	1311.95	-7.10	4.27	-.08
Institutional Support (AVISES)	$4151.88	1839.15	-11.89	4.07	-.13**
Institutional Grants (AVIGES)	$4840.90	2540.88	12.40	2.71	.21***
Graduation Rates (GRAD) (%)	55.82	18.11			

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Amount of Expenditures Per Student, Institutional Selectivity, and Graduation Rates

Research Question 3: Did institutional selectivity and the amount of money that was spent per student in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants significantly predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?

For this question institutional selectivity was added as an independent variable to investigate if institutional selectivity and average institutional expenditures per student predicted graduation rates. Utilizing *Barron's Profile of American Colleges* (Barron's, 2000), institutions were assigned a selectivity rating ranging from 1 - 6 with "1" assigned for the least competitive institutions and "6 " the most competitive institutions (see Appendix D).

Standard multiple regression was performed to determine the accuracy of the independent variables of instruction (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), institutional grants (AVIGES), and institutional selectivity (INS SELECT) in predicting 6-year graduation rates (GRAD). Ninety institutions were eliminated due to missing data. Seven institutions were identified as outliers and eliminated. Evaluation of linearity led to the natural log transformation of the variables: AVIES, AVASES, AVSSES, AVISES, and AVIGES.

Results indicated that the model was statistically reliable in predicting graduation rates: $R^2 = .656$, $R^2_{adj} = .650$, $F(6,361) = 114.61$, $p < .001$. The model accounted for 65.6% of the variance in graduation rates. Table 13 compares the summary of the previous model that examined institutional expenditures and the model that included institutional expenditures and institutional selectivity. In the model using only institutional expenditures as independent

variables, 58.8% of the variance in graduation rates was accounted for by institutional expenditures. When the variable of institutional selectivity was added to the institutional expenditure variables, the independent variables accounted for 65.6% of the variance in graduation rates.

Table 13. Model Summary for Research Questions 2 and 3

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Graduation						
Research Question 2[a]	.588	.582	106.27	5	373	.000
Research Question 3[b]	.656	.650	114.61	6	361	.000

[a] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD
[b] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES, INS SELECT. Dependent variable: GRAD
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Except for student services expenditures (AVSSES), all other variables significantly contributed to this model: instruction $\beta = .36$, $t(361) = 6.38$, $p < .001$; academic support $\beta = .16$, $t(361) = 3.40$, $p = .001$; institutional support $\beta = -.14$, $t(361) = -3.38$, $p = .01$; institutional grants $\beta = .17$, $t(361) = 3.93$, $p < .001$; and institutional selectivity $\beta = .38$, $t(361) = 8.98$, $p < .001$. There was a significant positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates and between institutional selectivity and 6-year graduation rates. There was a significant negative relationship between institutional support expenditures and 6-year graduation rates.

Institutional expenditure variables that significantly contributed to this model also significantly contributed to the model that included only institutional expenditures. Table 14

provides a summary of the means, standard deviations, and regression coefficients for both models.

Table 14. Means, Standard Deviations, and Summary of Regression Coefficients for Research Question 2 (N = 387): Institutional Expenditures per student and Graduation Rates and for Research Question 3 (N = 368): Institutional Expenditures per Student, Institutional Selectivity, and Graduation Rates

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (AVIES)					
Research Question 2[a]	$7112.45	3547.29	51.50	5.08	.57***
Research Question 3[b]	$7193.12	3556.39	32.21	5.05	.36***
Academic Support (AVASES)					
Research Question 2[a]	$1744.52	1165.71	13.63	3.17	.21***
Research Question 3[b]	$1770.04	1172.26	10.00	2.94	.16***
Student Services (AVSSES)					
Research Question 2[a]	$2953.31	1311.95	-7.10	4.27	-.08
Research Question 3[b]	$2967.01	1320.89	-4.43	3.91	-.05
Institutional Support (AVISES)					
Research Question 2[a]	$4151.88	1839.15	-11.89	4.07	-.13**
Research Question 3[b]	$4175.13	1847.65	-12.79	3.78	-.14**
Institutional Grants (AVIGES)					
Research Question 2[a]	$4840.90	2540.88	12.40	2.71	.21***
Research Question 3[b]	$4874.40	2545.72	9.85	2.51	.17***
Institutional Selectivity (INS SELECT)	3.24	1.22	5.60	.62	.38***
Research Question 3[b]					
Graduation (GRAD) (%)					
Research Question 2[a]	55.82	18.11			
Research Question 3[b]	56.43	17.88			

[a] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD

[b] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES, INS SELECT. Dependent variable: GRAD

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Research Question 4: For institutions with differing levels of institutional selectivity, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates?

The purpose of this research question was to determine if the amount of money allocated to each category of expenditures predicted graduation rates at institutions with differing levels of institutional selectivity. The most comprehensive approach to answering this question would be to use standard multiple regression to develop prediction models for each level of institutional selectivity. However, conducting a multiple regression analysis on each level was not feasible due to the low numbers for some of the levels of institutional selectivity. To overcome the limitations imposed by inadequate sample sizes while addressing Research Question 4 adequately, it was necessary to merge some of the levels of institutional selectivity into larger groups. Discriminant analysis was conducted to accomplish this task.

Using the variables of institutional expenditures and retention rates, discriminant analysis procedures of Tests of Equality of Group Means, Box's M, and Classification of Predicted Group Membership were utilized to identify similarities and differences among the six levels of institutional selectivity. Discriminant analysis was conducted to examine if the variables of average institutional expenditures per student for instruction (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), institutional grants (AVIGES) and 6-year graduation rate (GRAD) predicted differences in the six levels of institutional selectivity.

Results of the Tests of Equality of Group means indicated that there were significant differences in institutional selectivity based on the predictor variables (See Table 15). Box's

M test also indicated that the covariance matrices of the groups were significantly different: F (105, 23578.31) = 2.97, $p < .001$. The results of the Test of Equality of Group Means and Box's M verified that there were significant differences in institutional expenditures and retention rates due to institutional selectivity. Classification results for predicted group membership were then analyzed.

Table 15. Test of Equality of Group Means for Institutional Expenditures, Graduation and Institutional Selectivity

Variable	Wilks' Lamda	*F*	*df1*	*df2*	*p*
Instruction (AVIES)	.50	73.62	5	362	.000
Academic Support (AVASES)	.65	39.52	5	362	.000
Student Services (AVSSES)	.78	20.09	5	362	.000
Institutional Support (AVISES)	.79	19.58	5	362	.000
Institutional Grants (AVIGES)	.73	26.98	5	362	.000
Graduation (GRAD)	.43	95.04	5	362	.000

Classification results for predicted group membership highlighted two patterns within the data. Institutions with selectivity levels of 1, 2, or 3 were most likely to be predicted as members of Level 1, 2, or 3. Almost 83% of Level 1 institutions (noncompetitive) were predicted to be members of Level 1, 2 or 3. Ninety-five percent of Level 2 institutions (less competitive) were predicted to be members of Level 1, 2, or 3, and 71% of Level 3 institutions (competitive) were predicted to be members of Level 1, 2, or 3.

Institutions with selectivity levels of 4, 5, or 6 were most likely to be predicted as members of Level 4, 5, or 6. Approximately 79% of Level 4 (more competitive) institutions were predicted to be members of Levels 4, 5, or 6; 100% of Level 5 (highly competitive) institutions were predicted to be members of Levels 4, 5 or 6; and 100% of Level 6 institutions (most competitive) were predicted to be members of 5 or 6. Table 16 presents the classification results for predicted group membership.

Table 16. Classification Results for Predicted Group Membership for Institutional Expenditures per Student, Graduation Rates, and Institutional Selectivity

Original Level of Institutional Selectivity	Predicted Group Membership (%)					
	1	2	3	4	5	6
1 (low)	**26.1**	**30.4**	**26.1**	17.4	5.0	0
2	**21.3**	**57.5**	**16.4**	3.8	0	1.3
3	**16.3**	**19.5**	**35**	25.2	0	1.6
4	6.9	4.6	9.2	**59.8**	**18.4**	**1.1**
5	0	0	0	**5.3**	**76.3**	**18.4**
6 (high)	0	0	0	0	**11.8**	**88.2**

As a result of the classification of predicted group membership, institutional selectivity levels of 1, 2, 3 were combined to form one subgroup labeled "low selectivity" and institutions with selectivity levels of 4, 5 6, were combined to form another subgroup: "high selectivity."

Standard multiple regression was performed on each subgroup. For each subgroup, independent variables were average institutional expenditures per student for instruction,

(AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), and institutional grants (AVIGES). The dependent variable was 6-year graduation rate (GRAD). Ninety institutions were eliminated due to missing data. Seven institutions were identified as outliers and eliminated. Evaluation of linearity led to the natural log transformation of the variables: AVIES, AVASES, AVSSES, AVISES, and AVIGES. Results indicated that the independent variables significantly predicted graduation rates for low selectivity: $R^2 = .363$, $R^2_{adj} = .349$, $F(5,220) = 25.08$, $p < .001$ and high selectivity institutions: $R^2 = .395$, $R^2_{adj} = .372$, $F(5,136) = 17.74$, $p < .001$. For low selectivity institutions, the independent variables predicted 36.3% of the variance in graduation rates and for high selectivity institutions the independent variables predicted 39.5% of the variance in graduation rates (see Table 17).

Table 17. Model Summary of Low Selectivity and High Selectivity Institutions for Institutional Expenditures per Student and 6-Year Graduation Rates

Model	R^2	R^2_{adj}	F	*df1*	*df2*	*p*
Graduation[a]						
Low Selectivity	.363	.349	25.08	5	220	.000
High Selectivity	.395	.372	17.74	5	136	.000

[a] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Regression coefficients indicated that the variables of instruction, $\beta = .45$, $t(220) = 6.32$, $p < .001$; academic support, $\beta = .15$, $t(220) = 2.30$, $p < .05$; institutional support, $\beta = -.14$, $t(220) = -2.30$, $p < .05$; and institutional grants $\beta = .28$, $t(220) = 4.10$, $p < .001$ significantly contributed to the model for low selectivity institutions. There was a positive

relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates.

For high selectivity institutions, instruction, $\beta = .43$, $t(136) = 3.67$, $p < .001$, academic support, $\beta = .32$, $t(136) = 3.17$, $p < .01$; and institutional support, $\beta = -.20$, $t(136) = -2.13$, $p < .05$ significantly contributed to this model. There was a positive relationship between expenditures for instruction and academic support and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates. Institutional grants did not significantly predict graduation rates for high selectivity institutions. The mean 6-year graduation rate for low selectivity institutions (N=226) was 47% and the mean 6-year graduation rate for high selectivity institutions (N=142) was 71%. The standard deviations for institutional expenditures were higher at high selectivity institutions than low selectivity institutions. The standard deviation for graduation rates was higher at low selectivity institutions than high selectivity institutions. This indicates that there was larger variability in the institutional expenditures at high selectivity institutions but larger variability in graduation rates at low selectivity institutions.

On average, high selectivity institutions spent more money in each category of expenditures than low selectivity institutions. High selectivity institutions spent almost twice the amount in the area academic support than low selectivity institutions ($2522.66 vs. $1297.16). High selectivity institutions spent more than $4000 per student than low selectivity institutions ($9921.66 vs. $5478.73) on instruction and more than $3000 per student than low selectivity institutions ($6723.23 vs. $2712.74) in the area of institutional

grants. Table 18 provides the regression coefficients for institutional expenditures per student and six-year graduation rates for low selectivity and high selectivity institutions.

Table 18. Summary of Means, Standards Deviations, and Regression Coefficients for Institutional Expenditures per Student and 6-Year Graduation Rates for Low Selectivity (N=226) and High Selectivity Institutions (N=142)

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (AVIES)					
Low Selectivity	$5478.73	2013.11	41.95	6.63	.45***
High Selectivity	$9921.66	3774.22	31.97	8.56	.43***
Academic Support (AVASES)					
Low Selectivity	$1297.16	716.87	8.81	3.84	.15*
High Selectivity	$2522.66	1351.99	15.86	5.01	.32**
Student Services (AVSSES)					
Low Selectivity	$2503.88	1016.70	-10.68	5.68	-.14
High Selectivity	$3704.11	1414.52	3.28	5.65	.05
Institutional Support (AVISES)					
Low Selectivity	$3599.51	1444.73	-11.39	4.95	-.14*
High Selectivity	$5091.25	2044.16	-14.15	6.65	-.20*
Institutional Grants (AVIGES)					
Low Selectivity	$3712.74	1988.27	12.98	3.16	.28***
High Selectivity	$6723.23	2225.86	1.92	5.05	.03
Graduation (GRAD) (%)					
Low Selectivity	47.18	14.10			
High Selectivity	71.16	12.60			

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Summary

The first four research questions viewed institutional expenditures as the amount of money spent per student on retention and graduation rates at private Baccalaureate Liberal and General colleges and universities. Standard multiple regression was conducted to

determine the accuracy of the independent variables of institutional expenditures per student predicting first-year retention rates and 6-year graduation rates. Results of standard multiple regression indicated that the models significantly predicted retention and graduation.

Institutional selectivity was added as an independent variable to examine if institutional selectivity and institutional expenditures per student predicted retention and graduation rates. Results of standard multiple regression indicated that the models significantly predicted retention and graduation.

Using discriminant analysis, institutions were categorized into one of two subgroups: low selectivity and high selectivity. Standard multiple regression was conducted to determine the accuracy of institutional expenditures per student predicting retention and graduation rates. Results indicated that institutional expenditures significantly predicted retention and graduation for low selectivity and high selectivity institutions. Table 19 provides the means and standard deviations of the independent and dependent variables for Research Questions 1 - 4. Table 20 provides the summary for each model that examined the role of institutional expenditures per student and first-year retention and graduation rates.

Table 19. Means, Standard Deviations, and Regression Coefficients for Research Questions 1 - 4: Institutional Expenditures per Student, Institutional Selectivity, Retention and Graduation Rates

Variable	Mean	*SD*
Instruction		
Research Question 1[a]	$7972.90	4298.21
Research Question 2[b]	$7112.45	3547.29
Research Question 3[c] - Retention	$8073.40	4302.85
Research Question 3[d] - Graduation	$7193.12	3556.39
Research Question 4[a] - Retention		
Low Selectivity	$6069.33	2498.80
High Selectivity	$11230.51	4649.12
Research Question 4[b] - Graduation		
Low Selectivity	$5478.73	2013.11
High Selectivity	$9921.66	3774.22
Academic Support		
Research Question 1[a]	$2018.21	1494.46
Research Question 2[b]	$1744.52	1165.71
Research Question 3[c] - Retention	$2053.12	1500.90
Research Question 3[d] - Graduation	$1770.04	1172.27
Research Question 4[a] - Retention		
Low Selectivity	$1474.67	926.86
High Selectivity	$2964.37	1761.36
Research Question 4[b] - Graduation		
Low Selectivity	$1297.16	716.87
High Selectivity	$2522.66	1351.99
Student Services		
Research Question 1[a]	$3412.79	1663.80
Research Question 2[b]	$2953.31	1311.95
Research Question 3[c] - Retention	$3439.88	1672.30
Research Question 3[d] - Graduation	$2967.01	1320.89
Research Question 4[a] - Retention		
Low Selectivity	$2835.93	1257.67
High Selectivity	$4391.31	1801.25
Research Question 4[b] - Graduation		
Low Selectivity	$2503.88	1016.70
High Selectivity	$3704.11	1414.52
Institutional Support		
Research Question 1[a]	$4669.15	2296.40
Research Question 2[b]	$4151.88	1839.14
Research Question 3[c] - Retention	$4705.13	2309.17
Research Question 3[d] - Graduation	$4874.40	1847.65
Research Question 4[a] - Retention		
Low Selectivity	$3985.87	1888.22
High Selectivity	$5838.21	2458.89
Research Question 4[b] - Graduation		
Low Selectivity	$3599.51	1444.73
High Selectivity	$5091.25	2044.16

Table 19. (continued)

Variable	Mean	*SD*
Institutional Grants		
Research Question 1[a]	$5422.83	2838.68
Research Question 2[b]	$4840.90	2540.88
Research Question 3[c] - Retention	$5481.86	2829.62
Research Question 3[d] - Graduation	$4874.40	2545.72
Research Question 4[a] - Retention		
Low Selectivity	$4233.82	2251.54
High Selectivity	$7447.94	2517.56
Research Question 4[b] - Graduation		
Low Selectivity	$2712.74	1988.27
High Selectivity	$6723.23	2225.86
Institutional Selectivity		
Research Question 3[c]	3.26	1.21
Research Question 3[d]	3.24	1.22
Retention RETEN (%)		
Research Question 1[a]	75.13	11.78
Research Question 3[c] - Retention	75.44	11.70
Research Question 4[a] - Retention		
Low Selectivity	69.56	9.67
High Selectivity	84.71	8.05
Graduation GRAD (%)		
Research Question 2[b]	55.82	18.11
Research Question 3[d] - Graduation	56.43	17.88
Research Question 4[b] - Graduation		
Low Selectivity	47.18	14.10
High Selectivity	71.16	12.60

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN
[b] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD
[c] Independent variables: IES, ASES, SSES, ISES, IGES, INS SELECT. Dependent variable: RETEN
[d] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES, INS SELECT. Dependent variable: GRAD
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Table 20. Model Summary for Research Questions 1, 2, 3, and 4

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Retention						
Research Question 1[a]	.555	.549	94.64	5	381	.000
Research Question 3[b]	.639	.629	107.02	6	369	.000
Retention - Research Question 4[a]						
Low Selectivity	.323	.307	21.34	5	224	.000
High Selectivity	.440	.420	21.97	5	140	.000
Graduation						
Research Question 2[c]	.588	.582	106.27	5	373	.000
Research Question 3[d]	.656	.650	114.61	6	361	.000
Graduation - Research Question 4c						
Low Selectivity	.363	.349	25.08	5	220	.000
High Selectivity	.395	.372	17.74	5	136	.000

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN
[b] Independent variables: IES, ASES, SSES, ISES, IGES, INS SELECT. Dependent variable: RETEN
[c] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD
[d] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES, INS SELECT. Dependent variable: GRAD

Standard multiple regression results indicated that for all models, the independent variables predicted retention and graduation rates. However, the independent variables that significantly contributed to retention and graduation rates varied from model to model. The variable of instruction was the only variable that significantly contributed to retention and graduation rates in each model.

Academic support expenditures and institutional selectivity significantly and positively contributed to all the models predicting graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates. Institutional grants significantly contributed to all models except for the models that analyzed

high selectivity institutions. For high selectivity institutions, institutional grants did not significantly predict retention or graduation rates. Student services significantly contributed to all models examining retention rates except for the model examining high selectivity institutions. When significant, there was a negative relationship between student services expenditures and first-year retention rates. Table 21 provides a list of the variables that significantly contributed to each model.

Table 21. List of Independent Variables that Significantly Contributed to each Model for Research Questions 1, 2, 3, and 4

Model	Variables	*B*	*SE B*	β
Retention - Research Question 1[a]	Instruction	29.43	3.27	.54***
	Academic Support	4.40	1.90	.12*
	Student Services	-6.15	2.59	-.12*
	Institutional Grants	9.49	1.62	.22***
Retention -Research Question 3[b]	Instruction	17.89	3.25	.33***
	Student Services	-6.68	2.37	-.13**
	Institutional Grants	8.00	1.50	.22***
	Institutional Selectivity	3.86	.41	.40***
Retention - Research Question 4[a]				
Low Selectivity	Instruction	24.88	4.46	.42***
	Student Services	-9.65	3.48	-.20**
	Institutional Grants	9.52	1.93	.32***
Retention - Research Question 4[a]				
High Selectivity	Instruction	15.25	4.98	.35***
	Academic Support	9.75	2.83	.36***
Graduation - Research Question 2[c]	Instruction	51.50	5.08	.57***
	Academic Support	13.63	3.17	.21**
	Institutional Support	-11.89	4.07	-.13**
	Institutional Grants	12.40	2.71	.21***
Graduation - Research Question 3[d]				
	Instruction	32.21	5.05	.36***
	Academic Support	10.00	2.94	.16***
	Institutional Support	-4.43	3.78	-.14**
	Institutional Grants	9.85	2.51	.17***
	Institutional Selectivity	5.60	.62	.38***
Graduation - Research Question 4[c]				
Low Selectivity	Instruction	41.95	6.63	.45***
	Academic Support	8.81	3.84	.15*
	Institutional Support	-11.39	4.95	-.14*
	Institutional Grants	12.98	3.16	.28***
Graduation - Research Question 4[c]				
High Selectivity	Instruction	31.97	8.56	.43***
	Academic Support	15.86	5.01	.32***
	Institutional Support	-14.15	6.65	-.20*

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN

[b] Independent variables: IES, ASES, SSES, ISES, IGES, INS SELECT. Dependent variable: RETEN

[c] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD

[d] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES, INS SELECT. Dependent variable: GRAD

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Percentage of Institutional Expenditures and Retention and Graduation

Research Questions 5 - 8 focused on percentages of institutional expenditures and first-year retention and 6-year graduation rates at private Baccalaureate Liberal and General colleges and universities. Research Question 5 examined the accuracy of percentage of institutional expenditures per student in predicting retention. Research Question 6 investigated the accuracy of percentage of institutional expenditures per student in predicting retention.

Research Question 7 examined the relationship between institutional selectivity and percentage of institutional expenditures and retention and graduation rates. Research Question 8 investigated if the percentage of institutional expenditures predicted retention and graduation rates for low selectivity and high selectivity institutions. For Research Questions 7 and 8, retention and graduation rates are listed together as dependent variables. However, for each question, two separate analyses were conducted: one analysis used retention as a dependent variable and the second analysis used graduation rates as a dependent variable. Results will be organized according to dependent variables. The first half of this section will examine the variables of percentage of institutional expenditures, institutional selectivity, and first-year retention rates (Research Questions 5, 7, and 8). The second half of this section will examine the variables of percentage of institutional expenditures, institutional selectivity, and 6-year graduation rates (Research Questions 6, 7, and 8).

Percentage of Institutional Expenditures and Retention Rates

Research Question 5: Did the percentage of institutional expenditures in 2001-2002 for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates at private Baccalaureate Liberal and General institutions?

For this research question, the independent variables were percentage of institutional expenditures for instruction (PEI), academic support (PEAS), student services (PESS), institutional support (PEIS), and institutional grants (PEIG). First year retention rate (RETEN) was the dependent variable. Standard multiple regression was conducted to determine the accuracy of the independent variables predicting retention. Sixty-nine institutions were eliminated due to missing data. Examination of *z*-scores, Mahalanobis distance, and Cook's distance led to the elimination of 10 outliers. Evaluation of linearity led to the natural log transformation of the variables PEI, PEAS, PESS, PEIS, and PEIG. Multiple regression results indicated that the model was statistically reliable in predicting retention rates, $R^2 = .286$, $R^2_{adj} = .277$, $F(5,381) = 30.57$, $p < .001$. The variables accounted for almost 30% of the variance in first-year retention rates (see Table 22).

Table 22. Model Summary for Research Questions 5 [a]

R^2	R^2_{adj}	F	$df1$	$df2$	p
.286	.277	30.57	5	381	.000

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN

Regression coefficients specified that all five variables significantly contributed to the model: instruction $\beta = .25$, $t(381) = 5.32$, $p < .001$; academic support $\beta = .23$, $t(381) = 5.12$, $p < .001$; student services $\beta = -.28$, $t(381) = -5.93$, $p < .001$; institutional support $\beta = -.15$, $t(381) = -3.22$, $p = .001$ and institutional grants $\beta = .25$, $t(381) = 5.05$, $p < .001$. There was a positive relationship between instruction, academic support, and institutional grant expenditures and first-year retention rates. There was a negative relationship between student services and institutional support expenditures and first-year retention rates. A summary of regression coefficients for the model predicting retention is presented in Table 23.

Table 23. Means, Standard Deviations, and Regression Coefficients for Percentage of Institutional Expenditures Variables Predicting Retention Rates at Private Baccalaureate Liberal and General Institutions (N = 387)

Variable	Mean *(%)*	*SD*	*B*	*SE B*	β
PEI (Instruction)	33.02	7.70	26.30	4.95	.25***
PEAS (Academic Support)	8.02	3.53	12.20	2.38	.23***
PESS (Student Services)	14.65	4.86	-19.39	3.27	-.28***
PEIS (Institutional Support)	20.06	6.26	-12.71	3.94	-.15***
PEIG (Institutional Grants)	23.06	10.10	10.76	2.13	.25***
RETEN (Retention)	75.53	11.60			

Note. Percentages may not sum to 100 due to rounding.
*$p < .05$. **$p < .01$. ***$p \leq .001$.

Percentage of Institutional Expenditures, Institutional Selectivity, and Retention Rates

Research Question 7: Did institutional selectivity and the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants significantly predict first-year retention rates at private Baccalaureate Liberal and General institutions?

Similar procedures that were used to address Research Question 3 were used to address this research question. The variable of institutional selectivity (INS SELECT) was added to the independent variables of percentage of institutional expenditures.

The independent variables were percentage of institutional expenditures for instruction (PEI), academic services (PEAS), student services (PESS), institutional support (ISES), institutional grants (IGES) and institutional selectivity (INS SELECT). The dependent variable was first year retention rate (RETEN). Standard multiple regression was performed to determine the accuracy of the independent variables predicting retention. Seventy-nine institutions were eliminated due to missing data. Ten institutions were identified as outliers and were eliminated. Evaluation of linearity led to the natural log transformation of the variables PEI, PEAS, PESS, PEIS, and PEIG.

Regression results indicated that the model was statistically significant in predicting retention rates: $R^2 = .588$, $R^2_{adj} = .581$, $F(6,369) = 87.74$, $p < .001$. Table 24 compares the summaries of the previous model that examined institutional expenditures and the model that included institutional expenditures and institutional selectivity. In the model using only institutional expenditures as independent variables, 28.6% of the variance in retention was accounted for by institutional expenditures. When the variable of institutional selectivity was

added to the institutional expenditure variables, the independent variables accounted for 58.8% of the variance in retention.

Table 24. Model Summary for Research Questions 5 and 7

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Research Question 5[a]	.286	.277	30.57	5	381	.000
Research Question 7[b]	.588	.581	87.74	6	369	.000

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN
[b] Independent variables: PEI, PEAS, PESS, PEIS, PEIG, INS SELECT. Dependent variable: RETEN

The variables of instruction $\beta = .13$, $t(369) = 3.64$, $p < .001$; academic support $\beta = .13$, $t(369) = 3.75$, $p < .001$; student services $\beta = -.17$, $t(369) = -4.63$, $p < .001$; institutional grants $\beta = .17$, $t(369) = 4.41$, $p < .001$; and institutional selectivity $\beta = .61$, $t(369) = 16.67$, $p < .001$ significantly contributed to the model. There was a positive relationship between expenditures for instruction, academic support, and institutional grants, and first-year retention rates and a positive relationship between institutional selectivity and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates.

In the original model all institutional expenditures variables significantly contributed to the model. When the variable of institutional selectivity was added, all expenditure variables except institutional support significantly contributed to the model. Table 25 provides the means, standard deviations, and regression coefficients for the two models.

Table 25. Comparison of the Means, Standard Deviations and Regression Coefficients for Research Question 5 (N = 387): Percentage of Institutional Expenditures and Retention Rates and Research Question (N = 376): Percentage of Institutional Expenditures, Institutional Selectivity and Retention Rates

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (PEI) (%)					
Research Question 5[a]	33.02	7.70	26.30	4.95	.25***
Research Question 7[b]	33.20	7.63	14.12	3.88	.13***
Academic Support (PEAS) (%)					
Research Question 5[a]	8.02	3.53	12.20	2.38	.23***
Research Question 7[b]	8.08	3.50	7.06	1.88	.13***
Student Services (PESS) (%)					
Research Question 5[a]	14.65	4.86	-19.37	3.27	-.28***
Research Question 7[b]	14.63	4.87	-11.78	2.55	-.17***
Institutional Support (PEIS) (%)					
Research Question 5[a]	20.06	6.26	-12.70	3.94	-.15***
Research Question 7[b]	20.03	6.21	-4.31	3.11	-.05
Institutional Grants (PEIG) (%)					
Research Question 5[a]	23.06	10.10	10.76	2.13	.25***
Research Question 7[b]	23.15	10.03	7.34	1.67	.17***
Institutional Selectivity (INS SELECT)					
Research Question 7[b]	3.27	1.23	5.68	.34	.61***
Retention (RETEN) (%)					
Research Question 5[a]	75.53	11.60			
Research Question 7[b]	75.85	11.49			

Note. Percentages may not sum to 100 due to rounding.

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN

[b] Independent variables: PEI, PEAS, PESS, PEIS, PEIG, INS SELECT. Dependent variable: RETEN

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Research Question 8: For institutions with differing levels of institutional selectivity, did the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants predict first-year retention rates?

As in Research Question 4, institutions were divided into two levels of institutional selectivity: low selectivity and high selectivity. Using the variables of percentage of institutional expenditures and retention rates, discriminant analysis procedures of Tests of Equality of Group Means, Box's M, and Classification of Predicted Group Membership were utilized to identify similarities and differences among the six levels of institutional selectivity. Discriminant analysis was conducted to examine if the variables of percentage of institutional expenditures per student for instruction (PEI), academic support (PEIS), student services (PESS), institutional support (PEIS), institutional grants (PEIG) and retention (RETEN) predicted differences in the six levels of institutional selectivity.

Results of the Tests of Equality of Group means indicated that there were significant differences in institutional selectivity based on the predictor variables (see Table 26). Box's M test also indicated that the covariance matrices of the groups were significantly different: Box's M: F (105, 28686.76) = 3.82, $p < .001$. The results of the Test of Equality of Group Means and Box's M verified that there were significant differences in institutional expenditures and retention rates due to institutional selectivity. Classification results for predicted group membership were then analyzed.

Table 26. Test of Equality of Group Means for Institutional Expenditures, Retention and Institutional Selectivity

Variable	Wilks' Lamda	*F*	*df1*	*df2*	*p*
Instruction (PEI)	.90	9.09	5	370	.000
Academic Support (PEAS)	.93	5.95	5	370	.000
Student Services (PESS)	.97	2.38	5	370	.000
Institutional Support (PEIS)	.92	6.16	5	370	.000
Institutional Grants (PEIG)	.89	9.22	5	370	.000
Retention (RETEN)	.45	90.72	5	370	.000

Classification results for predicted group membership highlighted two patterns within the data. Institutions with selectivity levels of 1, 2, or 3 were most likely to be predicted as members of Level 1, 2, or 3. Seventy-one percent of Level 1 institutions (noncompetitive) were predicted to be members of Level 1, 2 or 3. Ninety percent of Level 2 institutions (less competitive) were predicted to be members of Level 1, 2, or 3, and 64% of Level 3 institutions (competitive) were predicted to be members of Level 1, 2, or 3.

Institutions with selectivity levels of 4, 5, or 6 were most likely to be predicted as members of Level 4, 5, or 6. Approximately 78% of Level 4 (more competitive) institutions were predicted to be members of Levels 4, 5, or 6; 100% of Level 5 (highly competitive) institutions were predicted to be members of Levels 4, 5 or 6; and 100% of Level 6 institutions (most competitive) were predicted to be members of 5 or 6. Table 27 presents the classification results for predicted group membership.

Table 27. Classification Results for Predicted Group Membership for Percentage of Institutional Expenditures, Retention Rates, and Institutional Selectivity

Original Level of Institutional Selectivity	Predicted Group Membership (%)					
	1	2	3	4	5	6
1 (low)	**28.6**	**23.8**	**19.0**	19	9.5	0
2	**24.7**	**43.2**	**22.2**	6.2	0	3.7
3	**15.7**	**20.5**	**28.3**	26	7.9	1.6
4	5.6	5.6	11.2	**57.3**	**18.0**	**2.2**
5	0	0	0	**5.4**	**75.7**	**18.9**
6 (high)	0	0	0	0	**9.5**	**90.5**

Based on the classification results of predicted group membership, institutional selectivity levels of 1, 2, 3 were combined to form one subgroup "low selectivity" and institutions with selectivity levels of 4, 5 6, were combined to form another subgroup "high selectivity".

Standard multiple regression was conducted on each subgroup. For each subgroup, independent variables were instruction (PEI), academic support (PEAS), student services (PESS), institutional support (PEIS), and institutional grants (PEIG). The dependent variable was first-year retention rate (RETEN). Seventy-nine institutions were eliminated due to missing data. Ten institutions were identified as outliers and were eliminated. Evaluation of linearity led to the natural log transformation of the variables PEI, PEAS, PESS, PEIS, and PEIG.

Results indicated that the percentage of institutional expenditures significantly predicted retention for low selectivity institutions: $R^2 = .194$, $R^2_{adj} = .176$, $F(5,223) = 10.72$, p

< .001 and high selectivity institutions: $R^2 = .273$, $R^2_{adj} = .247$, $F(5,141) = 10.57$, $p < .001$. For low selectivity institutions (N=230) the independent variables accounted for 19.4% of the variance in retention, and for high selectivity institutions (N=146) the independent variables accounted for 27.3% of the variance (see Table 28).

Table 28. Model Summary of Low Selectivity and High Selectivity Institutions for Percentage of Institutional Expenditures and First-Year Retention Rates [a]

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Low Selectivity	.194	.176	10.72	5	223	.000
High Selectivity	.273	.247	10.57	5	141	.000

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN

For low selectivity institutions, instruction $\beta = .21$, $t(223) = 3.22$, $p = .001$; student services $\beta = -.26$, $t(223) = -3.72$, $p < .001$; and institutional grants $\beta = .34$, $t(223) = 4.79$, $p < .001$ significantly contributed to the model. There was a positive relationship between expenditures for instruction and institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. For high selectivity institutions the variables of instruction $\beta = .19$, $t(141) = 2.49$, $p < .05$; academic support $\beta = .39$, $t(141) = 5.06$, $p < .001$; and student services $\beta = -.21$, $t(141) = -2.84$, $p < .01$ significantly contributed to retention. There was a positive relationship between expenditures for instruction and academic support and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates.

Low selectivity institutions had an average retention rate of approximately 70% and high selectivity institutions had an average retention rate of approximately 85%. The

standard deviations for retention and institutional expenditures were higher at low selectivity institutions than high selectivity institutions. This indicates that there was larger variability in the institutional expenditures and retention rates at low selectivity institutions. Table 29 provides the means, standard deviations, and regression coefficients for each variable. High selectivity institutions dedicated a larger percentage of their institutional expenditures to the areas of instruction (34.00 vs. 32.05), academic support (8.82 vs. 7.61), and institutional grants (24.69 vs. 22.15) than low selectivity institutions. Low selectivity institutions dedicated a larger percentage of their institutional expenditures to the areas of student services (14.94 vs.14.15) and institutional support (21.13 vs. 18.31) than high selectivity institutions.

Table 29. Summary of Means, Standards Deviations, and Regression Coefficients for Low Selectivity Institutions (N=229) and High Selectivity Institutions (N=148) for Percentage of Institutional Expenditures and First-Year Retention Rates.

Variable	Mean %	*SD*	*B*	*SE B*	β
Instruction (PEI)					
Low Selectivity	32.05	8.07	16.75	5.21	.21***
High Selectivity	34.00	6.52	17.50	7.03	.19*
Academic Support (PEAS)					
Low Selectivity	7.61	3.66	4.58	2.61	.11
High Selectivity	8.82	3.12	16.13	3.19	.39***
Student Services (PESS)					
Low Selectivity	14.94	4.97	-14.39	3.87	-.26***
High Selectivity	14.15	4.67	-10.38	3.65	-.21**
Institutional Support (PEIS)					
Low Selectivity	21.13	6.86	-6.64	4.10	-.10
High Selectivity	18.31	4.54	-4.86	5.82	-.06
Institutional Grants (PEIG)					
Low Selectivity	22.15	10.28	10.67	2.23	.34***
High Selectivity	24.69	9.44	.10	3.27	.00
Retention (RETEN))					
Low Selectivity	69.99	9.40			
High Selectivity	84.98	7.97			

Note. Percentages may not sum to 100 due to rounding.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Percentage of Institutional Expenditures and Graduation Rates

Research Question 6: Between 1996-1997 and 2001-2002, did the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Percentage of institutional expenditures for each category was calculated by averaging the percentage of institutional expenditures for academic years 1996-1997 through 2001-2002. The independent variables were average percentage of institutional expenditures for instruction (AVPEI), academic support (AVPEAS), student services (AVPESS), institutional support (AVPEIS), and institutional grants (AVPEIG). The dependent variable was 6-year graduation rate (GRAD).

Seventy-nine institutions were eliminated due to missing data and 3 institutions were identified as outliers and consequently, removed from the data set. Evaluation of linearity led to the natural log transformation of the variables AVIES, AVASES, AVSSES, AVSES, and AVIGES. Multiple regression results indicated that the model was statistically reliable in predicting graduation rates, $R^2 = .343$, $R^2_{adj} = .334$, $F(5,377) = 39.34$, $p < .001$ (see Table 30). The variables predicted over one-third of the variance of graduation rates.

Table 30. Model Summary for Research Questions 6[a]

R^2	R^2_{adj}	F	$df1$	$df2$	p
.343	.334	39.34	5	377	.000

[a]Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD

The five independent variables significantly contributed to the model: instruction $\beta = .27$, $t(377) = 5.96$, $p < .001$; academic support $\beta = .27$, $t(377) = 6.26$, $p < .001$; student services $\beta = -.20$, $t(377) = -4.60$, $p < .001$; institutional support $\beta = -.15$, $t(377) = -3.16$, $p < .01$ and institutional grants $\beta = .24$, $t(377) = 5.08$, $p < .001$ There was a positive relationship between instruction, academic support, and institutional grant expenditures and 6-year

graduation rates. There was a negative relationship between student services and institutional support expenditures and 6-year graduation rates. Means, standard deviations and regression coefficients for percentage of institutional expenditures and graduation rates are presented in Table 31.

Table 31. Means, Standard Deviations, and Summary of Simultaneous Regression Analysis for Percentage of Institutional Expenditures Variables Predicting Graduation Rates at Private Baccalaureate Liberal and General Institutions (N = 383)

Variable	Mean %	*SD*	*B*	*SE B*	β
Instruction (AVPEI)	32.95	7.02	50.56	8.48	.27***
Academic Support (AVPEAS)	7.88	3.10	26.40	4.22	.27***
Student Services (AVPESS)	14.08	4.26	-24.85	5.41	-.20***
Institutional Support (AVPEIS)	19.88	5.53	-22.79	7.21	-.15**
Institutional Grants (AVPEIG)	22.63	9.60	18.18	3.58	.24***
Graduation (GRAD)	56.31	18.22			

Note. Percentages may not sum to 100 due to rounding.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Percentage of Institutional Expenditures, Institutional Selectivity and Graduation Rates

Research Question 7: Did institutional selectivity and the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants significantly predict 6-year graduation rates at private Baccalaureate Liberal and General institutions?

Institutional selectivity was added as an independent variable to investigate if institutional selectivity and average percentages of institutional expenditures predicted graduation rates.

Standard multiple regression was conducted to determine the accuracy of the independent variables of instruction (AVPEAS), academic services (AVPEAS), student services (AVPESS), institutional support (AVISES), institutional grants (AVIGES) and institutional selectivity (INS SELECT) predicting 6-year graduation rates (GRAD). Data screening eliminated 90 institutions due to missing data. Three institutions were identified as outliers and eliminated. Evaluation of linearity led to the natural log transformation of the variables: AVIES, AVASES, AVSSES, AVISES, and AVIGES. Results indicated that the independent variables were statistically significant in predicting graduation rates: $R^2 = .61$, $R^2_{adj} = .60$, $F(6,365) = 95.58$, $p < .001$. Sixty percent of the variance of graduation rates was explained when institutional selectivity was added to the model compared to 33% with the original model (see Table 32).

Table 32. Model Summary for Research Questions 6 and 7.

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Graduation						
Research Question 6[a]	.343	.334	39.34	5	377	.000
Research Question 7[b]	.609	.602	94.58	6	365	.000

[a] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD

[b] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG, INS SELECT. Dependent variable: GRAD

Regression coefficients indicated that all of the variables significantly contributed to graduation rates: instruction $\beta = .14$, $t(365) = 3.82$, $p < .001$; academic support $\beta = .14$, $t(365) = 4.16$, $p < .001$; student services $\beta = -.08$, $t(365) = -2.16$, $p < .05$; institutional support $\beta = -.09$, $t(365) = -2.49$, $p < .05$; institutional grants $\beta = .15$, $t(365) = 3.96$, $p < .001$; and institutional selectivity $\beta = .58$, $t(365) = 15.93$, $p < .001$. There was a positive relationship

between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates and between institutional selectivity and 6-year graduation rates. There was a negative relationship between expenditures for student services and institutional support and 6-year graduation rates.

In the previous regression model that examined the relationship between the percentage of institutional expenditures and graduation, all of the institutional expenditure variables significantly contributed to graduation rates. Table 33 provides a comparison of the regression coefficients for the models that only contained the independent variables of percentage of institutional expenditures and the model that included institutional selectivity and percentage of institutional expenditures.

Table 33. Means, Standard Deviations and Summary of Regression Coefficients for Research Question 6 (N = 383): Percentage of Institutional Expenditures and Graduation Rates and Research Question 7 (N = 372): Percentage of Institutional Expenditures, Institutional Selectivity and Graduation Rates

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (AVPEI) (%)					
Research Question 6[a]	32.95	7.02	50.56	8.48	.27***
Research Question 7[b]	33.13	6.94	26.03	6.81	.14***
Academic Support (AVPEAS) (%)					
Research Question 6[a]	7.88	3.10	26.40	4.22	.27***
Research Question 7[b]	7.95	3.10	14.02	3.37	.14***
Student Services (AVPESS) (%)					
Research Question 6[a]	14.08	4.26	-24.85	5.41	-.20***
Research Question 7[b]	14.05	4.25	-9.22	4.28	-.08*
Institutional Support (AVPEIS) (%)					
Research Question 6[a]	19.88	5.53	-22.79	7.21	-.15**
Research Question 7[b]	19.88	5.53	-14.27	5.72	-.09*
Institutional Grants (AVPEIG) (%)					
Research Question 6[a]	22.63	9.60	18.18	3.58	.24***
Research Question 7[b]	22.65	9.59	11.12	2.81	.15***
Institutional Selectivity (INS SELECT)					
Research Question 7[b]	3.28	1.24	8.44	.53	.58***
Graduation (GRAD) (%)					
Research Question 6[a]	56.31	18.22			
Research Question 7[b]	56.93	17.98			

Note. Percentages may not sum to 100 due to rounding.

[a] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD

[b] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG, INS SELECT. Dependent variable: GRAD

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Research Question 8: For institutions with differing levels of institutional selectivity, did the percentage of institutional expenditures for instruction, academic support, student services, institutional support, and institutional grants predict 6-year graduation rates?

Institutions were divided into two levels of institutional selectivity: low selectivity and high selectivity based on procedures outlined for Research Question 4. Using the variables of institutional expenditures and retention rates, discriminant analysis procedures of Tests of Equality of Group Means, Box's M, and Classification of Predicted Group Membership were utilized to identify similarities and differences among the six levels of institutional selectivity. Discriminant analysis was conducted to examine if the variables of average institutional expenditures per student for instruction (AVPEI), academic support (AVPEIS), student services (AVPEAS) institutional support (AVPESS), institutional grants (AVPEIG) and 6-year graduation rates (GRAD) predicted differences in the six levels of institutional selectivity.

Results of the Tests of Equality of Group means indicated that there were significant differences in institutional selectivity based on the predictor variables (see Table 34). Box's M test also indicated that the covariance matrices of the groups were significantly different: Box's M = $F(105, 31865.55) = 2.94$, $p < .001$. The results of the Test of Equality of Group Means and Box's M verified that there were significant differences in institutional expenditures and graduation rates due to institutional selectivity. Classification results for predicted group membership were then analyzed.

Table 34. Test of Equality of Group Means for Institutional Expenditures, Graduation and Institutional Selectivity

Variable	Wilks' Lamda	*F*	*df1*	*df2*	*p*
Instruction (AVPEI)	.88	10.27	5	366	.000
Academic Support (AVPEAS)	.92	6.75	5	366	.000
Student Services (AVPESS)	.96	2.95	5	366	.000
Institutional Support (AVPEIS)	.88	9.78	5	366	.000
Institutional Grants (AVPEIG)	.89	8.83	5	366	.000
Graduation (GRAD)	.43	98.74	5	366	.000

Classification results for predicted group membership highlighted two patterns within the data. Institutions with selectivity levels of 1, 2, or 3 were most likely to be predicted as members of Level 1, 2, or 3. Approximately 74% of Level 1 institutions (noncompetitive) were predicted to be members of Level 1, 2 or 3. Ninety-two percent of Level 2 institutions (less competitive) were predicted to be members of Level 1, 2, or 3, and 70% of Level 3 institutions (competitive) were predicted to be members of Level 1, 2, or 3.

Institutions with selectivity levels of 4, 5, or 6 were most likely to be predicted as members of Level 4, 5, or 6. Approximately 77% of Level 4 (more competitive) institutions were predicted to be members of Levels 4, 5, or 6; 100% of Level 5 (highly competitive) institutions were predicted to be members of Levels 4, 5 or 6; and 100% of Level 6 institutions (most competitive) were predicted to be members of 5 or 6. Table 35 presents the classification results for predicted group membership.

Table 35. Classification Results for Predicted Group Membership for Percentage of Institutional Expenditures, Graduation Rates, and Institutional Selectivity

Original Level of Institutional Selectivity	Predicted Group Membership (%)					
	1	2	3	4	5	6
1 (low)	**26.1**	**30.4**	**17.4**	13.0	8.7	4.3
2	**21.8**	**50.0**	**20.5**	3.8	0	3.8
3	**17.1**	**17.9**	**35.0**	26.8	3.3	0
4	6.8	4.5	11.4	**53.4**	**20.5**	**3.4**
5	0	0	0	**17.9**	**66.7**	**15.4**
6 (high)	0	0	0	0	**4.8**	**95.2**

As a result of the classification of predicted group membership, institutional selectivity levels of 1, 2, 3 were combined to form one subgroup labeled "low selectivity" and institutions with selectivity levels of 4, 5 6, were combined to form another subgroup: "high selectivity."

Standard multiple regression was performed on each subgroup. For each subgroup, independent variables were average institutional expenditures per student for instruction, (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), and institutional grants (AVIGES). The dependent variable was 6-year graduation rate (GRAD). Ninety institutions were eliminated due to missing data; three institutions were identified as outliers and eliminated. Evaluation of linearity led to the natural log transformation of the variables: AVIES, AVASES, AVSSES, AVISES, and AVIGES. Percentage of institutional expenditures significantly predicted graduation rates for the low

selectivity institutions: $R^2 = .242$, $R^2_{adj} = .225$, $F(5,218) = 13.94$, $p < .001$ and high selectivity institutions: $R^2 = .263$, $R^2_{adj} = .237$, $F(5,142) = 10.12$, $p < .001$. For low selectivity institutions, the independent variables accounted for 24.2% of the variance in graduation rates and for high selectivity institutions, the independent variables accounted for 26.3% of the variance in graduation rates (see Table 36).

Table 36. Model Summary of Low Selectivity and High Selectivity Institutions for Percentage of Institutional Expenditures and Six-Year Graduation Rates

Model	R^2	R^2_{adj}	F	*df1*	*df2*	*p*
Graduation[a]						
Low Selectivity	.242	.225	13.94	5	218	.000
High Selectivity	.263	.237	10.12	5	142	.000

[a]Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD

For low selectivity institutions, all variables significantly contributed to the model: instruction $\beta = .22$, $t(218) = 3.42$, $p = .001$; academic support $\beta = .14$, $t(218) = 2.39$, $p < .05$; student services $\beta = -.15$, $t(218) = -2.23$, $p < .05$; institutional support $\beta = -.14$, $t(218) = -2.11$, $p < .05$ and institutional grants $\beta = .32$, $t(218) = 4.66$, $p < .001$. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and first-year retention rates. There was a negative relationship between expenditures of student services and institutional support and 6-year graduation rates.

For high selectivity institutions, instruction $\beta = .27$, $t(142) = 3.53$, $p < .001$ and academic support $\beta = .38$, $t(142) = 4.82$, $p < .001$ positively and significantly contributed to the model. For additional information regarding the regression coefficients, see Table 37.

The mean graduation rate for low selectivity institutions was 47% and the mean graduation rate for high selectivity institutions was 71%. Except for expenditures in student services, the standard deviations for the other institutional expenditure categories and graduation rates were higher at low selectivity institutions than high selectivity institutions. This indicates that there was larger variability in the expenditures of instruction, academic support, institutional support, and institutional grants and graduation rates at low selectivity institutions.

High selectivity institutions dedicated a larger percentage of their institutional expenditures to the areas of instruction (35.12 vs. 31.82), academic support (8.70 vs. 7.45), and institutional grants (24.64 vs. 21.34) than low selectivity institutions. Low selectivity institutions dedicated a larger percentage of their institutional expenditures to the areas of student services (14.52 vs. 13.34) and institutional support (21.15 vs. 17.96) than high selectivity institutions.

Table 37. Summary of Means, Standards Deviations, and Regression Coefficients for Low Selectivity Institutions (N=224) and High Selectivity Institutions (N=148) for Percentage of Institutional Expenditures and Six-Year Graduation Rates

Variable	*Mean* %	*SD*	*B*	*SE B*	β
Instruction (AVPEI)					
Low Selectivity	31.82	7.12	29.77	8.71	.22***
High Selectivity	35.12	6.15	44.69	12.67	.27***
Academic Support (AVPEAS)					
Low Selectivity	7.45	3.10	10.61	4.44	.14*
High Selectivity	8.70	2.95	29.06	6.03	.38***
Student Services (AVPESS)					
Low Selectivity	14.52	4.21	-14.70	6.60	-.15*
High Selectivity	13.34	4.23	-4.90	6.12	-.06
Institutional Support (AVPEIS)					
Low Selectivity	21.15	5.97	-15.66	7.43	-.14*
High Selectivity	17.96	4.10	-4.93	10.78	-.04
Institutional Grants (AVPEIG)					
Low Selectivity	21.34	9.71	17.02	3.65	.32***
High Selectivity	24.64	9.08	-3.09	5.53	-.05
Graduation (GRAD)					
Low Selectivity	47.31	14.02			
High Selectivity	71.48	12.79			

Note. Percentages may not sum to 100 due to rounding.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Summary

Research Questions 5- 8 viewed institutional expenditures as the percentage of expenditures spent per student on retention and graduation rates at private Baccalaureate Liberal and General colleges and universities. Standard multiple regression was conducted to determine the accuracy of the independent variables of percentage of institutional expenditures predicting first-year retention rates and 6-year graduation rates. Results of

standard multiple regression indicated that the models significantly predicted retention and graduation.

Institutional selectivity was added as an independent variable to examine if institutional selectivity and percentage of institutional expenditures predicted retention and graduation rates. Results of standard multiple regression indicated that the models significantly predicted retention and graduation.

Using discriminant analysis, institutions were categorized into one of two subgroups: low selectivity and high selectivity. Standard multiple regression was conducted to determine the accuracy of percentage of institutional expenditures predicting retention and graduation rates. Results indicated that percentage of institutional expenditures significantly predicted retention and graduation for low selectivity and high selectivity institutions. Table 38 provides the means and standard deviations of the independent and dependent variables for Research Questions 5 - 8. Table 39 provides the summary for each model that examined the role of percentage of institutional expenditures and first-year retention and graduation rates.

Table 38. Means, Standard Deviations, and Regression Coefficients for Research Questions 5 - 8: Percentage of Institutional Expenditures per Student, Institutional Selectivity, Retention and Graduation Rates

Variable	Mean	*SD*
Instruction (%)		
Research Question 5[a]	33.01	7.70
Research Question 6[b]	32.95	7.02
Research Question 7[c] - Retention	33.20	7.63
Research Question 7[d] - Graduation	33.13	6.94
Research Question 8[a] - Retention		
Low Selectivity	32.05	8.07
High Selectivity	34.00	6.52
Research Question 8[b] - Graduation		
Low Selectivity	31.82	7.12
High Selectivity	35.12	6.15
Academic Support (%)		
Research Question 5[a]	8.02	3.53
Research Question 6[b]	7.88	3.10
Research Question 7[c] - Retention	8.08	3.50
Research Question 7[d] - Graduation	7.95	3.10
Research Question 8[a] - Retention		
Low Selectivity	7.61	3.66
High Selectivity	8.82	3.12
Research Question 8[b] - Graduation		
Low Selectivity	7.45	3.10
High Selectivity	8.70	2.95
Student Services (%)		
Research Question 5[a]	14.65	4.86
Research Question 6[b]	14.08	4.26
Research Question 7[c] - Retention	14.63	4.87
Research Question 7[d] - Graduation	14.05	4.25
Research Question 8[a] - Retention		
Low Selectivity	14.94	4.97
High Selectivity	14.15	4.67
Research Question 8[b] - Graduation		
Low Selectivity	14.52	4.21
High Selectivity	13.34	4.23
Institutional Support (%)		
Research Question 5[a]	20.06	6.26
Research Question 6[b]	19.88	5.53
Research Question 7[c] - Retention	20.03	6.21
Research Question 7[d] - Graduation	19.88	5.53
Research Question 8[a] - Retention		
Low Selectivity	21.13	6.86
High Selectivity	18.31	4.54
Research Question 8[b] - Graduation		
Low Selectivity	21.15	5.97
High Selectivity	17.96	4.10

Table 38 (continued)

Variable	Mean	*SD*
Institutional Grants (%)		
Research Question 5[a]	23.06	10.10
Research Question 6[b]	22.63	9.60
Research Question 7[c] - Retention	23.15	10.03
Research Question 7[d] - Graduation	22.65	9.59
Research Question 8[a] - Retention		
Low Selectivity	22.15	10.28
High Selectivity	24.69	9.44
Research Question 8[b] - Graduation		
Low Selectivity	21.34	9.71
High Selectivity	24.64	9.08
Institutional Selectivity		
Research Question 7[c]	3.26	1.23
Research Question 7[d]	3.28	1.24
Retention RETEN (%)		
Research Question 5[a]	75.53	11.60
Research Question 7[c] - Retention	75.85	11.49
Research Question 8[a] - Retention		
Low Selectivity	69.99	9.40
High Selectivity	84.98	7.97
Graduation GRAD (%)		
Research Question 6[b]	56.31	18.22
Research Question 7[d] - Graduation	56.93	17.98
Research Question 8[b] - Graduation		
Low Selectivity	47.31	14.02
High Selectivity	71.48	12.79

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN
[b] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD
[c] Independent variables: PEI, PEAS, PESS, PEIS, PEIG.INS SELECT. Dependent variable: RETEN
[d] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG, INS SELECT. Dependent variable: GRAD
$*p < .05$. $**p < .01$. $***p \leq .001$.

Table 39. Model Summary for Research Questions 5, 6, 7, and 8.

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Retention						
Research Question 5[a]	.286	.277	30.57	5	381	.000
Research Question 7[b]	.588	.581	87.74	6	369	.000
Retention - Research Question 8[a]						
Low Selectivity	.194	.176	10.72	5	223	.000
High Selectivity	.273	.247	10.57	5	141	.000
Graduation						
Research Question 6[c]	.343	.334	39.34	5	377	.000
Research Question 7[d]	.609	.602	94.58	6	365	.000
Graduation - Research Question 8[c]						
Low Selectivity	.242	.225	13.94	5	218	.000
High Selectivity	.263	.237	10.12	5	142	.000

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN
[b] Independent variables: PEI, PEAS, PESS, PEIS, PEIG.INS SELECT. Dependent variable: RETEN
[c] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD
[d] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG, INS SELECT. Dependent variable: GRAD

Standard multiple regression results indicated that for all models, the independent variables predicted retention and graduation rates. However, the independent variables that significantly contributed to retention and graduation rates varied from model to model. The variable of instruction was the only variable that significantly contributed to retention and graduation rates in each model.

Except for the model that examined the relationship between institutional expenditures and retention rates at low selectivity institutions, academic support expenditures significantly and positively contributed to all the models predicting retention and graduation

rates. With the exception of the model that examined the relationship between the percentage of institutional expenditures and graduation rates at high selectivity institutions, student services expenditures significantly but negatively contributed to all models. Institutional grants significantly and positively contributed to all models except for the models that analyzed high selectivity institutions. For high selectivity institutions, institutional grants did not significantly predict retention or graduation rates. Table 40 provides a list of the variables that significantly contributed to each model.

Table 40. Variables that significantly contributed to each model: Research Questions 5 - 8.

Model	Variables	*B*	*SE B*	β
Retention - Research Question 5[a]	Instruction	26.30	4.95	.25***
	Academic Support	12.20	2.38	.23***
	Student Services	-19.37	3.27	-.28***
	Institutional Support	-12.70	3.94	-.15***
	Institutional Grants	10.76	2.13	.25***
Retention -Research Question 7[b]	Instruction	14.12	3.88	.13***
	Academic Support	7.06	1.88	.13***
	Student Services	-11.78	2.55	-.17***
	Institutional Grants	7.34	1.67	.17***
	Institutional Selectivity	5.68	.34	.61***
Retention - Research Question 8[a]				
Low Selectivity	Instruction	16.75	5.21	.21***
	Student Services	-14.39	3.87	-.26**
	Institutional Grants	10.67	2.23	.34***
Retention - Research Question 8[a]				
High Selectivity	Instruction	17.50	7.03	.19*
	Academic Support	16.13	3.19	.39***
	Student Services	-10.38	3.65	-.21**
Graduation - Research Question 6[c]	Instruction	50.56	8.48	.27***
	Academic Support	26.40	4.22	.27***
	Student Services	-24.85	5.41	-.20***
	Institutional Support	-22.79	7.21	-.15**
	Institutional Grants	18.18	3.58	.24***
Graduation - Research Question 7[d]	Instruction	26.03	6.81	.14***
	Academic Support	14.02	3.37	.14***
	Student Services	-9.22	4.28	-.08*
	Institutional Support	-14.27	5.72	-.09*
	Institutional Grants	11.12	2.81	.15***
	Institutional Selectivity	8.44	.53	.58***
Graduation - Research Question 8[c]				
Low Selectivity	Instruction	29.77	8.71	.22***
	Academic Support	10.61	4.44	.14*
	Student Services	-14.70	6.60	-.15*
	Institutional Support	-15.66	7.43	-.14*
	Institutional Grants	17.02	3.65	.32***
Graduation - Research Question 8[c]				
High Selectivity	Instruction	44.69	12.67	.27***
	Academic Support	29.06	6.03	.38***

[a] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN

[b] Independent variables: PEI, PEAS, PESS, PEIS, PEIG.INS SELECT. Dependent variable: RETEN

[c] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD

[d] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG, INS SELECT.. Dependent variable: GRAD

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Longitudinal Analysis

Amount of Expenditures Per Student and Retention and Graduation Rates 1992, 1997, 2002

Research Question 9: For private Baccalaureate Liberal and General institutions, did the amount of money spent per student on instruction, academic support, student services, institutional support, and institutional grants predict first-year retention and six-year graduation rates for 1992, 1997, and 2002?

The sample for Research Questions 9 consisted of all private Baccalaureate Liberal and General institutions that provided complete data for 1992, 1997, and 2002. Any institution that did not provide data for any of the three years was omitted from the study. A consistent data set was used to assess the relationship between institutional expenditures and retention and graduation rates over the 10-year period.

Amount of Expenditures and Retention Rates: 1992, 1997, 2002. Standard multiple regression was conducted to determine the accuracy of institutional expenditures per student predicting first-year retention rates. Three multiple regression analyses were conducted, one using the data for 1992, one using the data for 1997, and one utilizing data for 2002. For each regression analysis, the independent variables were instruction (IES), academic support (ASES), student services (SSES), institutional support (ISES), and institutional grants (IGES). First-year retention rates (RETEN) was the dependent variable. Due to the elimination of missing data and outliers, 256 institutions were analyzed for 1992, 1997, and 2002. Evaluation of linearity led to the natural log transformation of the independent variables. For each year (1992, 1997, 2002), the independent variables significantly predicted retention: 1992: $R^2 = .477$, $R^2_{adj} = .467$, $F(5,250) = 45.63$, $p < .001$; 1997: $R^2 = .511$, $R^2_{adj} = .502$, $F(5,250) = 52.34$, $p < .001$; and 2002: $R^2 = .564$, $R^2_{adj} = .555$, $F(5,250) = 64.68$, $p <$

.001. In 1992, the independent variables accounted for 47.7% of the variance in retention, in 1997 these variables accounted for 51.1% of the variance, and in 2002 it increased to 56.4%. Model summaries for each year are illustrated in Table 41.

Table 41. Model Summary for Institutional Expenditures per Student and Retention Rates for 1992, 1997, and 2002 (N=262)

Year	R^2	R^2_{adj}	F	df1	df2	p
1992	.477	.467	45.63	5	250	.000
1997	.511	.502	52.34	5	250	.000
2002	.564	.555	64.68	5	250	.000

For 1992 the independent variable of instruction $\beta = .63$, $t(250) = 8.57$, $p < .001$; 1997 contributed to first-year retentions rates significantly and positively. For 1997 the independent variables of instruction $\beta = .46$, $t(250) = 6.27$, $p < .001$; academic support $\beta = .29$, $t(250) = 4.22$, $p < .001$; and institutional grants $\beta = .14$, $t(250) = 2.47$, $p < .05$ significantly and positively contributed to the model. For 2002 instruction $\beta = .54$, $t(250) = 7.13$, $p < .001$; academic support $\beta = .16$, $t(250) = 2.40$, $p < .05$; and institutional grants $\beta = .22$, $t(250) = 4.16$, $p < .001$ significantly and positively contributed to the model.

Institutional expenditures per student increased for each 5- year period from 1992 to 2002. Retention rates decreased slightly from 78.1% in 1992 to 76.6% in 1997 but then increased from 76.6% in 1997 to 77.6% in 2002. A summary of means, standard deviations, and regression coefficients for 1992, 1997, and 2002 is included in Table 42.

Table 42. Summary of Means, Standard Deviations, and Regression Coefficients for Institutional Expenditures per Student Variables Predicting Retention Rates at Private Baccalaureate Liberal and General Institutions for 1992, 1997, and 2002 (N = 256)

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (IES)					
1992	$4571.92	1900.91	44.07	5.14	.63***
1997	$6403.16	2885.56	25.22	4.03	.46***
2002	$8416.02	4017.20	29.27	4.11	.54***
Academic Support (ASES)					
1992	$1027.26	620.36	5.60	2.86	.12
1997	$1498.45	951.75	10.27	2.43	.29***
2002	$2112.33	1400.66	5.32	2.22	.16*
Student Services (SSES)					
1992	$1617.04	652.59	-1.65	3.81	-.03
1997	$2491.07	1128.50	-2.84	3.00	-.06
2002	$3617.11	1657.33	-3.15	3.10	-.06
Institutional Support (ISES)	$2477.94	1057.50	-6.11	4.00	-.09
1992	$3490.68	1500.07	-3.37	3.43	-.06
1997	$4699.06	2214.95	-.81	2.86	-.02
2002					
Institutional Grants (IGES)					
1992	$2452.39	1320.29	3.08	2.41	.08
1997	$4422.86	2315.66	4.77	1.94	.14*
2002	$5869.39	2715.70	7.77	1.87	.22***
Retention (RETEN) (%)					
1992	78.08	12.06			
1997	76.61	10.32			
2002	77.56	10.49			

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Amount of Expenditures and Graduation Rates: 1992, 1997, 2002. Standard multiple regression was conducted to assess the ability of institutional expenditures to predict graduation rates for 1992, 1997, and 2002. Three multiple regression analyses were conducted, one using the data for 1992, one using the data for 1997, and one utilizing data for 2002. For each regression analysis, the independent variables were average institutional expenditures per student for instruction, (AVIES), academic support (AVASES), student services (AVSSES), institutional support (AVISES), and institutional grants (AVIGES). The dependent variable was graduation (GRAD). Data were screened for missing data and outliers resulting in a data set of 276 institutions. Evaluation of linearity led to the natural log transformation of the variables AVIES, AVASES, AVSSES, AVSES, and AVIGES.

For each year (1992, 1997, 2002), the independent variables significantly predicted retention: 1992: $R^2 = .551$, $R^2_{adj} = .542$, $F(5,270) = 66.18$, $p < .001$; 1997: $R^2 = .673$, $R^2_{adj} = .667$, $F(5,270) = 111.06$, $p < .001$; and 2002: $R^2 = .604$, $R^2_{adj} = .597$, $F(5,270) = 82.53$, $p < .001$.The independent variables significantly predicted graduation rates accounting for 55.1% of the variance in 1992, 67.3% in 1997, and 60.4% in 2002 (see Table 43).

Table 43. Model Summary for Institutional Expenditures per Student and Graduation Rates for 1992, 1997, and 2002 (N=276)

Year	R^2	R^2_{adj}	F	*df1*	*df2*	*p*
1992	.551	.542	66.18	5	270	.000
1997	.673	.667	111.06	5	270	.000
2002	.604	.597	82.53	5	270	.000

Except for student support expenditures, all variables significantly contributed to the model in 1992, 1997, and 2002. For 1992: instruction $\beta = .62$, $t(270) = 9.37$, $p < .001$, academic support $\beta = .14$, $t(270) = 2.42$, $p < .05$, institutional support $\beta = -.12$, $t(270) = -2.26$, $p < .05$, and institutional grants $\beta = .11$, $t(270) = 2.01$, $p < .05$.

Regression coefficients for 1997 were: instruction $\beta = .56$, $t(270) = 9.18$, $p < .001$, academic support $\beta = .20$, $t(270) = 3.85$, $p < .001$, institutional support $\beta = -.17$, $t(270) = -3.47$, $p = .001$, and institutional grants $\beta = .24$, $t(270) = 4.94$, $p < .001$.

Regression coefficients for 2002 were: instruction $\beta = .57$, $t(270) = 8.74$, $p < .001$, academic support $\beta = .27$, $t(270) = 4.61$ $p < .001$, institutional support $\beta = -.15$, $t(270) = -2.83$, $p < .01$, and institutional grants $\beta = .20$, $t(270) = 3.87$, $p < .001$.

For the three years, there was a positive relationship between expenditures for instruction, academic support and institutional grants and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates. Institutional expenditures per student increased during each 5- year period from 1992 to 2002. Graduation rates decreased slightly from 57.9% in 1992 to 57.3% in 1997 but then increased from 57.3% in 1997 to 60% in 2002. A summary of means, standard deviations, and regression coefficients are included in Table 44.

Table 44. Comparison of the Means, Standard Deviations, and Regression Coefficients for Institutional Expenditures per Student Variables Predicting Graduation Rates at Private Baccalaureate Liberal and General Institutions for 1992, 1997, and 2002 (N = 276)

Variable	Mean	*SD*	*B*	*SE B*	β
Instruction (AVIES)					
1992	$3916.77	1600.62	67.63	7.22	.62***
1997	$5226.92	2264.06	55.34	6.03	.56***
2002	$7506.28	3574.60	49.04	5.61	.57***
Academic Support (AVASES)					
1992	$874.46	539.35	10.18	4.20	.14*
1997	$1201.25	732.21	13.52	3.51	.20***
2002	$1840.92	1178.05	15.74	3.41	.27***
Student Services (AVSSES)					
1992	$1382.67	537.65	2.49	6.45	.02
1997	$1947.36	766.85	3.87	5.12	.04
2002	$3103.62	1336.15	-5.26	4.98	-.06
Institutional Support (AVISES)					
1992	$2242.28	938.50	-12.46	5.51	-.12*
1997	$2870.71	1128.92	-17.83	5.13	-.17***
2002	$4197.08	1770.14	-14.10	4.99	-.15**
Institutional Grants (AVIGES)					
1992	$1799.44	983.61	6.77	3.37	.11*
1997	$3328.35	1768.62	14.20	2.87	.24***
2002	$5094.86	2563.69	10.03	2.59	.20***
Graduation GRAD (%)					
1992	57.92	17.95			
1997	57.33	17.37			
2002	60.00	16.60			

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Percentage of Institutional Expenditures and Retention and Graduation Rates: 1992, 1997, 2002

Research Question 10: For private Baccalaureate Liberal and General institutions, did the percentage of institutional expenditures on instruction, academic support, student services, institutional support, and institutional grants predict first year retention and six-year graduation rates for 1992, 1997, and 2002?

The final research question investigated the relationship between the percentage of institutional expenditures and first year retention rates and 6-year graduation rates for 1992, 1997, and 2002. Any institutions that did not provide data for any of the three years were omitted from the study. A consistent data set was used to assess the relationship between institutional expenditures and retention and graduation rates over the 10-year period.

Percentage of Institutional Expenditures and Retention Rates: 1992, 1997, 2002. Standard multiple regression procedures were used to determine the accuracy of percentage of institutional expenditures predicting first-year retention rates for 1992, 1997, 2002. Three multiple regression analyses were conducted, one using the data for 1992, one using the data for 1997, and one utilizing data for 2002. For each regression analysis, the independent variables were percentage of institutional expenditures for instruction (PEI), academic support (PEAS), student services (PESS), institutional support (PEIS), and institutional grants (PEIG). First-year retention rate (RETEN) was the dependent variable. Due to the elimination of missing data and outliers, 264 institutions were analyzed for 1992, 1997, and 2002. Evaluation of linearity led to the natural log transformation of the variables PEI, PEAS, PESS, PEIS, and PEIG. For each year (1992, 1997, 2002), the independent variables significantly predicted retention: 1992: $R^2 = .273$, $R^2_{adj} = .259$, $F(5,258) = 19.40$, $p < .001$;

1997: $R^2 = .331$, $R^2_{adj} = .318$, $F(5,258) = 25.48$, $p < .001$; and 2002: $R^2 = .238$, $R^2_{adj} = .224$, $F(5,258) = 16.15$, $p < .001$. The independent variables significantly predicted retention rates for all three years. In 1992 the independent variables accounted for 27.3% of the variance, 33.1% in 1997, and 23.8% in 2002 (see Table 45).

Table 45. Model Summary for Percentage of Institutional Expenditures and Retention Rates for 1992, 1997, 2002 (N=264)

Year	R^2	R^2_{adj}	F	*df1*	*df2*	*p*
1992	.273	.259	19.40	5	258	.000
1997	.331	.318	25.48	5	258	.000
2002	.238	.224	16.15	5	258	.000

The five independent variables significantly contributed to the model for 1992, 1997, and 2002. For the year 1992 the variables of instruction $\beta = .32$, $t(258) = 5.85$, $p < .001$; academic support $\beta = .25$, $t(258) = 4.71$, $p < .001$; student services $\beta = -.14$, $t(258) = -2.63$, $p < .01$; institutional support $\beta = -.13$, $t(258) = -2.37$, $p < .05$, and institutional grants $\beta = .23$, $t(258) = 4.17$, $p < .001$ significantly contributed to the model. There was a negative relationship between expenditures for student services and institutional support and retention rates.

For the year 1997, the variables of instruction $\beta = .22$, $t(258) = 4.02$, $p < .001$; academic support $\beta = .41$, $t(258) = 7.46$, $p < .001$; student services $\beta = -.17$, $t(258) = -3.12$, $p < .01$; institutional support $\beta = -.18$, $t(258) = -3.56$, $p < .001$, and institutional grants $\beta = .16$, $t(258) = 2.97$, $p < .01$ significantly contributed to the model. There was a negative

relationship between expenditures for student services and institutional support and retention rates.

For the year 2002, the variables of instruction $\beta = .18$, $t(258) = 3.16$, $p < .01$; academic support $\beta = .28$, $t(258) = 4.96$, $p < .001$; student services $\beta = -.24$, $t(258) = -4.21$, $p < .001$; institutional support $\beta = -.12$, $t(258) = -2.15$, $p < .05$; and institutional grants $\beta = .17$, $t(258) = 2.97$, $p < .01$ significantly contributed to the model. For each year, there was a positive relationship between expenditures for instruction, academic support, and institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and institutional support expenditures and first-year retention rates. Table 46 provides the regression coefficients for the percentage of institutional expenditures predicting retention rates for 1992, 1997, and 2002.

Table 46. Comparison of the Means, Standard Deviations, and Regression Coefficients for Percentage of Institutional Expenditures per Student Predicting Retention Rates at Private Baccalaureate Liberal and General Institutions for 1992, 1997, and 2002 (N = 264)

Variable	Mean %	*SD*	*B*	*SE B*	β
Instruction (PEI)					
1992	29.25	5.39	45.92	7.85	.32***
1997	32.54	7.23	23.07	5.74	.22***
2002	34.06	6.38	22.37	7.20	.18**
Academic Support (PEAS)					
1992	6.46	2.66	16.44	3.49	.25***
1997	7.45	3.17	20.65	2.77	.41***
2002	8.28	3.32	15.29	3.09	.28***
Student Services (PESS)					
1992	10.40	2.93	-11.20	4.56	-.14**
1997	12.89	4.39	-10.64	3.41	-.17**
2002	14.90	4.70	-17.64	4.19	-.24***
Institutional Support (PEIS)					
1992	16.10	4.20	-13.70	5.78	-.13*
1997	18.17	5.07	-16.51	4.64	-.18***
2002	19.44	5.94	-10.05	4.68	-.12*
Institutional Grants (PEIG)					
1992	15.18	5.75	13.12	3.14	.23***
1997	22.25	9.96	6.82	2.30	.16**
2002	24.05	9.48	7.62	2.56	.17**
Retention (RETEN)					
1992	78.89	12.08			
1997	77.24	10.39			
2002	78.04	10.92			

Note. Percentages may not sum to 100 due to rounding.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Percentage of Institutional Expenditures and Graduation Rates: 1992, 1997, 2002.

Standard multiple regression was conducted to assess the ability of institutional expenditures to predict graduation rates for 1992, 1997, and 2002. Three multiple regression analyses were conducted, one using the data for 1992, one using the data for 1997, and one utilizing data for 2002. For each regression analysis, the independent variables were average institutional

expenditures per student for instruction (AVPEI), academic support (AVPEAS), student services (AVPESS), institutional support (AVPEIS), and institutional grants (AVPEIG). The dependent variable was graduation (GRAD). Data were screened for missing data and outliers resulting in a data set of 279 institutions. Evaluation of linearity led to the natural log transformation of the variables AVPEI, AVPEAS, AVPESS, AVPEIG, and AVPEIS.

For each year (1992, 1997, 2002), the independent variables significantly predicted retention: 1992: $R^2 = .340$, $R^2_{adj} = .328$, $F(5,273) = 28.18$, $p < .001$; 1997: $R^2 = .434$, $R^2_{adj} = .423$, $F(5,273) = 41.79$, $p < .001$; and 2002: $R^2 = .365$, $R^2_{adj} = .354$, $F(5,273) = 31.45$, $p < .001$.The independent variables significantly predicted graduation rates accounting for 34% of the variance in 1992, 43.4% in 1997, and 36.5% in 2002 (see Table 47).

Table 47. Model Summary for Percentage of Institutional Expenditures and Graduation Rates for 1992, 1997, 2002

Year	R^2	R^2_{adj}	F	*df1*	*df2*	*p*
1992	.340	.328	28.18	5	273	.000
1997	.434	.423	41.79	5	273	.000
2002	.365	.354	31.45	5	273	.000

For 1992, the variables of instruction $\beta = .23$, $t(273) = 4.35$, $p < .001$; academic support $\beta = .35$, $t(273) = 7.02$, $p < .001$; student services $\beta = -.15$, $t(273) = -2.99$, $p < .01$; and institutional grants $\beta = .27$, $t(273) = 5.33$, $p < .001$ significantly contributed to graduation. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between student services expenditures and 6-year graduation rates.

In 1997 and 2002 all five independent variables significantly contributed to the model. For 1997 the variables of: instruction $\beta = .26$, $t(273) = 5.27$, $p < .001$, academic support $\beta = .42$, $t(273) = 8.84$, $p < .001$, student services $\beta = -.14$, $t(273) = -3.02$, $p < .01$; institutional support $\beta = -.14$, $t(273) = -2.89$, $p < .01$, and institutional grants $\beta = .30$, $t(273) = 6.36$, $p < .001$ significantly contributed to the model.

For 2002 the variables of instruction $\beta = .24$, $t(273) = 4.59$, $p < .001$, academic support $\beta = .36$, $t(273) = 7.37$, $p < .001$, student services $\beta = -.24$, $t(273) = -4.79$, $p < .001$; institutional support $\beta = -.13$, $t(273) = -2.45$, $p < .05$; and institutional grants $\beta = .21$, $t(273) = 4.06$, $p < .001$ significantly contributed to the model. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between student services expenditures and 6-year graduation rates and institutional support expenditures and 6-year graduation rates. Table 48 provides a summary of the means, standard deviations, and regression coefficients for 1992, 1997, and 2002.

Table 48. Summary of Means, Standard Deviations, and Regression Coefficients for Percentage of Institutional Expenditures per Student Predicting Graduation Rates at Private Baccalaureate Liberal and General Institutions for 1992, 1997, and 2002 (N = 279)

Variable	*Mean* %	*SD*	*B*	*SE B*	β
Instruction (AVPEI)					
1992	29.67	5.37	48.96	11.26	.23***
1997	29.28	4.82	60.01	11.40	.26***
2002	33.73	6.47	43.40	9.47	.24***
Academic Support (AVPEAS)					
1992	6.28	2.26	37.11	5.28	.35***
1997	6.44	2.44	40.39	4.57	.42***
2002	7.93	3.01	32.53	4.41	.36***
Student Services (AVPESS)					
1992	10.54	2.57	-25.53	7.88	-.15**
1997	9.95	2.32	-20.93	6.94	-.14**
2002	14.19	4.15	-28.48	5.94	-.24***
Institutional Support (AVPEIS)					
1992	17.00	3.96	-17.97	9.15	-.11
1997	15.16	3.36	-25.71	8.89	-.14**
2002	19.02	4.47	-20.08	8.19	-.13*
Institutional Grants (AVPEIG)					
1992	13.28	5.06	23.29	4.37	.27***
1997	17.51	5.39	32.29	5.07	.30***
2002	23.30	9.65	13.57	3.45	.21***
Graduation (GRAD)					
1992	59.19	17.27			
1997	58.98	16.76			
2002	61.43	16.21			

Note. Percentages may not sum to 100 due to rounding.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Summary

Standard multiple regression was conducted to determine the accuracy of amount of institutional expenditures per student predicting first-year retention and 6-year graduation rates for 1992, 1997, and 2002. For each year, the institutional expenditures predicted first-

year retention rates and 6-year graduation rates. Standard multiple regression also was conducted to determine if percentage of institutional expenditures predicted first-year retention and 6-year graduation rates. For each year, percentage of institutional expenditures predicted first-year retention rates and 6-year graduation rates. The summary for each model is presented in Table 49.

Table 49. Model Summaries for Institutional Expenditures per Student and Retention and Graduation Rates for 1992, 1997, 2002 and Percentage of Expenditures and Retention and Graduation Rates for 1992, 1997, and 2002

Model	R^2	R^2_{adj}	F	$df1$	$df2$	p
Institutional Expenditures Per Student						
Retention[a]						
1992	.477	.467	45.63	5	256	.000
1997	.511	.502	52.34	5	256	.000
2002	.564	.555	64.68	5	256	.000
Graduation[b]						
1992	.551	.542	66.18	5	270	.000
1997	.673	.667	111.06	5	270	.000
2002	.604	.597	82.53	5	270	.000
Percentage of Institutional Expenditures						
Retention[c]						
1992	.273	.259	19.40	5	258	.000
1997	.331	.318	25.48	5	258	.000
2002	.238	.224	16.15	5	258	.000
Graduation[d]						
1992	.340	.328	28.18	5	273	.000
1997	.434	.423	41.79	5	273	.000
2002	.365	.354	31.45	5	273	.000

[a] Independent variables: IES, ASES, SSES, ISES, IGES. Dependent variable: RETEN
[b] Independent variables: AVIES, AVASES, AVSSES, AVISES, AVIGES. Dependent variable: GRAD.
[c] Independent variables: PEI, PEAS, PESS, PEIS, PEIG. Dependent variable: RETEN
[d] Independent variables: AVPEI, AVPEAS, AVPESS, AVPEIS, AVPEIG. Dependent variable: GRAD.

The variable of instruction expenditures per student significantly and positively contributed to retention and graduation for 1992, 1997, and 2002. The variables of academic support and institutional grants significantly and positively contributed to retention rates in 1997 and 2002 and for graduation rates for 1992, 1997, and 2002. There was a negative relationship between institutional support expenditures and graduation rates for 1992, 1997, and 2002 (see Table 50).

Table 50. List of variables that significantly contributed to each model for Research Question 9: Institutional Expenditures Per Student and Retention and Graduation Rates for 1992, 1997, and 2002

Model	Year	Variable	*B*	*SE B*	β
Retention	1992	Instruction	44.07	5.14	.63***
	1997	Instruction	25.22	4.03	.46***
		Academic Support	10.27	2.43	.29***
		Institutional Grants	4.77	1.94	.14*
	2002	Instruction	29.27	4.11	.54***
		Academic Support	5.32	2.22	.16*
		Institutional Grants	7.77	1.87	.22***
Graduation	1992	Instruction	67.63	7.22	.62***
		Academic Support	10.18	4.20	.14*
		Institutional Support	-12.46	5.51	-.12*
		Institutional Grants	6.77	3.37	.11*
	1997	Instruction	55.34	6.03	.56***
		Academic Support	13.52	3.51	.20***
		Institutional Support	-17.83	5.13	-.17***
		Institutional Grants	14.20	2.87	.24***
	2002	Instruction	49.04	5.61	.57***
		Academic Support	15.74	3.41	.27***
		Institutional Support	-14.10	4.99	-.15**
		Institutional Grants	10.03	2.59	.20***

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

In the models examining the percentage of institutional expenditures and retention and graduation rates, all five independent variables significantly contributed to retention rates for 1992, 1997, and 2002. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and first-year retention rates. There was a negative relationship between student services and institutional support expenditures and first-year retention rates.

For 1992, the variables of instruction, academic support, student services, and institutional grants significantly contributed to graduation rates. For 1997 and 2002, all five independent variables significantly contributed to graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between student services expenditures and 6-year graduation rates and institutional support expenditures and 6-year graduation rates. Table 51 lists the variables that significantly contributed to retention and graduation rates for 1992, 1997, and 2002.

Table 51. List of variables that significantly contributed to each model for Research Question 10: Percentage of Institutional Expenditures and Retention and Graduation Rates for 1992, 1997, and 2002

Model	Year	Variable	*B*	*SE B*	β
Retention	1992	Instruction	45.92	7.85	.32***
		Academic Support	16.44	3.49	.25***
		Student Services	-11.20	4.56	-.14**
		Institutional Support	-13.70	5.78	-.13*
		Institutional Grants	13.12	3.14	.23***
	1997	Instruction	23.07	5.74	.22***
		Academic Support	20.65	2.77	.41***
		Student Services	-10.64	3.41	-.17**
		Institutional Support	-16.51	4.64	-.18***
		Institutional Grants	6.82	2.30	.16**
	2002	Instruction	22.37	7.20	.18**
		Academic Support	15.29	3.09	.28***
		Student Services	-17.64	4.19	-.24***
		Institutional Support	-10.05	4.68	-.12*
		Institutional Grants	7.62	2.56	.17**
Graduation	1992	Instruction	48.96	11.26	.23***
		Academic Support	37.11	5.28	.35***
		Student Services	-25.53	7.88	-.15**
		Institutional Grants	23.29	4.37	.27***
	1997	Instruction	60.01	11.40	.26***
		Academic Support	40.39	4.57	.42***
		Student Services	-20.93	6.94	-.14**
		Institutional Support	-25.71	8.89	-.14**
		Institutional Grants	32.29	5.07	.30***
	2002	Instruction	43.40	9.47	.24***
		Academic Support	32.53	4.41	.36***
		Student Services	-28.48	5.94	-.24***
		Institutional Support	-20.08	8.19	-.13**
		Institutional Grants	13.57	3.45	.21***

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Summary

This quantitative study sought to determine if there was a relationship between institutional expenditures and retention and graduation rates at private Baccalaureate Liberal and General institutions. The independent variables were: instruction expenditures, academic support expenditures, student services expenditures, institutional support expenditures, and total institutional grants (scholarships, fellowships). The independent variables were calculated two ways: the actual dollars spent per student in each expenditure category and the percentage each category represented of the institution's total educational and general expenditures. The dependent variables were first-year retention rates and 6-year cohort graduation rates.

Standard multiple regression was used to investigate the relationship between institutional expenditures and retention and graduation rates. Research Questions 1- 4 examined the relationships between institutional expenditures per student and retention and graduation rates. Research Questions 5- 8 examined the relationship between the percentage of institutional expenditures and retention and graduation rates. For all analyses, 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. Table 52 presents the R^2 and the variables that significantly contributed to each model. Research Questions 9 - 10 examined if institutional expenditures per student and percentage of institutional expenditures predicted retention and graduation rates for 1992, 1997, and 2002. Table 53 presents the R^2 and the variables that significantly contributed to each model. The following chapter will provide a summary of these results and will discuss the implications of these results for practice and future research.

Table 52. Research Questions 1- 8: R^2 for each Model, Institutional Expenditures per Student and Percentage of Institutional Expenditures that Significantly Contributed to First-Year Retention and 6-year Graduation Rates

	Institutional Expenditures Per Student				Percentage of Institutional Expenditures			
	Retention				Retention			
R^2 and Variables	Research Question 1 (N=387)	Research Question 3 (N=376)	Research Question 4: Low Selectivity (N=230)	Research Question 4: High Selectivity (N=146)	Research Question 5 (N=387)	Research Question 7 (N=376)	Research Question 8: Low Selectivity (N=229)	Research Question 8: High Selectivity (N=148)
R^2	.555***	.635***	.323***	.440***	.286***	.588***	.194***	.273***
Instruction (β)	.54***	.33***	.42***	.35***	.25***	.13***	.21***	.19*
Academic Support(β)	.12*	-----	-----	.36***	.23***	.13***	-----	.39***
Student Services (β)	**-.12***	**-.13****	**-.20****	-----	**-.28*****	**-.17*****	**-.21****	**-.21*****
Institutional Support(β)	-----	-----	-----	-----	**-.15*****	-----	-----	-----
Institutional Grants (β)	.26***	.22***	.32***	-----	.25***	.17***	.34***	-----
	Graduation				Graduation			
R^2 and Variables	Research Question 2 (N=387)	Research Question 3 (N=368)	Research Question 4: Low Selectivity (N=226)	Research Question 4: High Selectivity (N=142)	Research Question 6 (N=383)	Research Question 7 (N=372)	Research Question 8: Low Selectivity (N=224)	Research Question 8: High Selectivity (N=148)
R^2	.588***	.656***	.363***	.395***	.343***	.609***	.242***	.263***
Instruction (β)	.57***	.36***	.45***	.43***	.27***	.14***	.22***	.27***
Academic Support (β)	.21***	.16***	.15*	.32***	.27***	.14***	.14*	.38***
Student Services (β)	-----	-----	-----	-----	**-.21*****	**-.08***	**-.15***	-----
Institutional Support (β)	**-.13****	**-.14****	**-.14***	**-.20***	**-.15****	**-.09***	**-.14***	-----
Institutional Grants (β)	.21***	.17***	.28***	-----	.24***	.15***	.32***	-----

Note: Highlighted β's denote that the variable is negatively correlated to the dependent variable (retention or graduation rate).
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Table 53. Research Questions 9 and 10: R^2 for each Model, Institutional Expenditures per Student and Percentage of Institutional Expenditures that Significantly Contributed to First-Year Retention and 6-year Graduation Rates for 1992, 1997, and 2002

	Institutional Expenditures Per Student			Percentage of Institutional Expenditures		
	Retention (N=256)			Retention (N=264)		
R^2 and Variables	1992	1997	2002	1992	1997	2002
R^2	.477***	.511***	.564***	.273***	.331***	.238***
Instruction (β)	.63***	.54***	.54***	.32***	.22***	.18**
Academic Support(β)	----	.29***	.16*	.25***	.41***	.28***
Student Services (β)	----	----	----	**-.14****	**-.17****	**-.24*****
Institutional Support (β)	----	----	----	**-.13***	**-.18*****	**-.12***
Institutional Grants (β)	----	.14*	.22***	.23***	.16**	.17**
	Graduation (N=276)			Graduation (N=279)		
R^2 and Variables	1992	1997	2002	1992	1997	2002
R^2	.551***	.673***	.604***	.340***	.434***	.365***
Instruction (β)	.62***	.56***	.57***	.23***	.26***	.24***
Academic Support (β)	.14*	.20***	.27***	.35***	.42***	.36***
Student Services (β)	----	----	----	**-.15****	**-.14****	**-.24*****
Institutional Support (β)	**-.12***	**-.17*****	**-.15****	----	**-.14****	**-.20****
Institutional Grants (β)	.11*	.24***	.20***	.27***	.30***	.21***

Note: Highlighted β's denote that the variable is negatively correlated to the dependent variable (retention or graduation rate).
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

CHAPTER 5: CONCLUSIONS

In the past decade, institutions increasingly have been scrutinized for their inability to control the costs of higher education (Massy, 1999a). Even though tuition charges are increasing at rates that outpace inflation (Stringer, et al., 1999), institutional leaders continue to lobby state and federal governments for additional funding. In these times of current fiscal constraints, constituents are reluctant to provide financial resources unless institutions demonstrate that this money is well spent (Burke, 1998; Hartle, 1998). Instead of granting more funding to institutions, the public is requiring institutions of higher education to identify ways to improve their performance (e.g. providing a stronger undergraduate education) without increasing costs (Massy).

Higher education administrators are aware of expectations to demonstrate fiscal responsibilities but are challenged with how to do this. In less complex organizations, fiscal responsibility can be illustrated by measuring productivity, the "the ratio of output to input in an organization" (Schapiro, 1996, p. 37). However, in a complex organization such as a higher education institution, measuring these inputs and outputs is not simple: inputs frequently are not in control of institutional leaders and outputs are not always measurable (Birnbaum, 1988).

This study sought to address these difficulties by examining how resources are allocated within the institution and the extent to which allocated resources meet such institutional goals as high first-year retention and 6-year graduation rates. Much of the past research on retention and graduation has focused on the traits (e.g. financial need) or behaviors (e.g. interacting with faculty, involvement in leadership activities) of the students enrolled in college (see Astin, 1984; Cabrera, et al., 1992; Tinto, 1993). Significantly less

research has examined how institutional behavior and traits rather than student characteristics or experiences may impact retention and graduation (Berger, 2001-2002).

This study investigated how an institutional behavior - resource allocation - and an institutional trait - institutional selectivity - may influence first-year retention and 6-year graduation rates. Unlike other studies that explored retention through the student perspective, this study viewed retention and graduation using an organizational behavior lens. This research was framed by Berger's (2001-2002) assumption that "...colleges and universities are organizations and subsequently that the organizational perspective is an appropriate framework for gaining useful insights into how undergraduate retention can be improved on college and university campuses" (p. 3).

The purpose of this study was to examine the relationship between institutional expenditures related to instruction, academic support, student services, institutional support, and institutional grants and retention and graduation rates at private Baccalaureate Liberal and General colleges and universities. This study had three goals: a) to understand the relationship between institutional expenditures and retention and graduation rates, b) to understand the relationship of institutional selectivity, institutional expenditures and retention and graduation rates and c) to investigate if these relationships have changed in the past ten years (1992 - 2002). Expenditures were viewed from two perspectives:

1. The relationship between the amount of money spent per student and retention and graduation rates at private Baccalaureate Liberal and General colleges and universities and

2. The relationship between the percentage of institutional expenditures and retention and graduation rates at private Baccalaureate Liberal and General colleges and universities.

This quantitative study sought to determine if retention and graduation rates of private, Baccalaureate Liberal and General institutions could be predicted by how institutions allocate funds to various institutional activities. The targeted population consisted of private Baccalaureate Liberal and General colleges and universities as identified by the 2000 Carnegie Classification system. The population included 466 private Baccalaureate Liberal and General institutions.

Data were collected using IPEDS, an on-line database maintained by NCES, *US News*' "America's Best Colleges", and *Barron's Profiles of American Colleges of 2001.* IPEDS was used to identify all private Baccalaureate Liberal and General institutions and institutional expenditures. *US News* provided first-year retention rates and 6-year graduation rates. *Barron's* provided institutional selectivity ratings.

Descriptive and inferential statistics were used to analyze the data and make inferences about the relationship between institutional expenditures and retention and graduation rates. Discriminant analysis procedures were employed to classify institutions into two subgroups: low selectivity and high selectivity institutions. Standard multiple regression was the primary statistical tool used in this study. It was employed to investigate if institutional expenditures accurately predicted retention and graduation rates. In addition, multiple regression analysis was used to examine which, if any, of the independent variables significantly predicted retention and graduation rates. An alpha of .05 was used as the level of significance. *SPSS 11.5* was the software used to perform multiple regression.

This chapter provides a summary of the major findings, discusses the implications of these findings for practice, addresses the limitations of the current study, and proposes areas of study for future research.

Findings

The data analyses described above produced the following major findings:

Amount of Expenditures Per Student

1. The amount of money spent per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted first-year retention and 6-year graduation rates. The variables of instruction, academic support, student services, and institutional grants significantly contributed to retention rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. The variables of instruction, academic support, institutional support and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates.
2. Institutional selectivity and the amount of money spent per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and 6-year graduation rates. The variables of instruction, student services, institutional grants, and institutional selectivity significantly contributed to retention rates. There was a positive relationship between expenditures for instruction and institutional grants and first-year retention rates and a positive relationship between institutional selectivity and first-year retention rates. There was a negative relationship between student services expenditures and first-

year retention rates. The variables of instruction, academic support, institutional support, institutional grants, and institutional selectivity significantly contributed to graduation rates. There was a positive relationship between expenditures for instruction, academic support, institutional grants and 6-year graduation rates and between institutional selectivity and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates.

3. For low selectivity institutions, the amount of money spent per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted first-year retention and graduation rates. The variables of instruction, student services, and institutional grants significantly contributed to retention rates. There was a positive relationship between expenditures for instruction and institutional grants and first-year retention rates for low selectivity institutions. There was a negative relationship between student services expenditures and first-year retention rates. The variables of instruction, academic support, institutional support and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates.
4. For high selectivity institutions, the amount of money spent per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and graduation rates. The variables of instruction and academic support significantly and positively contributed to retention rates. The variables of instruction, academic support, and institutional support

significantly contributed to 6-year graduation rates. There was a positive relationship between instruction and academic support expenditures and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates.

Percentage of Expenditures

5. Percentage of expenditures in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and graduation rates. The variables of instruction, academic support, student services, institutional support, and institutional grants significantly contributed to retention. There was a positive relationship between instruction, academic support, and institutional grant expenditures and first-year retention rates. There was a negative relationship between student services and institutional support expenditures and first-year retention rates. The variables of instruction, academic support, student services, institutional support, and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between instruction, academic support, and institutional grant expenditures and 6-year graduation rates. There was a negative relationship between expenditures of student services and institutional support and 6-year graduation rates.
6. Institutional selectivity and the percentage of expenditures in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and graduation rates. The variables of instruction, academic support, student services, institutional grants, and institutional selectivity significantly contributed first-year retention. There was a positive relationship

between expenditures for instruction, academic support, and institutional grants, and first-year retention rates and a positive relationship between institutional selectivity and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. The variables of instruction, academic support, student services, institutional support, institutional grants, and institutional selectivity significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates and between institutional selectivity and 6-year graduation rates. There was a negative relationship between expenditures for student services and institutional support and 6-year graduation rates.

7. For low selectivity institutions, percentage of expenditures per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and graduation rates. The variables of instruction, student services, and institutional grants significantly contributed to retention. There was a positive relationship between expenditures for instruction and institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. The variables of instruction, academic support, student services, institutional support, and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and first-year retention rates. There was a negative relationship between expenditures of student services and institutional support and 6-year graduation rates.

8. For high selectivity institutions, percentage of expenditures per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and graduation rates. The variables of instruction, academic support, and student services significantly contributed to retention rates. There was a positive relationship between expenditures for instruction and academic support and first-year retention rates. There was a negative relationship between student services expenditures and first-year retention rates. The variables of instruction and academic support significantly and positively contributed to 6-year graduation rates.

Longitudinal Analysis

9. For 1992, 1997, and 2002, the amount of money spent per student in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted first-year retention and graduation rates. For 1992, the variable of instruction contributed to first-year retention rates significantly and positively. For 1997, the variables of instruction, academic support, and institutional grants significantly and positively contributed to first-year retention rates. For 2002, the variables of instruction, academic support, and institutional grants significantly and positively contributed to first-year retention rates. For 1992, 1997, and 2002, the variables of instruction, academic support, institutional support, and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support and institutional grants and 6-year graduation rates. There was a negative relationship between institutional support expenditures and 6-year graduation rates.

10. For 1992, 1997, and 2002, the percentage of expenditures in the areas of instruction, academic support, student services, institutional support, and institutional grants significantly predicted retention and graduation rates. For 1992, 1997, and 2002 the variables of instruction, academic support, student services, and institutional grants significantly contributed to retention. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and first-year retention rates. There was a negative relationship between student services expenditures and institutional support expenditures and first-year retention rates. For 1992, the variables of instruction, academic support, student services, and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between student services expenditures and 6-year graduation rates. For 1997 and 2002, the variables of instruction, academic support, student services, institutional support, and institutional grants significantly contributed to 6-year graduation rates. There was a positive relationship between expenditures for instruction, academic support, and institutional grants and 6-year graduation rates. There was a negative relationship between expenditures of student services and institutional support and 6-year graduation rates.

Conclusions

The findings of this study confirm that there is a relationship between an organizational behavior (i.e. resource allocation) and retention and graduation rates. For each model that was analyzed institutional expenditures significantly predicted first-year retention

and 6-year graduation rates. Consistently, the amount of expenditures per student and percentage of expenditures significantly predicted retention and graduation rates.

The theoretical framework for this study was based on Berger's (1997) theory that organizational behavior can influence student persistence. Through its examination of the organizational behavior of resource allocation, this study supports Berger's theory: colleges and universities exhibit patterns of behavior (specifically by how they allocate resources) that have "important consequences for the retention of undergraduate students" (Berger, 2001-2002, p. 19). From a theoretical perspective, the findings of this study highlight the importance of investigating organizational behavior as a way to enhance student persistence.

In addition to this theoretical knowledge, this research also contains several implications for practice. This study's findings suggest that institutions have, within their control, a tool to help them improve retention and graduation rates. The next section of this chapter focuses on the research results related to institutional expenditures, institutional selectivity and the longitudinal analysis. These results will be addressed within the context of current theory and implications of these findings to current institutional practice will be discussed.

Instruction

Expenditures dedicated to instruction significantly contributed to first-year retention and 6-year graduation rates. As defined by NCES (2001b), instruction expenditures include "general academic instruction, vocational instruction, special session instruction, community education, preparatory and adult basic education, and remedial and tutorial instruction conducted by the teaching faculty for the institution's students" (NCES, p.11). Unlike other institutional expenditure categories that were significant in some models and not in others,

instruction expenditures consistently and positively contributed to retention and graduation rates.

This finding coincides with other theories of retention. Tinto's (1993) interactionalist theory of academic departure purports that the more individuals are academically and socially engaged in their college or university, the more likely they are to persist. In subsequent work Tinto (1998) asserted "in most cases, academic integration seems to be the more important form of involvement" (p. 169). Astin's (1984) theory of involvement proposed that as students become more involved in their course work or extracurricular activities, they are more likely will persist. If one assumes that as institutions allocate resources to instruction they are supporting the ability of students to be connected with faculty and other students, this study is consistent with Astin's and Tinto's theories.

Resource allocation planning "should be used to link the institutional operations strategically to the institution's mission..." (Dickmeyer, 1996; p. 539). This study also confirms that allocating money to activities that are consistent with institutional mission can improve retention and graduation rates (Merante & Ireland, 1993; Bruning, 1999; Kerr, 2001). Although institutional missions may differ, a common goal for all colleges and universities is educating students. Regardless of an institution's budgeting procedures or its organization culture, this study reemphasized the importance of focusing on the institutional mission, namely, the education of students, throughout the resource allocation process in order to improve retention and graduation (Thompson & Riggs, 2000; Vandament, 1989).

The consistency in which instructional expenditures predicted graduation and retention rates sends a clear message to institutional leaders. Allocating resources to

personnel and activities that are directly related to the instructional function of the institution has the greatest potential for improving retention and graduation rates.

Academic Support

Expenditures for academic support services include "the support services that are an integral part of the institution's primary mission of instruction, research, or public service. This category includes expenditures for libraries, museums, galleries, audio/visual services, academic computing support, ancillary support, academic administration, personnel development, and course and curriculum development" (NCES, 2001b, p. 12). In this study academic support expenditures almost always significantly contributed to retention and graduation rates.

Academic support expenditures may include functions related to academic advising. In the past 20 years, the need for quality academic advising has been emphasized as a way to increase student retention (Goetz, 1996; Gordon, Habley, & Associates, 2000). Academic advising especially is critical for first year students as they make the transition to college and become familiar with the academic expectations of the university (Goetz). Assuming that academic advising provides students with an opportunity to become engaged academically, it is not surprising that academic support expenditures positively contributed to retention and graduation rates (Astin, 1984; Tinto, 1993).

Ironically, at low selectivity institutions, academic support expenditures did not contribute to retention rates. Considering that low selectivity institutions are more likely than high selectivity institutions to enroll "at-risk" or less academically prepared students (Lee, 2001), and the first year is critical in helping students adjust to the institutions (Goetz, 1996), it would seem that dedicating expenditures to this area would contribute to student

persistence, but it did not. It may be, however, that since low selectivity institutions have less money than highly selective institutions, they may not have adequate expenditures to devote specifically to academic support. Rather, much of the responsibility for advising or working with at-risk students falls on faculty whose salaries are recorded as instruction expenditures.

Library and academic computing support are other critical functions within the university that are subsumed under academic support expenditures. This study verified that academic support expenditures positively contributed to retention and graduation rates but it is difficult, based on this study's methodology, to determine if the separate functions within academic support expenditures contributed to retention or graduation rates equally or if some have more influence on retention and graduation rates than others. For example, in their study of public institutions, Hamrick, Schuh, & Shelley (2004) examined the influence of library expenditures on graduation rates and found that library expenditures positively were related to graduation rates. In the past 15 years, the percentage of expenditures devoted to libraries has decreased; this trend is expected to continue. If library expenditures do contribute significantly to retention and graduation rates decreasing resources dedicated to this area may have negative consequences for student persistence. The impact of each of these functions on retention and graduation will be helpful for institutional leaders deciding how to allocate resources

In their study of undergraduates at 71 institutions, Kuh and Hu (2001) found that computers and information technology positively influenced learning and recommended that institutions continue to invest in this area. However since "computer and information technology is now almost ubiquitous on college campuses" (Kuh & Hu, p. 217) it is increasingly difficult to assign expenditures to specific areas. For instance, as libraries rely

less on physical space and provide more on-line resources for faculty and students, it may not be feasible to distinguish between expenditures devoted to academic computing, instructional uses or libraries.

As the value of quality academic advising becomes more apparent (Glennen, Farren, & Vowell, 1996) more institutions are formalizing the advising process and moving from a model where faculty members are advisors to a model that utilizes professional advisors. In the 1990s, institutions that used a faculty-only model decreased from 38% to 25% and 73% of all institutions had some form of an advising center (Habley & Morales, in Reinarz, 2001). The purpose of this change was to alleviate some of the workload from faculty members and provide students with a more consistent, more available service. This system may mean having a more consistent advising process but may result in less faculty-student interaction. How will these changes, along with changes in the purpose and goals of libraries and technology affect student persistence? Future research must investigate how changes in the current functions and expenditures of academic support expenditures will impact retention and graduation rates.

Student Services

Student services expenditures include monies dedicated to "admissions, registrar activities, and activities whose primary purpose is to contribute to students' emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program" (NCES, 2001b, p.12).

Expenditures for student services either did not contribute to retention or graduation rates or there was a negative relationship between student services expenditures and retention and graduation rates. In other words, the results of this study found that retention and

graduation rates were not improved by dedicating increased resources to student services. These results were similar to Meeth's (1974) study that also found no positive relationship between student services expenditures and retention and graduation rates. Nevertheless, from a theoretical and practical perspective, this is an unexpected finding.

The role of student services professionals is to complement students' in-class educational experience by getting them involved in their institution through a variety of experiences (e.g., residence halls, student activities, recreation, etc.) (Carpenter, 1996). As students become more connected to their institution, their involvement would increase, thus increasing their chances of persistence (Astin, 1984; Tinto, 1993). A significant amount of research has found that activities performed by student services offices do increase retention and graduation (see, for instance, Eyler & Giles, 1999; Lenning & Ebbers, 1999).

Conversely, this study found that expenditures related to student services do not significantly contribute to first-year retention and 6-year graduation rates. Two factors may help explain this unanticipated finding. One, the population of colleges studied may significantly influence the results. This study focused on small colleges and universities. At these types of institutions, the distinction between the traditional roles of faculty and student affairs staff is less clear (Young, 1986). Faculty members spend a significant time with students out of class and student affairs professionals also may be involved in academic advising, curriculum revisions, and teaching (Kuh & McAleenan, 1986; Wright, 1986).

Although institutions allocate resources in the specific areas of student affairs, academic support, and instruction, the uses of these resources in specific areas may overlap. For example, student affairs staff may hold a faculty appointment and faculty members may

serve as advisors of student groups. At small institutions, it may be difficult to accurately compartmentalize expenditures devoted to instruction, academic support, or student services.

Secondly, a significant amount of student services expenditures are used for administrative activities (Massy, 2001; Leslie & Rhoades, 2001). For instance, Admissions Offices primarily are concerned with recruiting students to the college and university (Miller, 1997). In essence their focus is on working with students prior to arriving but have little relationship with the students once they arrive. The Registrar's Office is responsible for scheduling classes and record keeping of courses and grades (Miller, 1997). Registrar's office personnel rarely directly influence a student's academic success; they report the results of a student's success.

Although recruiting students and maintaining records are critical institutional tasks, these tasks essentially are administrative and therefore, may not contribute to retention and graduation rates. It is not enough, however, simply to accept these activities as necessary expenses that provide little value to retention and graduation rates. Instead, both of these offices can consider how they may alter what they do to improve retention and graduation (Massy, 2001). The Admissions Office must understand the mission of its institution, clearly articulate this to its students, and ensure that students have access to services they will need to be successful (Miller, 1997). Registrar's Offices frequently will struggle with how their services are delivered. Many times they are at the "forefront of implementing new technologies on campus" (Miller, p. 151). Although technology drastically has altered how courses are scheduled or grades are processed, is it always the most efficient or cost-effective method? Or, do the initial costs of investing in technology dissuade institutions from moving to this even though it would save in future costs devoted to staff salaries? Registrar's Offices,

similar to Admissions Offices, must continue to evaluate how its functions contribute to retention and graduation (Miller, 1997).

Despite these possible explanations, the reality simply may be that expenditures for student services do not enhance the retention and graduation rates of undergraduate students. Using NCES data from the 1980s and 1990s, Rhoades (1995) found that money allocated to student services increased more than instruction expenditures and that administrative salaries in student services and number of student services positions created outpaced faculty salaries and hiring. The findings of this study suggest that students would be better served if expenditures currently dedicated to student services be reallocated to instruction such as hiring of faculty or student financial aid. Since the primary function of student services is to assist students in being successful, areas that are not contributing to this success should not receive additional funding or in some cases, be eliminated. At the very minimum, this study highlights the need to examine critically how each of the activities that comprise student services either detracts from or improves student retention.

Institutional Support

Allocating additional resources to institutional support negatively contributed to graduation. Institutional support includes activities such as "general administrative functions, legal and fiscal operations, and public relations" (NCES, 2001b, p.12). Of the six categories of expenditures, tasks such as these are the most administrative and thus, the least likely to impact students positively (Astin & Scherreri, 1980; Blau, 1973). Assuming adding more administrative support adds to the bureaucracy of an institution rather than a collegial environment, this study aligns with past studies on organizational behavior and retention and graduation rates.

Even though expenditures for institutional support continue to rise (Cunningham et al., 2001; Leslie & Rhoades, 2001), this study as well as other studies on organizational culture would argue that adding to the administrative budget does little to improve retention and graduation rates. Creating another faculty position rather than adding administrative personnel may be more effective in enhancing student persistence.

This finding does present a dilemma for institutional leaders. In this era when the public is demanding more accountability and voicing more negative perceptions of colleges and universities, it is necessary for institutions to hire individuals who are knowledgeable about the legal responsibilities of the institution, who are competent in budgeting and planning, and who can market the institution positively to prospective and current students, graduates, and the general public. In addition, institutions are mandated to increase spending in administrative areas to meet federal and state mandates such as those required by the Occupational Safety and Health Administration [OHSA] (OSHA, 2004) and the recently passed Patriot Act that requires colleges and universities to spend additional resources in tracking international students (Mitrano, 2002). Although institutions are required in to provide more resources in these areas, these resources do not improve retention or graduation rates - an outcome that is important to prospective and current students, graduates, legislatures, and the general public.

Institutional Grants

Expenditures dedicated to institutional grants have taken the form of "outright grants and trainee stipends to individuals enrolled in formal course work, either for credit or noncredit. This category includes aid to students in the form of tuition or fee remissions" (NCES, 2001b, p.7).

Of the six categories examined, expenditures devoted to institutional grants had the most significant increase in the amount of money spent per student and in the percentage of expenditures dedicated to this area between 1992 and 2002. The amount of institutional grants per student more than doubled from 1992 to 2002 and the percentage of expenditures increased approximately 10% in the same time period. These patterns reflect current trends in higher education (Cunningham et al., 2001).

It has been well documented that student financial aid is critical to a student's persistence toward graduation (Perna, 1998; St. John et al., 2002) and many of the analyses in this study reiterate this conclusion: institutional grants significantly contributed to retention and graduation rates. A closer look at the results suggests that this conclusion may be oversimplified. For low selectivity institutions, expenditures dedicated to institutional grants significantly contributed to retention and graduation but for high selectivity institutions, institutional grants did not significantly contribute to retention and graduation rates. What accounts for this difference? High selectivity institutions dedicated a larger dollar amount of money to institutional grants than low selectivity institutions and they also dedicated a larger percentage of their overall expenditures to institutional grants than low selectivity institutions. Yet, institutional grants did not significantly contribute to retention or graduation rates at high selectivity institutions.

Differences between low selectivity and high selectivity institutions may help explain this finding. Because high selectivity institutions usually cost significantly more than low selectivity institutions (McPherson & Winston, 1996), high selectivity institutions tend to enroll more students from high-income families than low selectivity institutions (Lee,

2001). Hearn's (1991) study of 1288 first-year students discovered that low-income students are more likely to attend low selectivity institutions regardless of their academic ability.

In Hill, Winston, & Boyd's (2003) report, "Affordability: Family Incomes and Net Prices at Highly Selective Private Colleges and Universities" the authors found that at 28 of the most highly selective schools in the United States, only 10% of the students came from low income families. As they summarized, "given the high correlation between family income and academic preparation, most of the students at these (high selectivity) schools are from high income families" (Hill, et al., p.7). They also found that although low-income students are paying dramatically reduced prices at high selectivity institutions than their higher income peers, families of low-income students pay 49% of their yearly total income to tuition and fees whereas families of high-income students pay 21% of their income to tuition and fees.

It can be implied, therefore, that since low selectivity institutions are more likely to enroll low-income students than their high selectivity peers and that low-income families are in more need of financial assistance, financial aid would play a more critical role in the retention and graduation at low selectivity institutions than high selectivity institutions. Changes in financial aid policy (i.e., the introduction of unsubsidized loans) in the past ten years as well as significant increases in tuition have affected low-income students the most significantly (Choy, 2000). With little hope that these trends will be reversed, low-income students will continue to rely on institutional grants to pay for college expenses. Institutional leaders need to be cognizant of the impact of financial aid on various student populations. High-income students may experience some financial distress if their financial aid is limited,

but low-income students may be forced to withdraw if they do not receive adequate financial aid.

Institutional Selectivity

The variable of institutional selectivity was added to institutional expenditure categories to explore if there was a relationship between institutional selectivity and retention and graduation rates. In each model, institutional selectivity contributed significantly to the overall variance of retention and graduation rates. Institutional selectivity was correlated positively to retention and graduation rates.

This finding was reiterated when institutions were divided into two categories: high selectivity and low selectivity institutions. High selectivity institutions had higher retention and higher graduation rates than low selectivity institutions. As mentioned earlier, when colleges and universities were categorized into low and high selectivity institutions, there were differences in the relationships between institutional grants and retention and graduation rates. Several factors may account for these differences. One, high selectivity institutions are more likely to enroll students with higher academic ability than low selectivity institutions (Lee, 2001). Since high academic ability is correlated with retention and graduation, it is not surprising that high selectivity institutions have higher retention and graduations rates than low selectivity institutions.

High selectivity institutions also enroll students with higher incomes than low selectivity institutions (Lee, 2001). Income level is another factor that has been found to influence retention and graduation rates. As reported in "Low-income Students: Who They Are and How They Pay for Their Education," Choy (2000) found that after controlling for

student background and other factors, low-income students had lower persistence rates than higher-income students.

In a subsequent report, "Undergraduates at High Sticker Price Institutions" Lee (2001) examined similarities and differences between students who attended public research institutions that had sticker prices above $12,000 a year and students who attended public research institutions that had sticker prices below $12,000. Lee found that students at both types of institutions were satisfied with their social involvement but students at high selectivity institutions were more satisfied with their academic experience than students at low selectivity institutions. Assuming, as Braxton & Brier (1989) found, that satisfaction is correlated to retention, students at high selectivity institutions may be more likely to graduate than students at low selectivity institutions.

Differences also exist in resource allocation amounts and expenditures between high selectivity and low selectivity. This study found that high selectivity institutions spent more in each category of expenditures than low selectivity institutions. Since high selectivity institutions tend to be more affluent than low selectivity institutions (McPherson & Winston, 1996), this study supports Bowen's (1980) earlier findings that more affluent institutions spend more in every expenditure category than their less affluent peers.

Bowen (1980) also concluded that more affluent institutions dedicate a larger percentage of their budgets to administrative areas. Bowen's conclusion was unfounded in this study. High selectivity institutions dedicated a larger percentage of expenditures in the areas of instruction, academic support, and institutional grants than low selectivity institutions. These areas were found to contribute positively to retention and graduation. Low selectivity institutions tended to devote a higher percentage of their resources to student

services or institutional support - areas that either did not significantly predict retention or graduation rates or there was a negative relationship between these expenditures and retention and graduation rates.

The variable of institutional selectivity provides additional information on the relationship between institutional expenditures and retention and graduation rates that have implications for institutional leaders. First, in their efforts to achieve high retention and graduation rates, undoubtedly, institutional leaders at high selectivity schools have a distinct advantage over leaders at low selectivity institutions. Students at high selectivity institutions tend to be more academically prepared and less sensitive to fluctuations in financial aid than students at low selectivity intuitions. In addition, high selectivity institutions can dedicate more money per student in each category of expenditures than their less selective peers. Based on these student and institutional factors, high selectivity institutions may have higher retention and graduation rates, regardless of an institution's resource allocation strategies.

For institutional leaders at low selectivity institutions, this conclusion may seem to describe a frustrating situation. No matter how determined they are, it is difficult for institutional leaders to dramatically improve their selectivity rating (Morphew, 2002) and therefore, it may be difficult to significantly improve their retention or graduation rates. While it may not be possible to quickly improve the student profile or garner significantly more resources, the results of this study suggest that low selectivity institutions can allocate resources strategically to improve retention and graduation rates. Dedicating a larger percentage of resources in the areas of instruction, academic support, and institutional grants is more beneficial to enhancing student persistence than spending resources on student services or institutional support.

This information provides additional insight for policy makers. Currently in the Reauthorization of the Higher Education Act, legislators are considering using retention and graduation rates as measures of institutional quality and accountability (Wolanin, 2003). The results of this study suggest that if institutions are evaluated on retention and graduation rates, the evaluation must consider institutional factors such as selectivity and student characteristics. If, for instance, low selectivity institutions are forced to close, this would severely limit access to higher education for a significant number of low income students.

Longitudinal Analysis

This study examined if institutional expenditures predicted retention and graduation rates over a 10-year period. For each model, the results consistently indicated that institutional expenditures have, over time, predicted retention and graduation rates. This longitudinal examination of the variables illustrated patterns in institutional expenditures and retention and graduation rates.

The amount of expenditures per student increased incrementally from 1992 to 2002 thus validating Bowen's (1980) Revenue Theory of cost: institutions raise all the money they can and institutions spend all the money they can which results in ever-increasing institutional expenditures. In the past 10 years, there has been little change in the relationship between institutional expenditures and retention and graduation rates. For institutions concerned about improving retention and graduation rates, allocating resources in the areas of instruction, academic support, and institutional grants has been a wise and reliable investment in student persistence.

The percentages of expenditures allocated to each category also changed from 1992 to 2002. In the model analyzing percentages of expenditures and retention rates, the

percentage of resources allocated to instruction increased 4.81%. The percentage of academic support expenditures increased 1.82%, student services expenditures increased 4.5%, institutional support increased 3.34% and institutional grants increased 8.87%.

When the relationship between percentage of institutional expenditures and graduation rates were examined, the percentage of expenditures for instruction increased 4.06%, academic support expenditures increased 1.65%, student services increased 3.65%, institutional support expenditures increased 2.02%, and institutional grants increased 10.02%.

These results are comparable to data compiled by Cunningham et al., (2001) except that Cunningham et al. found that the percentage of expenditures devoted to instruction slightly decreased from 1980 to 1996. This study found that the percentage of expenditures dedicated to instruction increased from 1992 to 2002. This difference may be accounted for by differences in the sample. Whereas this study examined only private, Baccalaureate Liberal and General institutions, Cunningham et al.'s study examined all private, four-year baccalaureate institutions.

One common finding between the Cunningham et al. (2001) study and this research is that in the past 10 years, institutions are increasing the amount and percentage of their expenditures dedicated to institutional grants significantly. For institutional leaders who want to improve retention and graduation rates, this is a wise investment - assuming that most of these grants are devoted to low-income rather than high-income students.

Interestingly, none of these institutional expenditures decreased over the 10-year period. This primarily may be due to changes in the reporting systems. In 2002, operation and maintenance of plant expenditures were no longer included as a separate expenditure

item, but these expenses were subsumed within the other categories such as instruction or academic support (C, Stratham, personal communication, October 23, 2003). Simultaneously, increases in these examined areas may also be the result of decreases in other areas (i.e. public service and research) that were not examined in this study.

Interpreting Standard Deviations

Thus far, little has been mentioned about the standard deviations for each category of expenditures and yet, examining the changes in standard deviations over time raises interesting questions about the nature of institutional expenditures. From 1992 to 2002 the standard deviations in each category of expenditures has increased. A standard deviation is a measure of variability within a variable. A small standard deviation score suggests that there is little difference among subjects whereas as a large standard deviation score indicates a wide range of scores among subjects (Mertler & Vanatta, 2001). As applied to this study, small standard deviations within institutional expenditures categories would suggest that each institution allocates similar amounts of money in each category. Large standard deviations suggest that there are substantial differences in the amount of money that institutions dedicate to an institutional expenditure category.

Overall, standard deviations in some of the areas are quite large in proportion to their mean. For example, in the first model examining institutional expenditures and retention, the mean for academic support was $2018.21 and the standard deviation was $1494.46. Some institutions allocated substantially more than $2000.00 and some institutions allocated substantially less. This finding mirrors Bowen's (1980) observation that institutions differ in how much money they have and how they spend their money.

This study also found that over a 10-year period, standard deviations in each category of expenditures have increased. As was illustrated earlier, institutions increased their expenditures throughout the 10-year period as reflected in their mean scores. Assuming all institutions were increasing their expenditures at the same rate, the standard deviations throughout the 10 years would have remained relative consistent. This was not the case. In 1992 there was a wide variety in the amount of money institutions dedicated in each category of expenditures. In 2002, this variation was larger. What does this suggest? Perhaps some institutions are able to continue to increase their expenditures while other institutions do not have the financial resources to do so. Another interpretation is simply this: affluent institutions were able to increase their expenditures as less affluent institutions continue to struggle with lack of resources (Bowen, 1980).

As the disparity between institutions increases, it is also likely that the characteristics of students enrolled in affluent and less affluent institutions will continue to be different, thus creating a two-tiered system of higher education. The higher tier will be composed of affluent, highly selective institutions that enroll higher-income, more academically prepared students and a lower tier of institutions that will enroll lower-income and less academically prepared students. Students enrolled in the high selectivity institutions will have a greater likelihood of graduating, that, in turn, provides them with access to the benefits of a college degree (i.e. higher income, greater life satisfaction, etc.). Low-income students, however, are less likely to see these benefits as they struggle to stay in school - a reality that has serious consequences for students and for society (IHEP, 1998).

Implications for Practice

The purpose of this study was to examine the relationship between institutional expenditures and retention and graduation rates at private Baccalaureate Liberal and General colleges and universities. Standard multiple regression was conducted to determine if expenditures related to instruction, academic support, student services, institutional support, and institutional grants predicted retention and graduation rates. For each model, institutional expenditures did predict retention and graduation rates. As the R^2 value for each model illustrated, institutional expenditures do not account for all the variance in retention and graduation but the analyses consistently illustrated that expenditures do account for at least a part of the variance in retention and graduation rates. It appears, then, that effective resource allocation strategies may be one way to improve retention and graduation rates. This section describes how institutional leaders can apply the results of this study to their college or university.

Fund Raising

This study found that, with few exceptions, expenditures dedicated to instruction, academic support, and institutional grants positively contributed to retention and graduation rates. Therefore, increasing the amount of money allocated to these areas may improve student persistence. One way institutions generate new money is through fund raising. Financial resources allocated to institutions in the form of private gifts and contributions significantly increased during the 1990s (NCES, 2001b). Although private giving has declined in recent years (Blumenstyk, 2003, March 21), these monies continue to be important sources of revenues for institutions (NCES, 2002a).

Institutions raise money for a variety of reasons: to construct a new recreation facility, to support a student club or organization, or to renovate existing facilities. In developing fund raising strategies, this study suggests that institutional leaders focus on raising money that can be dedicated to instruction, academic support, or institutional grants. Examples may include establishing additional faculty positions that result in reduced class sizes, enhancing the library collections, endowing scholarships for students, or providing research assistantships for undergraduates.

Given the reality of the current higher education environment, however, simply generating additional funds for instruction, academic support and student grants is not easily achieved. Though it may be difficult to generate more funds, institutions can choose how their resources are allocated. Institutions with tight budgets may still improve their retention by consciously allocating flexible resources to specific expenditure categories (i.e. academic support, institutional grants) that appear to influence retention and graduation rates.

Year End Funds

At some institutions, budgeting guidelines include a "use it or lose it" provision. Departments or units must spend all their money by the end of the fiscal year or it reverts back to the general fund (Massy, 1999d). The results of this study suggest that department or unit leaders could improve retention and graduation in their area by employing Astin's (1985) recommendation to reallocate resources "where involvement problems appear to be greatest" (pp. 159-160). Purchasing instructional resources, updating students' computer facilities, or providing work-study support for students may help increase the academic involvement of students and thus positively enhance retention and graduation.

Efficiency of Institutional Support and Student Services Expenditures

This study indicated that expenditures devoted to student services and institutional support had no significant positive relationship with retention and graduation rates. The categories of student services and institutional support include very different activities, but they are similar in that the majority of their expenses are devoted to administrative rather than instructional activities (Leslie & Rhoades, 2001; Massy, 2001). Massy characterized administrative costs as indirect costs, meaning, they (institutional support and student services expenditures) are necessary expenses that support the primary university tasks of teaching, research, and public service. The problem with administrative costs, as Massy (2001) articulated, is that institutions continue to increase spending in these areas without monitoring if these increases are contributing to the institutional priorities:

> Administration and student services are the growth-rate leaders in both public and private institutions, and their effect on budgets is compounded by the fact that between them they account for 25 percent of E & G expenses. Most institutions would do well to focus on these service areas when looking at costs. (p. 317)

The results of this study do not question the need for expenditures in these areas. After all, to be effective, colleges and universities need to invest in executive leaders such as a president and vice-presidents, Admission's Offices, and student services offices. Rather, this study questions if increasing administrative expenditures is a wise investment in retention and graduation:

> Ultimately, of course, the issue is not whether administrative cost increases reflect improved administrative services, the issue is whether expended resources might have served the institution better if the expenditure had been for instruction, research, or

> service. In the broader calculus, administrative expenditures are conceptualized as opportunity costs. In the end, evaluating expenditure trends is a matter or priorities, of what one values, and of the power to enact those value preferences (Leslie & Rhoades, 2001, p. 339).

One strategy for enhancing the efficiency of administrative areas is to focus on ways that these administrative areas can provide direct support to the functions of teaching, research, and service. "Powerful Partnerships" a report sponsored by the American Association for Higher Education (AAHE), the American College Personnel Association (ACPA) and the National Association of Student Personnel Administrators (NASPA) (1998) encouraged this approach. The report called for student affairs professionals to partner with academic departments in order to enhance student learning both in and out of the classroom, and ultimately, to improve student retention.

Institutional leaders can build these "powerful partnerships" on their campuses. Through the development of programs such as residential learning communities, first-year orientation programs, or service learning experiences, institutional support and student services areas can directly contribute to the instruction and academic support functions of the university. These programs require resources from executive leadership, student services, and academic units and they positively enhance student retention (Astin & Sax, 1998; Eyler & Giles, 1999; Lenning & Ebbers, 1999; Pascarella, Terenzini, & Blimling, 1994).

Merit-Based versus Need-Based Aid

As mentioned earlier, institutional grants significantly contributed to retention and graduation at low selectivity institutions but not at high selectivity institution. Differences in

these relationships have implications for institutional leaders, specifically as they relate to providing merit-based versus need-based aid.

Institutional grants can be awarded to a student based on his/her ability or "merit" or based on financial "need." This study did not differentiate between the two, but the results provide insights into the potential consequences of merit-based and need-based aid on retention and graduation. Institutional leaders are aware that students who are more academically prepared are more likely to persist than students who are less academically prepared. Academically prepared students are more likely to be from higher income families who do not qualify for a significant amount of need-based aid (Choy, 2000). Therefore, by providing more merit-based grants, institutions can recruit higher ability and more academically prepared students and thus improve their retention rate (Baksh & Hoyt, 2001; Hill, et al., 2003).

In contrast, students from low-income families, who may be less academically prepared, are more sensitive to fluctuations in their financial aid (Choy, 2000; St. John, et al, 2003) than higher income students. These students may have less access to merit-based aid, but they will require significant amounts of need-based aid (St. John, 1990). If institutions devote all their resources to merit-based aid and few to need-based aid, they may not be able to recruit or retain students from lower-income families (Choy; St. John, 1990).

This study separated low selectivity and high selectivity institutions and broad generalizations about the characteristics of the institutions and students were made: high selectivity students tend to enroll more academically prepared students from higher income families than low selectivity institutions. In reality, both high and low selectivity institutions

enroll economically and academically diverse populations of students and institutional leaders will need to find a balance between providing merit-based versus need-based aid.

A significant amount of research has been done to illustrate that student financial aid contributes to retention (St. John, et al., 2003). Other studies have compared different types of financial aid and found that institutional grants more significantly impact retention than loans (Perna, 1998). This study focused on institutional grants and the results suggested that different types of institutional grants (merit-based versus need-based) also influenced retention and graduation differently. Merit-based aid may be necessary to recruit students from higher-income families, but may not significantly contribute to retention and graduation. Merit-based and need-based aid are critical for retaining students from lower-income families. To improve retention and graduation rates, institutional financial aid policies must take these differences into account.

Consider Institutional Culture and Current Resource Allocation Strategies

Admittedly, the recommendations set forth in this chapter do not acknowledge some of the greater challenges institutional leaders face when altering their resource allocation strategies. As described in Chapter 2, institutions vary in their mission, culture and in their resource allocation procedures. It may be easier to focus money on improving student retention at an institution that values community and everyone's success as opposed to a highly political culture where resources are limited (Birnbaum, 1988). An institution where one or two people control the budget may have fewer challenges in reallocating resources than an institution with a decentralized allocation process (Massy, 1999d).

Institutional culture and resource allocation procedures may be so intertwined with the daily operations of a college or university that dramatic changes in the current

environment are not feasible. Therefore, a more reasonable may be, as Rhatigan and Schuh (2002) suggested, to incorporate Weick's (1984) concept of "small wins." According to Weick, a small win is "a concrete, complete, implemented outcome of moderate importance....Small wins are controllable opportunities that produce visible results." (p. 43).

Small wins originate "as solutions that single out and define as problems those specific, limited conditions for which they can serve as the complete remedy" (Weick, p. 43). As applied to this study, institutional leaders may devote resources to specific areas and activities that have been proven to improve retention and graduation rates. Potential activities could be: dedicating resources to student academic support services that provide tutoring or special instruction for students (Ryan & Glenn, 2002-2003), developing a mentoring program that pairs faculty with at-risk students (Campbell & Campbell, 1997), requiring administrators to serve as mentors for first-year students (Martin & Samuels, 1993), creating living-learning communities (Pike, Schroeder, & Berry, 1997) or providing need-based scholarships in lieu of student loans (Hebel, 2004, February 9). In each case, the activities initially may affect relatively few students but each has the potential to become more influential across campus.

The significant advantage of a small wins, according to Weick (1984) is "additional resources also flow toward winners, which means that slightly larger wins can be attempted" (p. 43). Small programs on campuses that improve retention and graduation may result in more individuals undertaking similar activities that can then have a greater impact on retention and graduation for all students.

Institutional leaders must assess the organizational culture and resource allocation procedures at their own institutions and apply the concept of "small wins" to fit their specific

environments. The results of this suggest that small wins can occur in retention and graduation when resources are diverted to the areas of instruction, academic support, and institutional grants.

Limitations and Recommendations for Future Research

There are several limitations associated with this study, some of which have been mentioned in the previous sections. This section will delineate additional limitations and propose ideas for continued research in this area.

Examine Additional Institutional Characteristics

This study focused on private baccalaureate institutions that spend a large percentage of their budget on undergraduate instruction and minimal resources in areas such as research and graduate education. Studies that include additional types of institutions (i.e. Research Intensive and Extensive) that have significant expenditures in other areas such as research may provide additional insight into the relationship between resource allocation and retention and graduation rates. This study also did not consider public institutions. Public institutions receive a greater percentage of their revenues from state governments and therefore may have less control over how resources are allocated (Bowen, 1980). Future research that examines the relationship between institutional expenditures and retention and graduation may help to confirm or raise questions regarding the applicability of these results to other institutional types.

This study focused on 4-year non-profit institutions. Little is known about the relationship between institutional expenditures and retention and graduation rates at other types of institutions such as 2-year colleges and for-profit institutions. As enrollment at these institutions continues to rise, so do questions about accountability, fiscal responsibility,

retention and graduation. A similar study applied to these institutions may help policy makers recognize how expenditure patterns at various institutions influence etention and graduation.

Although this study limited its focus to private baccalaureate institutions, these institutions vary in other significant ways. For instance, institutional characteristics such as the institution primarily is urban or rural, commuter or residential, etc., have been found to impact retention and graduation rates (Hamrick, et al., 2004). Institution leaders also may have invested in other facets of the university such as improving the physical space or buildings that in turn contribute to retention and graduation rates. This study did not consider these additional characteristics. Research in this area would provide a more comprehensive understanding of the relationship between institutional expenditures and retention and graduation rates.

Examine Difference Among Students

Just as this study failed to delineate differences among private baccalaureate institutions, it also did not differentiate among the students. A variety of student characteristics such as gender, ethnicity, and family background have been found to influence retention and graduation rates. Many institutions now record retention and graduation rates for specific student populations, but this study focused on overall institutional first-year retention and graduation rates.

First-year retention rates and 6-year graduation rates were used to measure student persistence. Although student attrition is most likely to occur between a student's first and second-year, other students withdraw after this but before graduation. Little is known about the relationship between expenditures and retention after a student's first year.

Examine Differences in Functions of Categories

The results of this study provide a general sense of which expenditures significantly predict retention and graduation rates. As mentioned in the earlier section, the categories cover a variety of functions and make it difficult to analyze specific functions within the categories. Student services expenditures encompass the offices of Admissions, Registrar's, Student Counseling, and Student Activities. The category of academic support encompasses areas such as academic advising and library expenditures. Additional studies employing qualitative research methods such as case studies may assist in understanding how activities within each expenditure category may contribute to a student's involvement in college.

Similarly, the current study did not distinguish between institutional expenditures that were devoted to salaries and wages versus expenditures devoted to equipment. It did not distinguish between expenditures devoted to personnel: faculty versus academic advisors, executive leadership versus student affairs professionals. Institutions struggle with these decisions: is it better to hire several faculty members to have smaller class sizes or purchase equipment to teach a greater number of students through distance education?

Investigating Discrepancies in Institutional Selectivity and Retention and Graduation

Prior research has found that institutions vary widely in how they allocate their resources and in their institutional effectiveness (Bowen, 1980; Meeth, 1974). This study employed discriminant analysis techniques as a way to uncover patterns in resource allocation expenditures, retention rates, and graduation rates among institutions with similar and different institutional selectivity. Although two patterns were highlighted, the result of this analysis also identified inconsistencies. For instance, based on their institutional expenditures and retention rates a few institutions that were rated as non-competitive (low

selectivity) institutions were predicted to be in the higher selectivity categories. Similarly, some of the higher selectivity institutions were predicted to be in the lower selectivity institutions.

If a consistent relationship between how institutions spend their money and retention and graduation rates existed, little discrepancy between the original and predicted classifications would have surfaced. In some cases, a wide discrepancy emerged. What is happening at these institutions that have predicted levels of selectivity significantly different form their original ranking? A qualitative case study that examines individual institutions, specifically institutions that have modest expenditures but better than anticipated graduation and retention rates, may provide insight into how institutions with fewer resources can perform better than expected.

Answer the Question: How Much Is Enough?

Finally, this study does not answer the question, "How much is enough?" This study does not provide a formula for institutions to use to determine the amount of money needed to significantly improve retention or graduation rates. If institutions wanted to improve retention rates, for example, how much additional money would they need to allocate in the areas of instruction, academic support, or institutional grants to see results? If institutions currently have high graduation rates, would allocating even more resources in these areas improve graduation rates? Future studies could examine the complex relationship between institutional expenditures and retention and graduation rates.

Summary

This study examined if institutional expenditures predicted retention and graduation rates at private Baccalaureate Liberal and General colleges and universities. Standard

multiple regression was used to analyze the relationship between institutional expenditures and retention and graduation rates. Results indicated that institutional expenditures do significantly predict retention and graduation rates. Expenditures dedicated to instruction, academic support, and institutional grants positively contributed to retention and graduation rates whereas expenditures dedicated to student services and institutional support did not enhance retention and graduation rates positively.

The results of this study have important implications for institutional leaders. In these times of financial pressures, higher education leaders are going to need to take a more critical look at how and where their money is being spent (Rhodes, 2001). In the reauthorization of the Higher Education Act Congress may look at ways to reward institutions that do well in retaining and graduating students (Wolanin, 2003). It appears that in the predictable future that the public will continue to pressure institutions to illustrate their accountability by retaining and graduating students. This study provides an indication of how financial plans and decisions can, at an institutional level, influence student retention to graduation.

APPENDIX A:

PERCENTAGE E&G REVENUES & EXPENDITURES AT PRIVATE NOT-FOR PROFIT BACHELOR'S INSTITUTIONS

Table 26.—Percentage composition of E&G revenue and expenditure at private not-for-profit bachelor's institutions, on average: 1988–89 to 1995–96

	1988–89	1989–90	1990–91	1991–92	1992–93	1993–94	1994–95	1995–96
Tuition	60.6	61.9	63.3	64.1	65.0	66.4	66.6	64.8
Federal appropriations	0.3	0.3	0.2	0.2	0.2	0.0 *	0.0	0.0
State appropriations	0.4	0.4	0.4	0.3	0.3	0.2	0.1	0.1
Local appropriations	0.1	0.0 *	0.0 *	0.0	0.0	0.0	0.0	0.0
Federal grants and contracts	7.7	7.4	6.9	7.2	7.5	7.0	6.8	6.1
State grants and contracts	3.0	3.0	2.9	3.2	3.2	3.0	3.0	2.8
Local grants and contracts	0.0 *	0.0 *	0.0 *	0.0 *	0.0 *	0.0 *	0.0 *	0.1
Private gifts, grants, and contracts	14.4	13.6	13.2	12.4	12.6	12.1	11.9	13.0
Endowment income	9.6	9.5	9.3	9.2	8.1	8.1	8.2	8.8
Sales and services of educational activities	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3
Other	3.5	3.5	3.3	3.2	2.8	2.8	3.1	4.0
E&G revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Instruction	29.1	28.9	29.3	28.9	28.7	28.4	28.3	28.3
Research	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.8
Public service	0.9	1.0	1.0	0.8	0.9	0.9	1.0	0.9
Academic support	6.7	6.8	6.7	6.6	6.5	6.5	6.6	6.6
Student services	10.3	10.2	10.3	10.2	10.2	10.2	10.2	10.3
Institutional support	17.5	17.2	17.1	16.6	16.2	16.1	16.0	16.3
Plant operation/maintenance	9.8	9.5	9.3	8.9	8.7	8.6	8.4	8.3
Scholarships and fellowships	20.6	21.0	21.7	23.5	24.6	24.9	25.5	25.1
Mandatory transfers	2.0	1.9	1.8	1.7	1.7	1.7	1.8	1.7
Nonmandatory transfers	3.5	3.6	2.7	2.1	2.0	1.9	1.4	1.9
E&G expenditures	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

N = 451

*Values round to less than .1 percent.

NOTE: Percentages may not sum to 100 due to rounding. Dollar amounts were converted to constant 1999 dollars using the CPI-U (1982–84 = 100) before percentage shares were calculated. All revenue and expenditure categories are per full-time equivalent (FTE) student.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Full Collection Years 1989 to 1996.

APPENDIX B:

DEFINITIONS OF VARIABLES, CALCULATION PROCEDURES, DESCRIPTIONS OF THE DATABASE AND CATEGORIES

Table B1. Definition, Calculation Procedures, Description of the Database and Categories Used to Locate the Variables for Research Questions 1, 3, and 4

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students.	IPEDS; Enrollment; 2001; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total part-time undergraduates' Grand total men; grand total women (NCES, 2001a) IPEDS; Enrollment; 2001; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total full-time undergraduates' Grand total men; grand total women (NCES, 2001a).
IES	Instruction expenditure per student	Instruction expenditures divided by FTE	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; instruction - total amount (NCES, 2002b).
ASES	Academic support expenditures per student	Academic support expenditures divided by FTE	IPEDS ; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; academic support - total amount (NCES, 2002b).
SSES	Student services expenditures per student	Student services expenditures divided by FTE	IPEDS ; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; student services - total amount (NCES, 2002b).
ISES	Institutional support expenditures per student	Institutional support expenditures divided by FTE	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; institutional support - total amount (NCES, 2002b).
IGES	Institutional grants expenditures per students	Institutional grants divided by FTE	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Student grants; total institutional grants (funded) and total institutional grants (unfunded) (NCES, 2002b).
INS SELECT	Degree of admission's competitiveness	Incoming students' SAT/ACT, high school rank, high school grade point average and the percentage of applicants who were accepted	*Barron's Profiles of American Colleges of 2001(Barron's,* 2000).
RETEN	Retention	Average proportion of freshmen entering between 1998 and 2001 who returned the subsequent year.	US News' America's Best Colleges 2004 (*US News, 2003*). Average freshman retention rate

Table B2. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Questions 2, 3, and 4

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students. Add FTEs for 1996-2001 and divide by 6 to get average full-time enrollment for past six years.	IPEDS; Enrollment; 2001, 2000, 1999, 1998, 1997, 1996; Race/ethnicity gender, attendance status, and level of student, Total part-time undergraduates' Grand total men; grand total women. (NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997; NCES 1996). IPEDS; Enrollment; 2001, 2000, 1999, 1998, 1997, 1996; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total full-time undergraduates' Grand total men; grand total women (NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997; NCES 1996).
IES	Instruction expenditure per student	Instruction expenditures divided by FTE for 1997-2002b to get instruction expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add instruction expenditures per student for 1997-2002b and divide by 6 to get average instruction expenditures per student.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; instruction - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
ASES	Academic support expenditures per student	Academic support expenditures divided by FTE for 1997-2002b to get academic support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add academic support expenditures per student for 1997-2002b and divide by 6 to get average academic support expenditures per student.	IPEDS ; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; academic support - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).

Table B2. (continued)

Variable	Definition	Calculated	Database and Categories
SSES	Student services expenditures per student	Student services expenditures divided by FTE for 1997-2002b to get student support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add student services expenditures per student for 1997-2002b and divide by 6 to get average student services expenditures per student.	IPEDS ; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; student services - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
ISES	Institutional support expenditures per student	Institutional support expenditures divided by FTE for 1997-2002b to get institutional support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional support expenditures per student for 1997-2002b and divide by 6 to get average institutional support expenditures per student.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; institutional support - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
IGES	Institutional grants expenditures per students	Institutional grants divided by FTE for 1997-2002b to get institutional grant expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional grants per student for 1997-2002b and divide by 6 to get average institutional grants expenditures per student.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Student grants; total institutional grants (funded) and total institutional grants (unfunded) (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
INS SELECT	Degree of admission's competitiveness	Incoming students' SAT/ACT, high school rank, high school grade point average and the percentage of applicants who were accepted	*Barron's Profiles of American Colleges of 2001 (Barron's,* 2000).
GRAD	Graduation	The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1993 and 1996	US News' America's Best Colleges 2004 (*US News, 2003*). Average graduation rate

Table B3. Definition, Calculation Procedures, Description of the Database and Categories Used to Locate the Variables for Research Questions 5, 7, and 8

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students.	IPEDS; Enrollment; 2001; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total part-time undergraduates' Grand total men; grand total women (NCES, 2001a). IPEDS; Enrollment; 2001; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total full-time undergraduates' Grand total men; grand total women (NCES, 2001a).
TES	Total Expenditures per Student	Total Expenditures divided by FTE	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; total (NCES, 2002b).
PEI	Percentage of Expenditures for Instruction	IES divided by TES	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; instruction - total amount (NCES, 2002b).
PEAS	Percentage of Expenditures for Academic Support	ASES divided by TES	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; academic support - total amount (NCES, 2002b).
PESS	Percentage of Expenditures for Student Services	SSES divided by TES	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; student services - total amount (NCES, 2002b).
PEIS	Percentage of Expenditures for Institutional Support	ISES divided by TES	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; institutional support - total amount (NCES, 2002b).
PEIG	Percentage of Expenditures for Institutional Grants	IGES divided by TES	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Student grants; total institutional grants (funded) and total institutional grants (unfunded) (NCES, 2002b).
INS SELECT	Degree of admission's competitiveness	Incoming students' SAT/ACT, high school rank, high school grade point average and the percentage of applicants who were accepted	*Barron's Profiles of American Colleges of 2001 (Barron's,* 2000).

Table B3. (continued)

Variable	Definition	Calculated	Database and Categories
RETEN	Retention	Average proportion of freshmen entering between 1998 and 2001 who returned the subsequent year.	US News' America's Best Colleges 2004 (*US News, 2003*). Average freshman retention rate

Table B4. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Questions 6, 7, and 8

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students. Add FTEs for 1996-2001 and divide by 6 to get average full-time enrollment for past six years.	IPEDS; Enrollment; 2001, 2000, 1999, 1998, 1997, 1996; Race/ethnicity gender, attendance status, and level of student, Total part-time undergraduates' Grand total men; grand total women (NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997; NCES 1996). IPEDS; Enrollment; 2001, 2000, 1999, 1998, 1997, 1996; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total full-time undergraduates' Grand total men; grand total women (NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997; NCES 1996).
TES	Total Expenditures per Student	Total Expenditures divided by FTE for 1997-2002b to get total expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add total expenditures per student for 1997-2002b and divide by 6 to get average total expenditures per student.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; total (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
PEI	Percentage of Expenditures for Instruction	Instruction expenditures divided by FTE for 1997-2002b to get instruction expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add instruction expenditures per student for 1997-2002b and divide by 6 to get average instruction expenditures per student. Divide average instruction expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; instruction - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).

Table B4. (continued)

Variable	Definition	Calculated	Database and Categories
PEAS	Percentage of Expenditures for Academic Support	Academic support expenditures divided by FTE for 1997-2002b to get academic support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add academic support expenditures per student for 1997-2002b and divide by 6 to get average academic support expenditures per student. Divide average academic support expenditures per student by 6-year average for TES.	IPEDS ; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; academic support - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
PESS	Percentage of Expenditures for Student Services	Student services expenditures divided by FTE for 1997-2002b to get student support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add student services expenditures per student for 1997-2002b and divide by 6 to get average student services expenditures per student. Divide average student services expenditures per student by 6-year average for TES.	IPEDS ; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; student services - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
PEIS	Percentage of Expenditures for Institutional Support	Institutional support expenditures divided by FTE for 1997-2002b to get institutional support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional support expenditures per student for 1997-2002b and divide by 6 to get average institutional support expenditures per student. Divide average institutional support per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; institutional support - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).

Table B4. (continued)

Variable	Definition	Calculated	Database and Categories
PEIS	Percentage of Expenditures for Institutional Support	Institutional support expenditures divided by FTE for 1997-2002b to get institutional support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional support expenditures per student for 1997-2002b and divide by 6 to get average institutional support expenditures per student. Divide average institutional support per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; institutional support - total amount (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
PEIG	Percentage of expenditures for institutional grants	Institutional grants divided by FTE for 1997-2002b to get institutional grant expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional grants per student for 1997-2002b and divide by 6 to get average institutional grants expenditures per student. Divide average institutional grant expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Student grants; total institutional grants (funded) and total institutional grants (unfunded) (NCES, 2002b: NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
GRAD	Graduation	The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1993 and 1996	US News' America's Best Colleges 2004 (*US News, 2003*) Average graduation rate
INS SELECT	Degree of admission's competitiveness	Incoming students' SAT/ACT, high school rank, high school grade point average and the percentage of applicants who were accepted	*Barron's Profiles of American Colleges of 2001(Barron's,* 2000).

Table B5. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Question 9

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students for 2002b, 1997, 1992	IPEDS; Enrollment; 2001; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total part-time undergraduates' Grand total men; grand total women (NCES, 2001a). IPEDS; Enrollment; 2001; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total full-time undergraduates' Grand total men; grand total women (NCES, 2001a). IPEDS; Enrollment; 1996: Race/ethnicity gender, attendance status, and level of student; Total part-time undergraduates; total men; total women (NCES, 1996). IPEDS; Enrollment; 1996: Race/ethnicity gender, attendance status, and level of student; Total full-time undergraduates; total men; total women (NCES, 1997). IPEDS; Enrollment; 1991: Fall enrollments by race/ethnicity gender, attendance status, and level of student; Total part-time undergraduates; total men; total women (NCES, 1991). IPEDS; Enrollment; 1991: Fall enrollments by race/ethnicity gender, attendance status, and level of student; Total full-time undergraduates; total men; total women (NCES, 1991).
IES	Instruction expenditures per student	Instruction expenditures divided by FTE for 2002b, 1997, 1992	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; instruction - total amount (NCES, 2002b). IPEDS; Finance; 1997; Private, not-for-profit 4-year and 2-year; Expenses by function; instruction (NCES, 1997). IPEDS; Finance; 1992; Current funds expenditures and transfers; Instruction, total. (NCES, 1992).

Table B5. (continued)

Variable	Definition	Calculated	Database and Categories
ASES	Academic support expenditures per student	Academic support expenditures divided by FTE for 2002b, 1997, 1992	IPEDS ; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; academic support - total amount (NCES, 2002b) IPEDS; Finance; 1997; Private, not-for-profit 4-year and 2-year; Expenses by function; Academic support (NCES, 1997). IPEDS; Finance; 1992; Current funds expenditures and transfers; Academic support, total. (NCES, 1992).
SSES	Student services expenditures per student	Student services expenditures divided by FTE for 2002b, 1997, 1992	IPEDS ; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; student services - total amount (NCES, 2002b). IPEDS; Finance; 1997; Private, not-for-profit 4-year and 2-year; Expenses by function; Student services (NCES, 1997). IPEDS; Finance; 1992; Current funds expenditures and transfers; Student services, total (NCES, 1992).
ISES	Institutional support expenditures per student	Institutional support expenditures divided by FTE for 2002b, 1997, 1992	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; institutional support - total amount (NCES, 2002b). IPEDS; Finance; 1997; Private, not-for-profit 4-year and 2-year; Expenses by function; institutional support (NCES, 1997). IPEDS; Finance; 1992; Current funds expenditures and transfers; Institutional support, total (NCES, 1992).

Table B5. (continued).

Variable	Definition	Calculated	Database and Categories
IGES	Institutional grants expenditures per students	Institutional grants divided by FTE for 2002b, 1997, 1992	IPEDS; Finance; 2002b; Private, not for profit, institutions or public institutions using FASB; Student grants; total institutional grants (funded) and total institutional grants (unfunded) (NCES, 2002b). IPEDS: Finance: 1997; Private, not-for-profit, 4-year and 2-year; Revenues and investment return and student aid; student aid: institutional grants (funded) and student aid: institutional grants (unfunded) (NCES, 1997). IPEDS: Finance, 1992; Scholarship and fellowship expenditures; Total institutional scholarships and fellowships (NCES, 1992).
RETEN	Retention	2002b: Average proportion of freshmen entering between 1998 and 2001 who returned the subsequent year. 1997: Average proportion of freshmen entering between 1993 and 1996 who returned the subsequent year. 1992: Average proportion of freshmen entering between 1989 and 1991 who returned the subsequent year.	US News' America's Best Colleges 2004 (*US News, 2003*). Average freshman retention rate US News' America's Best Colleges 1999 (*US News, 1998*). Average freshman retention rate US News' America's Best Colleges 1994 (*US News, 1993*). Average freshman retention rate

Table B5. (continued).

Variable	Definition	Calculated	Database and Categories
GRAD	Graduation	2002b: The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1993 and 1996	US News' America's Best Colleges 2004 (*US News, 2003*). Average graduation rate
		1997: The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1988 and 1991.	US News' America's Best Colleges 1999 (*US News, 1998*). Average graduation rate
		1992: The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1983 and 1986.	US News' America's Best Colleges 1994 (*US News, 1993*). Average graduation rate

Table B6. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Question 10

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	2002b: Part-time undergraduate students multiplied by .33 plus full-time undergraduate students. Add FTEs for 1996-2001 and divide by 6 to get average full-time enrollment for past six years.	IPEDS; Enrollment; 2001, 2000, 1999, 1998, 1997, 1996; Race/ethnicity gender, attendance status, and level of student, Total part-time undergraduates' Grand total men; grand total women (NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997; NCES 1996). IPEDS; Enrollment; 2001, 2000, 1999, 1998, 1997, 1996; Race/ethnicity gender, attendance status, and level of student, Fall 2001; Total full-time undergraduates' Grand total men; grand total women (NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997; NCES 1996).
		1997: Part-time undergraduate students multiplied by .33 plus full-time undergraduate students. Add FTEs for 1991-1996 and divide by 6 to get average full-time enrollment for past six years.	IPEDS; Enrollment; 1996, 1995, 1994, 1993, 1992, 1991;: Race/ethnicity gender, attendance status, and level of student; Total part-time undergraduates; total men; total women (NCES, 1996; NCES 1995; NCES 1994; NCES 1993; NCES 1992; NCES 1991). IPEDS; Enrollment; 1996, 1995, 1994, 1993, 1992, 1991;: Race/ethnicity gender, attendance status, and level of student; Total full-time undergraduates; total men; total women (NCES, 1996; NCES 1995; NCES 1994; NCES 1993; NCES 1992; NCES 1991).
		1992: Part-time undergraduate students multiplied by .33 plus full-time undergraduate students. Add FTEs for 1986 - 1991 and divide by 6 to get average full-time enrollment for past six years.	IPEDS; Enrollment; 1991, 1990, 1989, 1988; 1987; 1986: Fall enrollments by race/ethnicity gender, attendance status, and level of student; Total part-time undergraduates; total men; total women (NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987; NCES, 1986). IPEDS; Enrollment; 1991, 1990, 1989, 1988; 1987; 1986: Fall enrollments by race/ethnicity gender, attendance status, and level of student; Total full-time undergraduates; total men; total women (NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987; NCES, 1986).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
TES	Total Expenditures per Student	2002b: Total Expenditures divided by FTE for 1997-2002b to get total expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add total expenditures per student for 1997-2002b and divide by 6 to get average total expenditures per student.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; total (NCES, 2002b; NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
		1997: Total expenditures divided by FTE for 1992-1997 to get total expenditures per student for 1992, 1993, 1994, 1995, 1996, 1997. Add total expenditures per student and divide by 6 to get average total expenditures per students.	IPEDS; Finance; 1997; 1996, 1995, 1994, 1993, 1992; Private, not-for-profit 4-year and 2-year; Expenses by function; Total (NCES, 1997; NCES 1996; NCES, 1995; NCES, 1994; NCES, 1993; NCES, 1992).
		1992: Total expenditures divided by FTE for 1987-1992 to get total expenditures per student for 1987, 1988, 1989, 1990, 1991, and 1992. Add total expenditures per student and divide by 6 to get average total expenditures per students.	IPEDS; Finance; 1992, 1991, 1990, 1989, 1988, 1987; Current funds expenditures and transfers; Total (NCES, 1992; NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
PEI	Percentage of Expenditures for Instruction	2002b: Instruction expenditures divided by FTE for 1997-2002b to get instruction expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add instruction expenditures per student for 1997-2002b and divide by 6 to get average instruction expenditures per student. Divide average instruction expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; instruction - total amount (NCES, 2002b; NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
		1997: Instruction expenditures divided by FTE for 1992-1997 to get instruction expenditures per student for 1992, 1993, 1994, 1995, 1996, 1997. Add instruction expenditures per student for 1993-1997 and divide by 6 to get average instruction expenditures per student. Divide average instruction expenditures per student by 6-year average for 1997 TES.	PEDS; Finance; 1997; 1996, 1995, 1994, 1993, 1992; Private, not-for-profit 4-year and 2-year; Expenses by function; Instruction (NCES, 1997; NCES 1996; NCES, 1995; NCES, 1994; NCES, 1993; NCES, 1992).
		1992: Instruction expenditures divided by FTE for 1987-1992 to get instruction expenditures per student for 1987, 1988, 1989, 1990, 1991, and 1992. Add instruction expenditures per student for 1987-1992 and divide by 6 to get average instruction expenditures per student. Divide average instruction expenditures per student by 6-year average for TES.	IPEDS; Finance; 1992, 1991, 1990, 1989, 1988, 1987; Current funds expenditures and transfers; Instruction (NCES, 1992; NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
PEAS	Percentage of Expenditures for Academic Support	2002b: Academic support expenditures divided by FTE for 1997-2002b to get academic support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add academic support expenditures per student for 1997-2002b and divide by 6 to get average academic support expenditures per student. Divide average academic support expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; Academic support - total amount (NCES, 2002b; NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
		1997: Academic support expenditures divided by FTE for 1992-1997 to get academic support expenditures per student for 1992, 1993, 1994, 1995, 1996, 1997. Add academic support expenditures per student for 1993-1997 and divide by 6 to get average academic support expenditures per student. Divide average academic support expenditures per student by 6-year average for TES.	IPEDS; Finance; 1997; 1996, 1995, 1994, 1993, 1992; Private, not-for-profit 4-year and 2-year; Expenses by function; Academic support (NCES, 1997; NCES 1996; NCES, 1995; NCES, 1994; NCES, 1993; NCES, 1992).
		1992: Instruction expenditures divided by FTE for 1987-1992 to get academic support expenditures per student for 1987, 1988, 1989, 1990, 1991, and 1992. Add academic support expenditures per student for 1987-1992 and divide by 6 to get average academic support expenditures per student. Divide average academic support expenditures per student by 6-year average for TES.	IPEDS; Finance; 1992, 1991, 1990, 1989, 1988, 1987; Current funds expenditures and transfers; Academic support (NCES, 1992; NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
PESS	Percentage of Expenditures for Student Services	2002b: Student services expenditures divided by FTE for 1997-2002b to get student services expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add student services expenditures per student for 1997-2002b and divide by 6 to get average student services expenditures per student. Divide average student services expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; Student services - total amount (NCES, 2002b; NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
		1997: Student services expenditures divided by FTE for 1992-1997 to get student services expenditures per student for 1992, 1993, 1994, 1995, 1996, 1997. Add student services expenditures per student for 1993-1997 and divide by 6 to get average student services expenditures per student. Divide average student services expenditures per student by 6-year average for 1997 TES.	IPEDS; Finance; 1997; 1996, 1995, 1994, 1993, 1992; Private, not-for-profit 4-year and 2-year; Expenses by function; Student services (NCES, 1997; NCES 1996; NCES, 1995; NCES, 1994; NCES, 1993; NCES, 1992).
		1992: Student services expenditures divided by FTE for 1987-1992 to get student services expenditures per student for 1987, 1988, 1989, 1990, 1991, and 1992. Add student services expenditures per student for 1987-1992 and divide by 6 to get average student services expenditures per student. Divide average student services expenditures per student by 6-year average for TES.	IPEDS; Finance; 1992, 1991, 1990, 1989, 1988, 1987; Current funds expenditures and transfers; Student services (NCES, 1992; NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
PEIS	Percentage of Expenditures for Institutional Support	2002b: Institutional support expenditures divided by FTE for 1997-2002b to get institutional support expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional support expenditures per student for 1997-2002b and divide by 6 to get average institutional support expenditures per student. Divide average institutional support expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; Institutional support - total amount (NCES, 2002b; NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
		1997: Institutional support expenditures divided by FTE for 1992-1997 to get institutional support expenditures per student for 1992, 1993, 1994, 1995, 1996, 1997. Add institutional support expenditures per student for 1993-1997 and divide by 6 to get average institutional support expenditures per student. Divide average institutional support expenditures per student by 6-year average for 1997 TES.	IPEDS; Finance; 1997; 1996, 1995, 1994, 1993, 1992; Private, not-for-profit 4-year and 2-year; Expenses by function; Institutional support (NCES, 1997; NCES 1996; NCES, 1995; NCES, 1994; NCES, 1993; NCES, 1992).
		1992: Institutional support expenditures divided by FTE for 1987-1992 to get institutional support expenditures per student for 1987, 1988, 1989, 1990, 1991, and 1992. Add institutional support expenditures per student for 1987-1992 and divide by 6 to get average institutional support expenditures per student. Divide average instruction expenditures per student by 6-year average for TES.	IPEDS; Finance; 1992, 1991, 1990, 1989, 1988, 1987; Current funds expenditures and transfers; Institutional support (NCES, 1992; NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
PEIG	Percentage of expenditures for institutional grants	2002b: Institutional grants expenditures divided by FTE for 1997-2002b to get institutional grants expenditures per student for 1997, 1998, 1999, 2001, and 2002b. Add institutional grants expenditures per student for 1997-2002b and divide by 6 to get average institutional grants expenditures per student. Divide average institutional grants expenditures per student by 6-year average for TES.	IPEDS; Finance; 2002b, 2001, 2000, 1999, 1998, 1997; Private, not for profit, institutions or public institutions using FASB; Expenses by function and natural classification; Institutional grants - total amount (NCES, 2002b; NCES, 2001a; NCES, 2000; NCES, 1999; NCES 1998; NCES 1997).
		1997: Institutional grants expenditures divided by FTE for 1992-1997 to get institutional grants expenditures per student for 1992, 1993, 1994, 1995, 1996, 1997. Add institutional grants expenditures per student for 1993-1997 and divide by 6 to get average instruction expenditures per student. Divide average institutional grants expenditures per student by 6-year average for 1997 TES.	IPEDS; Finance; 1997; 1996, 1995, 1994, 1993, 1992; Private, not-for-profit 4-year and 2-year; Expenses by function; Institutional grants (NCES, 1997; NCES 1996; NCES, 1995; NCES, 1994; NCES, 1993; NCES, 1992).
		1992: Institutional grants expenditures divided by FTE for 1987-1992 to get institutional grants expenditures per student for 1987, 1988, 1989, 1990, 1991, and 1992. Add institutional grants expenditures per student for 1987-1992 and divide by 6 to get average institutional grants expenditures per student. Divide average institutional grants expenditures per student by 6-year average for TES.	IPEDS; Finance; 1992, 1991, 1990, 1989, 1988, 1987; Current funds expenditures and transfers; Institutional grants (NCES, 1992; NCES, 1991; NCES 1990; NCES, 1989; NCES, 1988; NCES, 1987).

Table B6. (continued)

Variable	Definition	Calculated	Database and Categories
RETEN	Retention	2002b: Average proportion of freshmen entering between 1998 and 2001 who returned the subsequent year.	US News' America's Best Colleges 2004 (*US News, 2003*). Average freshman retention rate
		1997: Average proportion of freshmen entering between 1993 and 1996 who returned the subsequent year.	US News' America's Best Colleges 1999 (*US News, 1998*). Average freshman retention rate
		1992: Average proportion of freshmen entering between 1989 and 1991 who returned the subsequent year.	US News' America's Best Colleges 1994 (*US News, 1993*). Average freshman retention rate
GRAD	Graduation	2002b: The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1993 and 1996	US News' America's Best Colleges 2004 (*US News, 2003*). Average graduation rate
		1997: The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1988 and 1991.	US News' America's Best Colleges 1999 (*US News, 1998*). Average graduation rate
		1992: The percentage of freshmen who graduated within a six-year period, averaged over classes entering between 1983 and 1986.	US News' America's Best Colleges 1994 (*US News, 1993*). Average graduation rate

APPENDIX C:

CORRELATION MATRICES FOR RESEARCH QUESTIONS 1 - 10

Table C1. Research Question 1: Correlation Matrix for Institutional Expenditures Per Student and Retention Rates

	RETEN02	IES	ASES	SSES	ISES	IGES
RETEN02	1.000	-----	-----	-----	-----	-----
IES	.711	1.000	-----	-----	-----	-----
ASES	.576	.727	1.000	-----	-----	-----
SSES	.455	.649	.613	1.000	-----	-----
ISES	.432	.618	.526	.480	1.000	
IGES	.587	.606	.511	.558	.358	1.000

Table C2. Research Question 3: Correlation Matrix for Institutional Expenditures Per Student, Institutional Selectivity and Retention Rates

	RETEN02	IES	ASES	SSES	ISES	IGES	INS SELECT
RETEN02	1.000	-----	-----	-----	-----	-----	-----
IES	.706	1.000	-----	-----	-----	-----	-----
ASES	.572	.730	1.000	-----	-----	-----	-----
SSES	.455	.650	.614	1.000	-----	-----	-----
ISES	.430	.615	.534	.477	1.000	-----	-----
IGES	.583	.597	.507	.560	.359	1.000	-----
INS SELECT	.708	.662	.523	.478	.413	.482	1.000

Table C3. Research Question 4: Correlation Matrix for Institutional Expenditures Per Student and Retention Rates at Low Selectivity Institutions (0) and High Selectivity Institutions (1).

HILOW		RETEN02	IES	ASES	SSES	ISES	IGES
0 (Low)	RETEN02	1.000	-----	-----	-----	-----	-----
	IES	.490	1.000	-----	-----	-----	-----
	ASES	.304	.546	1.000	-----	-----	-----
	SSES	.211	.551	.483	1.000	-----	-----
	ISES	.197	.421	.356	.311	1.000	-----.
	IGES	.441	.457	.379	.467	.155	1.000
1 (High)	RETEN02	1.000	-----	-----	-----	-----	-----
	IES	.611	1.000	-----	-----	-----	-----
	ASES	.606	.766	1.000	-----	-----	-----
	SSES	.384	.548	.582	1.000	-----	-----
	ISES	.373	.666	.560	.479	1.000	-----
	IGES	.416	.516	.409	.477	.410	1.000

Table C4. Research Question 2: Correlation Matrix for Institutional Expenditures Per Student and Graduation Rates

	02GRAD	AVIES	AVASES	AVSSES	AVISES	AVIGES
02 GRAD	1.000	-----	-----	-----	-----	-----
AVIES	.732	1.000	-----	-----	-----	-----
AVASES	.606	.708	1.000	-----	-----	-----
AVSSES	.474	.634	.585	1.000	-----	-----
AVISES	.366	.590	.547	.508	1.000	-----
AVIGES	.580	.629	.487	.614	.368	1.000

Table C5. Research Question 2: Correlation Matrix for Institutional Expenditures Per Student, Institutional Selectivity and Graduation Rates

	02GRAD	AVIES	AVASES	AVSSES	AVISES	AVIGES	INS SELECT
02 GRAD	1.000	-----	-----	-----	-----	-----	-----
AVIES	.724	1.000	-----	-----	-----	-----	-----
AVASES	.599	.705	1.000	-----	-----	-----	-----
AVSSES	.479	.637	.586	1.000	-----	-----	-----
AVISES	.358	.591	.561	.513	1.000	-----	-----
AVIGES	.583	.633	.486	.616	.373	1.000	-----
INS SELECT	.717	.672	.550	.452	.407	.499	1.000

Table C6. Research Question 4: Correlation Matrix for Institutional Expenditures Per Student and Graduation Rates at Low Selectivity Institutions (0) and High Selectivity Institutions (1)

HILOW		02GRAD	AVIES	AVASES	AVSSES	AVISES	AVIGES
0 (Low)	02 GRAD	1.000	-----	-----	-----	-----	-----
	AVIES	.493	1.000	-----	-----	-----	-----
	AVASES	.335	.534	1.000	-----	-----	-----
	AVSSES	.274	.568	.469	1.000	-----	-----
	AVISES	.052	.427	.415	.463	1.000	-----
	AVIGES	.480	.487	.363	.521	.169	1.000
1.00 (High)	02 GRAD	1.000	-----	-----	-----	-----	-----
	AVIES	.525	1.000	-----	-----	-----	-----
	AVASES	.501	.748	1.000	-----	-----	-----
	AVSSES	.394	.539	.571	1.000	-----	-----
	AVISES	.277	.664	.581	.489	1.000	-----
	AVIGES	.241	.441	.372	.407	.383	1.000

Table C7. Research Question 5: Correlation Matrix for Percentage of Institutional Expenditures and Retention Rates

	RETEN02	PEI2	PEAS	PESS	PEIS	PEIG
RETEN02	1.000	-----	-----	-----	-----	-----
PEI2	.349	1.000	-----	-----	-----	-----
PEAS	.302	.208	1.000	-----	-----	-----
PESS	-.097	.184	.130	1.000	-----	-----
PEIS	-.258	-.211	-.191	-.099	1.000	-----
PEIG	.268	.299	.118	.375	-.179	1.000

Table C8. Research Question 7: Correlation Matrix for Percentage of Institutional Expenditures, Institutional Selectivity and Retention Rates

	RETEN02	PEI2	PEAS	PESS	PEIS	PEIG	INS SELECT
RETEN02	1.000	-----	-----	-----	-----	-----	-----
PEI2	.334	1.000	-----	-----	-----	-----	-----
PEAS	.302	.188	1.000	-----	-----	-----	-----
PESS	-.087	.194	.122	1.000	-----	-----	-----
PEIS	-.262	-.224	-.201	-.107	1.000	-----	-----
PEIG	.260	.285	.101	.389	-.175	1.000	-----
INS SELECT	.715	.250	.229	-.045	-.240	.165	1.000

Table C9. Research Question 8: Correlation Matrix for Percentage of Institutional Expenditures and Retention Rates at Low Selectivity Institutions (0) and High Selectivity Institutions (1)

HILOW		RETEN02	PEI2	PEAS	PESS	PEIS	PEIG
.00 (Low)	RETEN02	1.000	-----	-----	-----	-----	-----
	PEI2	.264	1.000	-----	-----	-----	-----
	PEAS	.155	.121	1.000	-----	-----	-----
	PESS	-.009	.285	.146	1.000	-----	-----
	PEIS	-.167	-.167	-.129	-.169	1.000	-----
	PEIG	.309	.300	.139	.471	-.184	1.000
1.00 (High)	RETEN02	1.000	-----	-----	-----	-----	-----
	PEI2	.292	1.000	-----	-----	-----	-----
	PEAS	.432	.245	1.000	-----	-----	-----
	PESS	-.154	.059	.118	1.000	-----	-----
	PEIS	-.219	-.265	-.277	-.025	1.000	-----
	PEIG	-.065	.140	-.102	.263	-.032	1.000

Table C10. Research Question 6: Correlation Matrix for Percentage of Institutional Expenditures and Graduation Rates

	02 GRAD	AVPEI	AVPEAS	AVPESS	AVPEIS	AVPEIG
02 GRAD	1.000	-----	-----	-----	-----	-----
AVPEI	.419	1.000	-----	-----	-----	-----
AVPEAS	.336	.152	1.000	-----	-----	-----
AVPESS	-.091	.058	.043	1.000	-----	-----
AVPEIS	-.358	-.379	-.204	-.052	1.000	-----
AVPEIG	.282	.252	.018	.329	-.263	1.000

Table C11. Research Question 7: Correlation Matrix for Percentage of Institutional Expenditures, Institutional Selectivity and Graduation Rates

	02 GRAD	AVPEI	AVPEAS	AVPESS	AVPEIS	AVPEIG	INS SELECT
02 GRAD	1.000	-----	-----	-----	-----	-----	-----
AVPEI	.397	1.000	-----	-----	-----	-----	-----
AVPEAS	.325	.118	1.000	-----	-----	-----	-----
AVPESS	-.083	.056	.032	1.000	-----	-----	-----
AVPEIS	-.383	-.393	-.195	-.047	1.000	-----	-----
AVPEIG	.286	.255	.007	.331	-.259	1.000	-----
INS SELECT	.724	.290	.254	-.123	-.295	.177	1.000

Table C12. Research Question 8: Correlation Matrix for Percentage of Institutional Expenditures and Graduation Rates at Low Selectivity Institutions (0) and High Selectivity Institutions (1)

HILOW		02 GRAD	AVPEI	AVPEAS	AVPESS	AVPEIS	AVPEIG
.00	02 GRAD	1.000	-----	-----	-----	-----	-----
	AVPEI	.331	1.000	-----	-----	-----	-----
	AVPEAS	.167	.062	1.000	-----	-----	-----
	AVPESS	.051	.184	.028	1.000	-----	-----
	AVPEIS	-.301	-.365	-.061	-.120	1.000	-----
	AVPEIG	.353	.247	.025	.428	-.290	1.000
1.00	02 GRAD	1.000	-----	-----	-----	-----	-----
	AVPEI	.318	1.000	-----	-----	-----	-----
	AVPEAS	.420	.095	1.000	-----	-----	-----
	AVPESS	-.046	-.061	.114	1.000	-----	-----
	AVPEIS	-.246	-.313	-.335	-.039	1.000	-----
	AVPEIG	-.088	.142	-.174	.281	-.027	1.000

Table C13. Research Question 9: Correlation Matrix for Institutional Expenditures Per Student and Retention Rates for 1992

	92 RETEN	IES	ASES	SSES	ISES	IGES
92 RETEN	1.000	-----	-----	-----	-----	-----
IES	.680	1.000	-----	-----	-----	-----
ASES	.501	.646	1.000	-----	-----	-----
SSES	.400	.590	.524	1.000	-----	-----
ISES	.374	.616	.488	.526	1.000	-----
IGES	.447	.595	.434	.533	.453	1.000

Table C14. Research Question 9: Correlation Matrix for Institutional Expenditures Per Student and Retention Rates for 1997

	97 RETEN	IES	ASES	SSES	ISES	IGES
97 RETEN	1.000	-----	-----	-----	-----	-----
IES	.682	1.000	-----	-----	-----	-----
ASES	.618	.725	1.000	-----	-----	-----
SSES	.453	.621	.635	1.000	-----	-----
ISES	.429	.625	.601	.569	1.000	-----
IGES	.480	.573	.447	.524	.401	1.000

Table C15. Research Question 9: Correlation Matrix for Institutional Expenditures Per Student and Retention Rates for 2002

	02 RETEN	IES	ASES	SSES	ISES	IGES
02 RETEN	1.000	-----	-----	-----	-----	-----
IES	.722	1.000	-----	-----	-----	-----
ASES	.612	.745	1.000	-----	-----	-----
SSES	.494	.656	.604	1.000	-----	-----
ISES	.461	.653	.539	.533	1.000	-----
IGES	.546	.547	.471	.543	.345	1.000

Table C16. Research Question 9: Correlation Matrix for Institutional Expenditures Per Student and Graduation Rates for 1992

	92 GRAD	AVIES	AVASES	AVSSES	AVISES	AVIGES
92 GRAD	1.000	-----	-----	-----	-----	-----
AVIES	.727	1.000	-----	-----	-----	-----
AVASES	.557	.677	1.000	-----	-----	-----
AVSSES	.469	.605	.565	1.000	-----	-----
AVISES	.372	.578	.502	.613	1.000	-----
AVIGES	.499	.604	.395	.591	.460	1.000

Table C17. Research Question 9: Correlation Matrix for Institutional Expenditures Per Student and Graduation Rates for 1997

	97 GRAD	AVIES	AVASES	AVSSES	AVISES	AVIGES
97 GRAD	1.000	-----	-----	-----	-----	-----
AVIES	.780	1.000	-----	-----	-----	-----
AVASES	.649	.721	1.000	-----	-----	-----
AVSSES	.578	.657	.617	1.000	-----	-----
AVISES	.450	.646	.593	.619	1.000	-----
AVIGES	.647	.645	.481	.618	.464	1.000

Table C18. Research Question 9: Correlation Matrix for Institutional Expenditures Per Student and Graduation Rates for 2002

	02 GRAD	AVIES	AVASES	AVSSES	AVISES	AVIGES
02 GRAD	1.000	-----	-----	-----	-----	-----
AVIES	.734	1.000	-----	-----	-----	-----
AVASES	.640	.712	1.000	-----	-----	-----
AVSSES	.519	.680	.613	1.000	-----	-----
AVISES	.411	.637	.602	.594	1.000	-----
AVIGES	.568	.589	.502	.617	.395	1.000

Table C19. Research Question 10: Correlation Matrix for Percentage of Institutional Expenditures and Retention Rates for 1992

	92 RETEN	PEI	PEAS	PESS	PEIS	PEIG
92 RETEN	1.000	-----	-----	-----	-----	-----
PEI	.354	1.000	-----	-----	-----	-----
PEAS	.255	.063	1.000	-----	-----	-----
PESS	-.150	-.102	.028	1.000	-----	-----
PEIS	-.222	-.154	-.035	-.046	1.000	-----
PEIG	.205	-.063	-.074	.046	-.181	1.000

Table C20. Research Question 10: Correlation Matrix for Percentage of Institutional Expenditures and Retention Rates for 1997

	97 RETEN	PEI	PEAS	PESS	PEIS	PEIG
97 RETEN	1.000	-----	-----	-----	-----	-----
PEI	.369	1.000	-----	-----	-----	-----
PEAS	.427	.278	1.000	-----	-----	-----
PESS	-.044	.108	.212	1.000	-----	-----
PEIS	-.194	-.063	.075	.133	1.000	-----
PEIG	.206	.260	.061	.247	-.020	1.000

Table C21. Research Question 10: Correlation Matrix for Percentage of Institutional Expenditures and Retention Rates for 2002

	02 RETEN	PEI	PEAS	PESS	PEIS	PEIG
02 RETEN	1.000	-----	-----	-----	-----	-----
PEI	.274	1.000	-----	-----	-----	-----
PEAS	.343	.211	1.000	-----	-----	-----
PESS	-.170	.053	.019	1.000	-----	-----
PEIS	-.210	-.157	-.192	-.051	1.000	-----
PEIG	.166	.188	.043	.273	-.122	1.000

Table C22. Research Question 10: Correlation Matrix for Percentage of Institutional Expenditures and GraduationRates for 1992

	92 GRAD	AVPEI	AVPEAS	AVPESS	AVPEIS	AVPEIG
92 GRAD	1.000	-----	-----	-----	-----	-----
AVPEI	.333	1.000	-----	-----	-----	-----
AVPEAS	.371	.125	1.000	-----	-----	-----
AVPESS	-.221	-.205	-.047	1.000	-----	-----
AVPEIS	-.289	-.310	-.137	.016	1.000	-----
AVPEIG	.250	-.023	-.125	-.019	-.220	1.000

Table C23 Research Question 10: Correlation Matrix for Percentage of Institutional Expenditures and Graduation Rates for 1997

	97 GRAD	AVPEI	AVPEAS	AVPESS	AVPEIS	AVPEIG
97 GRAD	1.000	-----	-----	-----	-----	-----
AVPEI	.399	1.000	-----	-----	-----	-----
AVPEAS	.403	.139	1.000	-----	-----	-----
AVPESS	-.158	-.204	.175	1.000	-----	-----
AVPEIS	-.344	-.335	-.076	.095	1.000	-----
AVPEIG	.289	-.002	-.129	-.069	-.222	1.000

Table C24. Research Question 10: Correlation Matrix for Percentage of Institutional Expenditures and Graduation
Rates for 2002

	02 GRAD	AVPEI	AVPEAS	AVPESS	AVPEIS	AVPEIG
02 GRAD	1.000	-----	-----	-----	-----	-----
AVPEI	.345	1.000	-----	-----	-----	-----
AVPEAS	.420	.078	1.000	-----	-----	-----
AVPESS	-.173	.015	.029	1.000	-----	-----
AVPEIS	-.295	-.259	-.208	.034	1.000	-----
AVPEIG	.249	.247	.089	.278	-.119	1.000

APPENDIX D:

COLLEGE ADMISSIONS SELECTOR: DEFINITIONS OF SELECTIVITY RATINGS

Table D1. College Admissions Selector: Definitions of Selectivity Ratings (Barrons, 2000)

Selectivity Rating	Variable Code	Definition
Most Competitive	6	High school rank: Top 10% to 20% Grade averages: A to B+ Median freshmen test scores: SAT I: 655-800; ACT: 29 and above Institutions admit fewer than one-third of their applicants .
Highly Competitive	5	High school rank: Top 20% to 25% Grade averages: B+ to B Median freshmen test scores: SAT I: 620-654; ACT: 27 or 28 Institutions admit between one-third and one-half of their applicants.
Very Competitive	4	High school rank: Top 35% to 50% Grade averages: Not less than a B- Median freshmen test scores: SATI: 573-619; ACT: 24 to 26 Institutions admit between one-half and three quarters of their applicants.
Competitive	3	High school rank: Top 50% to 65% Grade averages: Either B- or above or a minimum of C+ or C. Median freshmen test scores: SAT I: 500-575; ACT: 21 or 23. Institutions accept between 75% to 85% of their applicants
Less Competitive	2	High school rank: Top 65% Grade averages: Admit students with averages below C Median freshmen test scores: SAT I: Below 500; ACT: Below 21 Institutions admit 85% or more of their applicants
Noncompetitive	1	Colleges require only evidence of graduation. Accepts 98% or more of applicants.

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