PLEASE PAY RETENTION:

A QUANTITATIVE ANALYSIS OF INSTITUTIONAL EXPENDITURES AND THEIR IMPACT ON RETENTION AT PUBLIC TWO-YEAR COLLEGES

by:

RAYMOND E. CARNLEY

(Under the Direction of Manuel S. Gonzalez Canche)

ABSTRACT

The study builds on the assumption, drawn from existing theory, that institutional behaviors at public 2-year colleges can impact college student retention rates. Specifically, the purpose of this study was to explore how institutions allocated resources in the areas of instruction, academic support, and student services and assess whether the relationship between these expenditures and retention was consistent with previous research conducted on public and private 4-year colleges. Data were gathered from the Integrated Postsecondary Education Data System (IPEDS) as provided by the National Center for Education Statistics (NCES) for the 2012-13 academic year, the 2013 American Community Survey as provided by the United Stated Census Bureau, and the Bureau of Justice Statistics' Uniform Crime Reporting Statistics database for 2013. All public 2-year and public 4-year colleges in the contiguous United States that completed the IPEDS survey were included in the population and analysis.

Using multiple regression analysis, controlling for percentage of fulltime enrollment, percentage of fulltime faculty, poverty rates, and crime rates, the study found that institutional expenditures for instruction, academic support, and student services

were not good predictors of college student retention rates at public 2-year colleges, especially when other important environmental characteristics were controlled. According to the findings, statistically significant relationships did exist between retention and expenditures for instruction and student services, though neither presented a numerically significant R-squared value. Instead, poverty rates and crime rates were discovered to be the strongest predictor of college student retention for public 2-year colleges. Implications for theory and practice are discussed and recommendations proposed.

INDEX WORDS: College Retention, Institutional Expenditures, Public 2-Year College, Community College, Junior College, Instruction, Academic Support, Student Services, Institutional Behavior, Crime Rate, Poverty Rate.

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DEDICATION

To my wife, Kelley, and our children, Andrew and Margaret. You three are, and will forever be, all my reasons. I love you (x+1).

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With deep appreciation and heartfelt gratitude for you all,

Raymond E. Carnley

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CHAPTER 1

INTRODUCTION

When submitting its proposal to become a member of the Alliance of States for Complete College America, the State of Georgia (2011) stated that funding was "critical in demonstrating that initial investments can pay off in measurable college completion increases" (p. 12). This statement echoes Gansemer-Topf & Schuh's (2006) and Berger (2002) claims that institutional behavior, specifically institutional expenditures, can influence student outcomes in retention, persistence, and graduation. In simpler terms, the way an institution allocates its resources is understood to have a direct and significant correlation to student outcomes.

The State of Georgia's statement also demonstrates increased pressure on institutions to reprioritize spending towards those areas viewed as causally beneficial to increased student outcomes and is reflective of an *Era of Adjustment and Accountability* in higher education (Thelin, 2003). This era, beginning in the early-1970s, saw increased public scrutiny on resource allocation for higher education and resulted in significant changes in how colleges and universities made decisions and allocated resources (McLendon, Hearn, & Deaton, 2006; Thelin, 2003).

The demand for accountability continues today. In 2005, the National Commission on Accountability in Higher Education called for clearer and more efficient methods to assess institution efficiency, spelling out new accountability measures that focused on institutional inputs and educational outcomes (Umfress, 2010). In essence, the commission calls on institutions to demonstrate how their behaviors, including how one

decides to spend available resources, impact student outcomes. In an attempt to demonstrate accountability, many colleges and universities have begun to depend heavily on comparisons between institutional inputs, such as allocations and expenditures of funds, and outputs, such as student retention, to make extrapolations about current funding structures and their impact on outcomes.

The challenge is that limited research exists to justify the comparison of institutional expenditures and student outcomes. What does exist has produced inconsistent, inconclusive, and sometimes contradictory results. Moreover, the research to date has been strictly limited to private and public colleges and universities offering a bachelor's degree or higher. The previously stated assumed relationship is yet to be tested in institutions offering less than a bachelor's degree. Indeed, an in-depth review of the available literature concerning this subject is all but exclusive towards 4-year colleges and universities. Further research is needed to investigate previous conflicting findings and to test the validity of previous results against public 2-year colleges.

Statement of the Problem

This lack of evidence and literature on the relationship between budget allocation and student outcomes is significant when understanding that the primary influencers of student attainment for public 2-year colleges are different when compared to other institutional types (Laskey & Hetzel, 2011; Mertes & Hoover, 2014; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). As an example, public 2-year colleges will generally see a higher concentration of socioeconomically at-risk and academically ill-prepared students when compared to 4-year colleges of either type (Laskey & Hetzel, 2011; Mertes & Hoover, 2014). Both of these factors are known to

play a greater role in student attrition and retention at 2-year colleges when compared to 4-year colleges (ACT Inc., 2010a/2010b/2010c). Thus merely mirroring 4-year colleges' budget allocation in the 2-year sector would not necessarily translate into observed similar student outcomes, as the two populations of students (represented in 2-year and 4-year sectors) may be systematically different. The scarcity of evidence in the public 2-year sector justifies the importance of studying the relationship between budget allocation and student outcomes.

This study analyzes whether institutional expenditures in the areas of instruction, academic support, and student services, as a percentage of the institution's overall budget, have any influence on student retention rates at public 2-year colleges throughout the contiguous United States. Before answering this question, it is necessary to compare the budget allocation public 2-year colleges give to these areas in comparison to 4-year colleges. This study also assesses whether the findings remain consistent when using the dollar amount spent per FTE, rather than percentages, for each of the predictor variables. Explained differently, the study tests whether the significance of the coefficient between the dependent and independent variables remain consistent when assessing institutional expenditures as a dollar amount per FTE rather than a percentage of budget. Finally, this study considers whether the influence of institutional expenditures on student retention remains consistent when controlling for percentage of fulltime enrollment, percentage of fulltime faculty, poverty rates, and crime rates.

Research Questions

The specific research questions guiding this study are as follows:

- Research Question 1: Do public 2-year colleges allocate their budget similarly, both as a percentage of their total budget and as a dollar amount per FTE, on instruction, academic support, and student services when compared to public 4-year colleges?
- Research Question 2: Does the percentage of budget spent on instruction, academic support and student services positively influence student retention at public 2-year colleges?
- Research Question 3: Are the findings in RQ2 consistent when using the dollar amount spent per FTE, rather than percentages, for each of the predictor variables?
- Research Question 4: Are the findings in RQ2 and RQ3 consistent when important institutional and environmental characteristics are controlled?
- Research Question 5: How do the findings in RQ4 compare with public 4-year colleges for the same time period using similar variables?

Definitions

To avoid confusion, this study provides operational definitions and descriptions to allow the reader to better understand key concepts addressed in the study. To ensure correlation between the definition and datasets, all definitions, unless otherwise noted, are pulled directly from the online glossary accompanying the Integrated Postsecondary Education Data System (IPEDS) as provided by the National Center for Education Statistics [NCES] (2015). The following definitions were used:

- *Academic Support Expenditures* – "A functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service. It includes the retention, preservation, and display of educational materials (for example, libraries, museums, and galleries); organized activities that provide support services to the academic functions of the institution (such as a demonstration school associated with a college of education or veterinary and dental clinics if their primary purpose is to support the instructional program); media such as audiovisual services; academic administration (including academic deans but not department chairpersons); and formally organized and separately budgeted academic personnel development and course and curriculum development expenses" (NCES, 2015).
- *Associate's Colleges* – "An institutional classification developed by the Andrew W. Carnegie Foundation for the Advancement of Teaching. Associate's Colleges offer associate's degree and certificate programs but, with few exceptions, award no baccalaureate degrees. This group includes institutions where, during the period studied, bachelor's degrees represented less than 10 percent of all undergraduate awards" (NCES, 2015).
- *Baccalaureate/Associate's Colleges* – "An institutional classification developed by the Andrew W. Carnegie Foundation for the Advancement of Teaching. Baccalaureate/Associate's Colleges are undergraduate colleges where the majority of conferrals are below the baccalaureate level (associate's degrees and certificates). During the period studied, bachelor's degrees accounted for at least ten percent of undergraduate awards" (NCES, 2015).

- *Baccalaureate Colleges (General)* – "An institutional classification developed by the Andrew W. Carnegie Foundation for the Advancement of Teaching. Baccalaureate Colleges - General are primarily undergraduate colleges with major emphasis on baccalaureate programs. During the period studied, they awarded less than half of their baccalaureate degrees in liberal arts fields" (NCES, 2015).
- *Baccalaureate Colleges (Liberal Arts)* – "An institutional classification developed by the Andrew W. Carnegie Foundation for the Advancement of Teaching. Baccalaureate Colleges - Liberal Arts are primarily undergraduate colleges with major emphasis on baccalaureate programs. During the period studied, they awarded at least half of their baccalaureate degrees in liberal arts fields" (NCES, 2015).
- *Institutional Size* – An indicator derived based on the institution's total students enrolled for credit" (NCES, 2015).
- *Instruction Expenditures* – "A functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted. Includes general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions. Also includes expenses for both credit and non-credit activities. Excludes expenses for academic administration where the primary function is administration (e.g., academic deans)" (NCES, 2015).

- *Master's Colleges and Universities I* – "An institutional classification developed by the Andrew W. Carnegie Foundation for the Advancement of Teaching. Master's Colleges and Universities I typically offer a wide range of baccalaureate programs, and they are committed to graduate education through the master's degree. During the period studied, they awarded 40 or more master's degrees per year across three or more disciplines" (NCES, 2015).
- *Master's Colleges and Universities II* – "An institutional classification developed by the Andrew W. Carnegie Foundation for the Advancement of Teaching. Master's Colleges and Universities II typically offer a wide range of baccalaureate programs, and they are committed to graduate education through the master's degree. During the period studied, they awarded 20 or more master's degrees per year" (NCES, 2015).
- *Student Retention* – "A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage. For four-year institutions, this is the percentage of first-time bachelors (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall. For all other institutions this is the percentage of first-time degree/certificate-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall" (NCES, 2015).
- *Student Services Expenditures* – "A functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal

instructional program. Examples include student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Intercollegiate athletics and student health services may also be included except when operated as self-supporting auxiliary enterprises" (NCES, 2015).

- *Student Outcomes* – General term to include student characteristics after exposure to the college environment. Includes college student retention, persistence, graduation, personal and leadership development, student engagement, knowledge gain, communication skills, etc." (Astin, 1993).

CHAPTER 2

LITERATURE REVIEW

As early as the 1960s, student retention has become a highly researched and much debated subject in American higher education (Umfress, 2010). This is largely due to the accepted understanding that the first year of college is a significant factor in predicting student retention, persistence, and graduation (Tinto, 1975; Umfress, 2010; Veenstra, 2009). The first year experience as perceived by the student is a significant influencer on a student's decision to return to college a second year (retention), which greatly increases the probability of said student persisting on to graduation (Tinto, 1975; Veenstra, 2009). Consequently, colleges and universities spend significant resources, both human and financial, in an effort to improve the first year experience as a way of improving student retention. If this investment can help 4-year institutions improve retention rates, such investment would, in theory, be of interest for many community and public 2-year colleges as they tend to experience significantly lower retention rates than 4-year public and private institutions (Mertes & Hoover, 2014; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). However, it is unlikely that 4-year institutions' areas of investment would render similar results in the 2-year sector as students enrolling at each sector may have differing academic and financial needs.

Accountability and Financial Impact

To understand the burgeoning conversation around retention, it becomes necessary to understand why retention is so important. For public 2-year and 4-year colleges, the importance is multi-faceted. Most public institutions receive a significant

amount of their funding through state appropriations – either through performance based-funding or a funding formula using student headcount (Desroches & Hurlburt, 2014; McLendon & Hearn, 2013). In either instance, a public institution can arguably increase its state appropriation by retaining more students. However, the importance transcends a strictly fiscal significance as state governing bodies have begun demanding a higher level of accountability for student outcomes and success.

In 2010, the total fiscal outlay for higher education in America included $304 billion in federal and state tax dollars (Mortenson, 2012). Understandably, an investment of this size requires a level of accountability to the public on how the institution is spending the money to deliver adequate outcomes (McGuinness, 2005; McLendon, Hearn, & Deaton, 2006; Powell, Gilleland, & Person, 2012). Beginning with the Higher Education Act of 1965, institutions of higher education were called upon to be more forthcoming in demonstrating how they were using public dollars to accomplish institutional goals (McLendon, Hearn, & Deaton, 2006). This was a challenge for most institutions, which had historically provided little evidence of productivity or outcomes (Schmidtlein & Berdahl, 2005). However, public trust, influenced by the visible role colleges and universities played in the civil rights movement, gave way to public pressure to demonstrate improved outcomes (McGuinness, 2005; McLendon, Hearn, & Deaton, 2006; Powell, Gilleland, & Person, 2012).

In 1978, the state of Tennessee established the Tennessee Performance Funding Policy (TPFP), establishing the nation's first form of performance-based funding (P-BF) where state funding was tied to institutional outcomes (Bogue & Johnson, 2010). Tennessee's adoption of P-BF, as well as those states that would later follow suit, was an

effort to respond to the drastic change in the national dialogue around accountability in higher education. What had previously been a focus on accountability for expenditures was rapidly shifting towards an accountability of outcome (Bogue & Johnson, 2010; Burke & Modarresi, 2000). Historically, P-BF assessed both qualitative (research, academic merit, rigor, etc.) and quantitative (graduation, retention, and persistence rates) indicators in determining funding (Hermes, 2012; Jones, 2013; McLendon & Hearn, 2013; Rabovsky, 2012; Tandberg & Hillman, 2013). While the majority of today's funding formulas still consider qualitative and quantitative indicators, a much greater emphasis is being placed on the latter (McLendon & Hearn, 2013). The general public has become less concerned with how the institution is spending its money. Now, citizens want to know what the spending is accomplishing.

Since its introduction in 1978, the conversation around P-BF has evolved into one of the primary issues before American higher education. In 2014, a total of 31 states had in place or were actively converting to some model of P-BF (National Conference of State Legislators [NCSL], 2014). This includes seven states that had previously abandoned P-BF (Jones, 2013; NCSL, 2014). An additional five states currently have an active interest in P-BF (Jones, 2013). These figures represent nearly a three-fold increase in just four years. Such a dramatic and rapid change becomes noteworthy in understanding the value colleges and universities associate with retention.

Retention

For many colleges and universities, the retention of students has become fundamentally and strategically linked to retaining a strong financial position (Bylaska, 2008; Tinto, 2006). This not only includes those institutions utilizing P-BF; but nearly all

colleges and universities, as more and more institutions have had to increase their dependency on tuition revenue to ensure fiscal soundness (Government Accountability Office [GAO], 2012). According to the GAO (2012), from 1999 to 2009, public institutions saw an increase in tuition revenue from 16 to 22 percent while private colleges and universities saw an increase from 29 to 40 percent. There are two primary ways to increase tuition revenue – raise the price of tuition or enroll more students (Kinne, Roza, Murphy, & Gross, 2012). Retention relates directly to the latter and helps explain the increased attention, research, and theory related to the topic over the last half-century.

Historical Review

By the 1960s, retention had become an increased topic for conversation, scholarly research, and theory development (Umfress, 2010). Early research around student retention attributed attrition with individual characteristics and behaviors. Essentially, those students who did not return were believed to lack the patience, capacity, or motivation needed for success in college (Tinto, 2006). Very little consideration was given to external factors outside the student's control. It was not until the early-1970s that researchers began to seriously consider external factors and the role they played on student retention (Spady, 1971; Tinto, 1975).

Spady (1971) was among the first researchers to suggest that, while the student's individual behaviors and characteristics do play a significant role in attrition (retention viewed through another lens), external factors also have a significant impact. These included factors such as age, college readiness, and socio-economic status; but also included factors within the institutions control, such as class-size, academic support, and

campus activities. Spady (1971) was able to demonstrate that constructive student behaviors coupled with a compatible college environment resulted in a higher probability for retention.

Spady was the foundation for Tinto's theory of student departure, which remains the gold-standard for retention strategy today (Umfress, 2010). Tinto (1975) proposed that retention strategies are most effective when they address both the academic and social aspects of college life. Another popular theory, Bean's theory of student attrition, is anchored in Tinto's assertion that retention is maximized when student behavior (commitment, determination, and attitude) and institutional behavior (instruction, academic support, and student services) are aligned and complement each other (Bean & Eaton, 2000).

Additional researchers have sought to expand upon Tinto's model, providing new perspectives from a psychological, environmental, organizational, or economic position (Umfress, 2010). Others have, citing Tinto's focus on traditional aged student, sought to expand his model to populations other than traditional undergraduates. These efforts have resulted in many new theories on student retention (Cabrera, Nora, & Castaneda, 1993; Rendon, 1994; St. John, Paulson, & Starkey, 1996; Tinto, 2000). Even still, these new theories draw from Tinto (Umfress, 2010).

2-year vs. 4-year

Traditionally, the focus on improving retention has been placed primarily on improving the student's first year experience (Schroeder, 2013; Turner & Thompson, 2014; Veenstra, 2009). This includes their classroom experiences, but also focuses on academic and social activities outside of the classroom (Melancon & Frederick, 2014;

Schroeder, 2013). These activities consist of providing academic support programs to help improve study habits and grade point averages and recreational programs to help ease the transition into college and provide students better coping skills (Turner & Thompson, 2014). However, Windham, Rehfuss, William, Pugh, & Tincher-Ladner (2014) and Mertes & Hoover (2014) argue that the most commonly applied retention strategies are biased towards and heavily influenced by what works on primarily residential, 4-year college campuses.

Applying similar strategies to public 2-year colleges, which are primarily non-residential, commuter campuses, rarely produce similar results. Laskey & Hetzel (2011) and Ryan (2013) suggest that the more common retention strategies can actually hurt retention on public 2-year college campuses because they draw money away from other programs that increase retention. Moreover, when one considers that 84% of public 2-year college students do not participate in other activities outside the classroom, known as the parking-lot-to-class-to-parking-lot syndrome, some suggest that public 2-year colleges might consider decreasing the budget for other areas, most notably student services, and increase their investment in areas of instruction and academic support (Staley, 2012; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014).

The research that has been conducted on student retention at public 2-year colleges has uniformly identified instruction, advising, and tutoring as the primary influencers of student retention (Mertes & Hoover, 2014; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). This requires further clarification. Each of the above are the primary influencers controlled by the institution and does not take into account the influence of other variables like socioeconomic status, generational

status, or college readiness; influencers that are known to have as much, conceivably more, influence over student retention (ACT Inc., 2010a) but are largely beyond the institution's control. ACT Inc. (2010a) identified the ten most significant factors for attrition (the opposite of retention) at public 2-year colleges, of which seven are primarily beyond institutional control (see highlighted factors in Table 2.1). This is compared to factors for attrition at public and private 4-year colleges in Table 2 and Table 3 (ACT Inc., 2010b/2010c).

Table 2.1

Attrition Factors with Highest Means for Community Colleges

Item #	Items	Mean
2	level of student preparation for college-level work	4.27
31	student study skills	4.11
20	adequacy of personal financial resources	4.06
13	level of student commitment to earning a degree	4.00
21	level of student motivation to succeed	3.92
36	student family responsibilities	3.91
27	level of job demands on students	3.83
9	student low socio-economic status	3.81
10	amount of financial aid available to students	3.63
42	student personal coping skills	3.59

SOURCE: Adapted from *What works in retention? Fourth national survey: Community colleges report* by ACT Inc., 2010, Iowa City, IA.
Note: Shaded rows indicate factors considered primarily outside the institution's control

It is important to note that ACT Inc. (2010a, 2010b, 2010c) does not identify whether a factor is within the institution's control or whether the factor lies without. Instead, ACT Inc. simply reports the primary factors of attrition as identified by the students sampled. The determination of whether a factor is primarily within the institution's control is done at the discretion of the researcher based on sensitivity to the literature reviewed. In discerning control for each of the factors, a guiding query was made of each factor: does the institution have primary responsibility for the factor, or does that responsibility lie with something or someone outside the institution. For example, one could argue that an institution has the ability to influence item #13 and #27

listed in Table 2.1. But while it is possible for an institution to influence these specific factors, ultimately the level of a student's commitment and motivation is determined by the student – not the institution. Moreover, the determination of influence for factors in Tables 2.1-2.3 is not done to empirically defend influence; rather to illustrate that retention is often influenced by factors beyond institutional control.

While public 4-year colleges reported very similar factors for attrition (highlighted in Table 2.2), the mean score associated with each was much higher for public 2-year colleges. By comparison, private 4-year colleges reported a slightly different set of factors for attrition, of which six were beyond the institution's control (highlighted in Table 2.3). Like with public 4-year colleges, private 4-year colleges had much lower mean scores when compared to public 2-year colleges. This suggests that, while public 2-year and 4-year colleges share similar factors for attrition, the influence of those factors on attrition is much greater in public 2-year sector than public and private 4-year sector. This is especially true for those factors beyond institutional control.

Table 2.2

Attrition Factors with Highest Means for Public 4-Year Colleges and Universities

Item #	Items	Mean
2	level of student preparation for college-level work	3.90
20	adequacy of personal financial resources	3.90
31	student study skills	3.80
10	amount of financial aid available to students	3.65
21	level of student motivation to succeed	3.64
13	level of student commitment to earning a degree	3.56
27	level of job demands on students	3.52
9	student low socio-economic status	3.49
17	student educational aspirations and goals	3.36
42	student personal coping skills	3.34

SOURCE: Adapted from *What works in retention? Fourth national survey: Public four-year colleges and universities report* by ACT Inc., 2010, Iowa City, IA.
Note: Shaded rows indicate factors considered primarily outside the institution's control

Table 2.3

Attrition Factors with Highest Means for Private 4-Year Colleges and Universities

Item #	Items	Mean
20	adequacy of personal financial resources	3.86
10	amount of financial aid available to students	3.71
2	level of student preparation for college-level work	3.58
21	level of student motivation to succeed	3.43
31	student study skills	3.43
14	student-institution "fit"	3.42
13	level of student commitment to earning a degree	3.23
12	ratio of loans to other forms of financial aid	3.17
9	student low socio-economic status	3.09
17	student educational aspirations and goals	3.06

SOURCE: Adapted from *What works in retention? Fourth national survey: Private four-year colleges and universities report* by ACT Inc., 2010, Iowa City, IA.
Note: Shaded rows indicate factors considered primarily outside the institution's control

Of note is that none of the studies identified student services or research as influencers of retention at public 2-year colleges. This supports existing literature that these functions, while important for 4-year colleges, do not play a significant role in student retention at public 2-year colleges (Mertes & Hoover, 2014; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). Instead, when assessing the most common on-campus retention strategies for public 2-year colleges and their influence on a student's decision to retain, nine of the top ten institutional influencers of student retention were directly tied to instruction and academic support (see Table 2.4) (ACT Inc., 2010a). Only *programs for first-generational students* could be considered within the purview of student services. First-generational programs could also mean academic support and instruction. The lack of information from ACT Inc. (2010a), prevents determination.

Table 2.4

Attrition Factors with Highest Means for Community Colleges

Item #	Items	Mean
46	reading center/lab	4.14
43	comprehensive learning assistance center/lab	4.12
48	tutoring	4.11
24	mandated placement in courses based on test scores	4.11
41	remedial/developmental coursework (required)	4.08
12	increased number of academic advisors	4.01
45	writing center/lab	4.00
44	mathematics center/lab	3.99
76	programs for first-generation students	3.97
11	advising interventions with selected populations	3.91

SOURCE: Adapted from *What works in retention? Fourth national survey: Community colleges report* by ACT Inc., 2010, Iowa City, IA.

Despite the above research, public 2-year colleges continue to generally make use of retention strategies based on models used at 4-year colleges and universities (Mertes & Hoover, 2014); the majority of which are largely based on Tinto's theory of student departure (Berger & Braxton, 1998; Tinto, 1975) or Bean's model of student attrition (Bean & Eaton, 2000). Both models heavily influence retention strategies today and propose that retention strategies are most effective by addressing both the academic and social aspects of college life (Bean & Eaton, 2000; Mertes & Hoover, 2014; Tinto, 1975). Surprisingly, both Tinto (1975) and Bean (Bean & Eaton, 2000) caution that students bring a variety factors with them that influence retention and attrition and any decision to universally apply retention strategies across institutional types may be misguided (Mertes & Hoover, 2014). Bean specifically states that his model does not work well for students that lack academic ability or college readiness (Bean & Eaton, 2000). Given the access mission identifiable with public 2-year colleges, it seems logical that these institutions would experience different results as 4-year colleges when utilizing similar retention strategies (Mertes & Hoover, 2014).

Crime and Poverty

Due to its access mission, the student population at public 2-year colleges generally includes a higher percentage of socioeconomically at-risk and less academically prepared students when compared to both public and private not-for-profit 4-year colleges (Laskey & Hetzel, 2011; Mertes & Hoover, 2014). Institutional selectivity, established by many public and private 4-year colleges using predetermined admission standards, has served as an attractor to students who not only come from more affluent backgrounds and academic credentials than two-year students, but who also travel longer distances to attend college. In this sense, it is argued that local level factors surrounding community colleges may help to shape the outcomes of these students with greater magnitudes than those observed among four-year entrants. This assumed relationship merited the incorporation of county or zip code level factors, such as crime and poverty levels as described next.

While the relationship between poverty and violent crime is not as strong as social perception would suggest, some crimes, particularly property crime, are directly attributable to poverty (Baily, 1984; Messner, 1982). Research has shown a statistical association between crime and socioeconomic status with the strength of their correlation directly attributable to a variety of social predictors within a community (Saegert, Adler, Bullock, Cauce, Liu, & Wyche, 2006). Buka, Stichick, Birdthistle, and Earls (2001) found youths from low-income neighborhoods witnessed significantly more crime than youths from middle- and upper-income neighborhoods. Additionally, exposure to crime and violence, like poverty, was associated with poor academic achievement in student success (Bartram, 2015; Bell, 2012; Luther, 2015; Saegert, Adler, Bullock, Cauce, Liu, &

Wyche, 2006). Even if a student is not directly involved with crime, the social influence of being exposed to crime, particularly violent crime, can create a situation where the emotional impact can carry over into the classroom (Bartram, 2015; Luther 2015).

As mentioned earlier, public 4-year colleges generally reach greater distances to attract students, whereas public 2-year colleges mostly serve local students (Mertes & Hoover, 2014). Moreover, the access mission of public 2-year colleges means the sector has traditionally served a greater number of at-risk students. These two points considered together suggests that the effect of local poverty and crime rates on student success is more likely to be greater at public 2-year colleges; whereas similar distribution may not be represented in the public 4-year sector as the social influences of 4-year students are not likely to be influence by local measures of crime and poverty.

Institutional Expenditures and Resource Allocation

While colleges and universities have always spent money, the level of public attentiveness and demand for accountability on how those institutions spend money and the reasons why are still relatively new in the history of American higher education. As early as the Higher Education Act of 1965, it became compulsory for colleges and universities to be more forthcoming in demonstrating how they were using public dollars to accomplish institutional goals (McLendon, Hearn, & Deaton, 2006). However, little effort was made early on to understand how institutions made decisions on where, and for what amount, to allocate available resources (Slaughter, 1993; Powell, Gilleland, & Pearson, 2012). It was not until the mid-1980s, following a widely perceived retrenchment in American Higher Education that researchers began to study how academe spent its money (Eckel, 2002; Hackman, 1985; Slaughter, 1993; Volk, Slaugher,

& Thomas, 2001). This increased attentiveness on institutional budget allocation was largely driven by the perceived notion that the breadth and depth of the 1980s retrenchment was more severe than required to retain financial stability in American higher education (Slaughter, 1993).

Hackman (1985), while not among the first to study resource allocation as a theory, is considered the first to study resource allocation in higher education. Hackman's theory of resource allocation in higher education informs much of the research to date around budget decision making for colleges and universities. Hackman assessed that the level at which a particular program or unit gained or lost institutional resources is directly tied to its centrality, defined as how closely related the unit is to the institution's mission. Core units, those most closely related to the institution's mission and often represented by academic and student service units, often received a larger portion of institutional resources than peripheral units, those that supported the institution but are not pivotal to its mission and most often represented by administrative units. That said, peripheral units that were able to bring significant amounts of revenue to the institution, specifically research dollars, were able to see an increase in resource allocation. Hackman also assesses that environmental pressures outside of the institution may have an influence on resource allocation, especially in public institutions. It is important to note that Hackman's theory, as well as the others explained in this section, identify a unit as either academic or administrative.

Slaughter (1993) and Volk, Slaughter, and Thomas (2001) have expanded on Hackman (1985), demonstrating that resource allocation not only favors core units, but even more so those units that are believed to be revenue generators for the institution.

Given the precipitous increase in the cost of higher education, many college and university leaders prioritize funding for those units or programs believed to increase revenues for the institution. Core units now include those units close to the institution's mission, as well as those units believed to attract a higher number of new students and retain them (Eckel, 2002; Slaughter, 1993; Volk, Slaughter, & Thomas, 2001). Eckel (2002) and Volk, Slaughter, and Thomas (2001) suggest that student recruitment and retention are now primary factors in determining resource allocation in higher education.

Institutional Expenditures and Retention

Berger (1997, 2002) establishes that institutions of higher education are, at their core, organizations. As such, organizational/institutional behavior is a suitable and useful tool for analyzing institutional outcomes – like student retention. Berger identifies institutional behavior as the actions, including how an institution allocates resources, of a college or university's students, administrators, faculty, and staff; and goes on to stress that patterns of institutional behavior have important consequences for the retention of college students. Essentially, Berger finds that institutional behavior is a valid tool with which to assess student retention. Berger (2002) further states that the increased scrutiny of higher education expenditures places increased pressure on administrators to produce outcomes. Of those outcomes, student retention is a common metric of accountability used to assess institutional effectiveness.

While Berger (1997, 2002) asserts that institutional expenditures are an effective tool for studying retention, very little research has been done to assess the correlation between institutional expenditures and outcomes. Umfress (2010) identifies approximately a dozen studies, including his own, that assessed some form of

institutional expenditure and its correlation to student outcomes, all of which were conducted using datasets or student samples from 4-year institutions. The earliest ones (James, Alsalam, Conaty, & To, 1989; Rock, Centra, & Linn, 1970) found no significant relationship between institutional expenditures and student outcomes (Umfress, 2010). More recent research studies have produced inconsistent results (Pike, Smart, Kuh, & Hayek, 2006; Ryan, 2005; Smart, Ethington, Riggs, & Thompson, 2002; Toutkoushian & Smart, 2001), though three studies (Gansemer-Topf & Schuh, 2006; Ryan, 2004; Umfress, 2010) were able to positively associate institutional expenditures in certain areas with student retention. This is significant as only these three studies specifically evaluated retention as one of the measured outcomes. Moreover, all three were able to demonstrate a statistically significant relationship between select institutional expenditures and student retention; however, findings were inconsistent.

Both Ryan's (2004) study of 363 public and private Carnegie Baccalaureate I and II colleges[1] and Gansemer-Topf & Schuh's (2006) study of 466 private Carnegie Baccalaureate I and II colleges and universities found a positive correlation between retention rates and institutional expenditures in instruction and academic support. Even still, the two studies came to different conclusions on the influence of student services with Ryan's (2004) study finding no significant relationship between retention and institutional expenditures on student services while Gansemer-Topf & Schuh's (2006) study found a negative correlation between the two. Both of these are then contradicted by Umfress (2010), whose study of all 1,252 public and private 4-year colleges echoed

[1] Both Ryan and Gansemer-Topf & Schuh's research identified institutions using a Carnegie classification system that is obsolete (McCormick, 2005). Their population of study would correlate to the following classifications: Baccalaureate Colleges – General, Baccalaureate – Liberal Arts, Master's Colleges and Universities I, and Master's Colleges and Universities II.

Ryan's and Ganesmer-Topf & Shcuh's findings regarding institutional expenditures in instruction and academic support but also found that expenditures for student services had a positive significant influence on retention. It should be noted, however, and with great emphasis, that a thorough review of the literature has yet to identify a similar study for public 2-year colleges.

Limitations in the Literature

While the relationship between institutional expenditures and retention has been explored in the literature, the available literature is fairly thin and, to date, entirely focused on 4-year colleges and universities. A thorough review of the available literature failed to yield one study analyzing the relationship between institutional expenditure and retention at public 2-year colleges. Moreover, the available studies produced contradictory and inconsistent results. The lack of literature on public 2-year colleges coupled with the variation between the results of available studies at 4-year colleges warrants further research.

Conceptual and Theoretical Framework

This paper contributes to the dialogue and provides quantitative research on the influence institutional expenditures in the areas of instruction, academic support, and student services can have on student retention at public 2-year colleges in the contiguous United States. The identified institutional expenditures are used because they consistently make up the majority of expenditures in nearly all colleges and universities, regardless of type, and are consistently identified as significant influencers of retention (Gansemer-Topf & Schuh, 2006).

While the studies analyzing the relationship between institutional expenditures and student retention are limited, the studies conducted on the many other influencers of student retention are numerous, seemingly exhaustive. However, as Mertes & Hoover (2014) and Windham, Rehfuss, William, Pugh, & Tincher-Ladner (2014) suggest, their attention has been predominantly focused on 4-year colleges and universities. The modicum of research that has been conducted on retention at public 2-year colleges clearly demonstrates that the primary influencers of retention at a public 2-year college are different from those at a 4-year college (Laskey & Hetzel, 2011; Mertes & Hoover, 2014; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). Despite knowing this, public 2-year colleges still invest significant resources, both human and financial, in retention strategies and programs that are proven to work at 4-year public and private colleges but seemingly come up short at public 2-year colleges.

Theoretically, this study draws from Tinto's (1975) theory of student departure and Berger's (2002) assertion that institutional behaviors, specifically resource allocation, are an appropriate tool with which to assess outcomes. The framework is influenced by Ryan's (2004) and Gansemer-Topf & Schuh's (2006) research on institutional expenditures and their influence on college outcomes, as well as Mertes & Hoover's (2014) research on predictors of first-year retention at public 2-year colleges. Finally, this study also considers budget theory, particularly Hackman's (1985) theory on resource allocation in higher education and Slaughter's (1997) research on how resource allocation is impacted by revenue generation.

This study uses the theoretical framework and findings for the above to *explain how the relationship between institutional expenditures and retention at public 2-year*

colleges compares with similar research conducted to date for 4-year colleges (Gansemer-Topf & Schuh, 2006; Ryan, 2004; Umfress, 2010).

Using the proposed theoretical framework, this study hypothesized that institutional expenditures in instruction and academic support will reproduce Gansemer-Topf & Schuh's (2006) and Ryan's (2004) research by finding a positive correlation with retention. It was also expected that this study will not be able to reproduce Umfress' (2010) findings and demonstrate a positive correlation between expenditures for student services and retention; will instead, like Gansemer-Topf & Schuh (2006), find a negative correlation. Additionally, when controlling for variables, this study theorized that the correlation between expenditures for instruction and student retention will be higher when controlling for percentage of fulltime faculty and local crime and poverty rates.

A conceptual map is provided to assist the reader in understanding the theoretical framework for the study (see Figure 2.1).

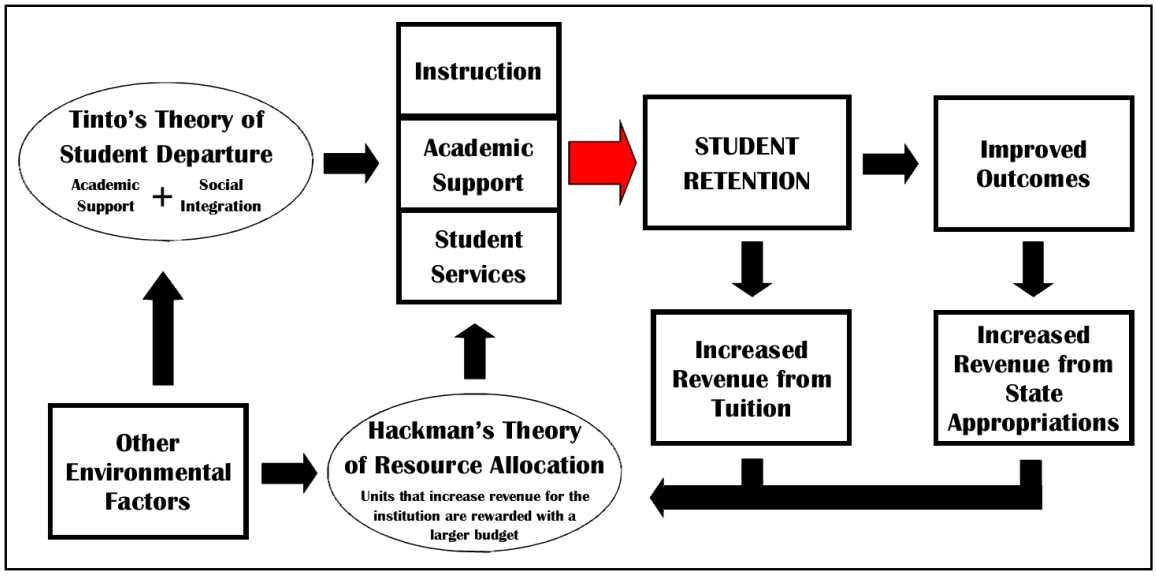

Figure 2.1. Conceptual Framework for an analysis of the relationship (shown in red) between institutional expenditures and student retention at public 2-year colleges in the contiguous United States.

In reviewing the conceptual map in Figure 1, the reader is able to see how Tinto's (1975) theory of student departure and Hackman's (1985) theory of resource allocation in higher education play a role in influencing institutional behaviors, specifically institutional expenditures, in order to increase retention. As explained in the literature review, 2-year colleges have prioritized retention as a primary factor in improving outcomes and increasing tuition revenue. Institutional expenditures in the areas of instruction, academic support, and student services are specifically highlighted in the map as they were most consistently identified as being significantly related to retention in the previous research (Gansemer-Topf & Schuh, 2006; Ryan, 2004; Umfress, 2010). The two theories approach retention from different positions though using similar channels. Tinto's theory is utilized by colleges and universities solely to improve retention as an outcome; whereas, Hackman's theory applies primarily as a result of the improved outcome.

It is important to note that Tinto's theory of student departure, while important for understanding the relationship between institutional behavior and student retention, cannot be fully utilized in the proposed theoretical framework. Tinto's (1975) theory of student departure is based on Spady's (1971) suggestion that constructive student behaviors combined with academic support and social integration result in a higher probability for retention. The theoretical model does not take into consideration the individual characteristics of the student. This should not be interpreted as an assumption that individual characteristics do not play a role in retention. Instead, the framework is limited by the dataset. As described in the methodology, the dataset for this study comes from the Integrated Postsecondary Education Data System (IPEDS) as provided by the

National Center for Education Statistics (NCES). IPEDS data did not allow the researcher to include variables that capture student level characteristics. Instead, IPEDS only reports student characteristics aggregated at the institutional level such as race, gender, and age.

Moreover, the conceptual map in Figure 2.1 shows that additional environmental factors, as identified by Hackman's (1985) theory of resource allocation, play a significant role in how colleges and universities decide to allocate resources. This can include factors such as political/government influence, resource negotiation, faculty influence, and others.

Given that Tinto (1975) and Hackman (1985) identify other factors, both internal and external, as influential on both student retention and resource allocation, the model does bring some of these factors into consideration by controlling for specific variables believed to be influential as derived from the reviewed literature. As stated, the purpose of this study was to explain how the relationship between institutional expenditures and retention at public 2-year colleges compares with similar research conducted to date for 4-year colleges. However, where the availability of data permits, this study does identify variances between the two and attempts to provide possible explanations.

It is important to note that the purpose of this study was not to test the validity of the proposed conceptual and theoretical framework. The proposed framework, instead, served as a concept to guide the research in identifying the stated variables and analyzing their relationship with student retention.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Research Design

Using multiple regression analysis, this paper used a quantitative approach to test whether the variation of retention rate (dependent variable) could be explained by institutional expenditures as a percentage of the total budget in instruction, academic support, and student services (predictor variables).

Given the capacity for quantitative research to describe cause and effect relationships, test hypotheses, and explain trends using causal and correlation measurements (Creswell, 2012), a quantitative approach is appropriate for this study. By characterization, a quantitative analysis is considered less biased than other approaches and is structured to comply with standards of reliability and validity. A quantitative approach allowed the researcher to interpret the data to verify the theories in question, identify new variables, relate variables, and test hypotheses.

Population of Study

The primary population of study included all public, degree-granting, 2-year colleges in the contiguous United States that submitted complete data surveys to the Integrated Postsecondary Education Data System for the 2013 year. This study was limited to institutions in the contiguous United States due to the commonly held understanding that Hawaii, Alaska, and outlying U.S. Territories possess unique characteristics, primarily social and economic, that can present bias to the study (State Higher Education Executive Officers [SHEEO], 2014). The 2013 survey year was used as

it represented the most complete and current dataset available at the time of study. For clarity, a public 2-year college generally refers to institutions associated with a larger state university system, which primarily award associate degrees or certificate programs; though may include institutions that award baccalaureate degrees (Center for Postsecondary Research [CFPR], 2015). For this study, public 2-year colleges included all public institutions with a Carnegie Classification of Associate's College and Baccalaureate/Associate's College as defined within the definitions section of this paper. For the primary population, this study utilized the entire population available and produced a sample of 973 institutions (n=973).

To answer research question one, a secondary population of study was required and included all public, degree-granting, 4-year colleges in the contiguous United States that submitted complete data surveys to the Integrated Postsecondary Education Data System for the 2013 year. For clarity, a public 4-year college generally refers to those institutions associated with a larger state university stems, which primarily award bachelor's degrees; though may include institutions that award graduate and doctoral degrees (CFPR, 2015). For this study public 4-year colleges will include all public institutions with a Carnegie Classification of Baccalaureate College – General, Baccalaureate College – Liberal Arts, Master's Colleges and Universities I, and Master's Colleges and Universities II as defined within the definitions section of this paper. Public research institutions were not included as they allocate a significant portion of their budget on conducting research when compared to other public 4-year colleges. As public 2-year colleges allocate very little, if any, of their budget to research, the omission of public research institutions from this dataset was done to limit bias in the results. For the

secondary population, this study utilized the entire population available and produced a sample of 335 institutions (n=335).

The populations of study were limited to public institutions in the 2-year and 4-year sectors. This was necessary given the increased emphasis these institutions have placed on student retention as a result of P-BF (McLendon & Hearn, 2013). As demonstrated in the conceptual map in Figure 2.1, P-BF is significant in the model due to its ability to influence resource allocation, specifically in the public sector. Private colleges and universities, while attentive to student retention, are not impacted by P-BF. For the above reasons, 2-year and 4-year colleges in the private sector, including both not-for-profit and for-profit institutions, are not included in the populations of study.

Data Collection

Data was collected using the Integrated Postsecondary Education Data System (IPEDS) as provided by the National Center for Education Statistics [NCES] (2014). Multiple datasets were collected. IPEDS gathers information from every postsecondary institution (i.e. institutions of higher education) in America that participates in federal student financial aid programs (NCES, 2014). Under the authority of the Higher Education Act of 1965 the NCES (2014) requires that every institutions participating in federal student aid programs "report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid" (p. N/A). This information is then made available to the public, to include parents, students, and researchers (NCES, 2014). It falls under the guidance of the U.S. Department of Education and is considered a credible and reliable data source for

identifying and analyzing trends in higher education. For the purposes of this study, IPEDS was able to provide complete, reliable, and accurate datasets.

Dataset for Research Question 1

The first research question required gathering, for both public, degree-granting 2-year and 4-year colleges in the contiguous United States, the following variables:

- FY2013 institutional expenditures as a percentage of core budget in the areas of instruction, academic support, and student services.
- FY2013 institutional expenditures as a dollar amount spent per FTE in the areas of instruction, academic support, and student services.
- Institutional size.
- Geographic location

This represented two separate datasets – public 2-year colleges and public 4-year colleges. Using both datasets, the study assessed the summary statistics for each institution type and identified similarities or differences in budget allocation for each of the predictor variables. Each dataset was pulled from the IPEDS Finance Survey (institutional expenditures) and the IPEDS Institutional Characteristics Survey (size and location) for the 2012-2013 academic year.

Dataset for Research Question 2

The second research question required gathering 2012-2013 academic year institutional expenditures, as a percentage of the total budget, in the areas of instruction, academic support, and student services for all public, degree-granting, 2-year colleges in the contiguous United States. Additionally, fall 2013 retention rates were gathered for the same institutions. It was important to use 2012-2013 academic year expenditures to

determine the influence on fall 2013 retention to make the outcomes contemporaneously exogenous. That is, students retained in fall 2013 would have been the beneficiaries of institutional expenditures in the previous academic year; as such, their decision to return in the fall 2013 may have been influenced by expenditures during the 2012-2013 academic year. This dataset was pulled from the IPEDS Finance Survey for the 2012-2013 academic year and the Fall Enrollment Survey for fall 2013, respectively.

A multiple regression analysis was used to test research question two and determine whether the variation of retention rate (dependent variable) could be explained by institutional expenditures as a percentage of the total budget in instruction, academic support, and student services (predictor variables). This model was written as:

Retention = constant + B1*InstructionExpenditures + B2*AcademicSupportExpenditures + B3*StudentServicesExpenditures + e

Dataset for Research Question 3

The third research question required gathering 2012-2013 academic year institutional expenditures, as a dollar amount per FTE, in the areas of instruction, academic support, and student services for all public, degree-granting, 2-year colleges in the contiguous United States. Additionally, fall 2013 retention rates were gathered for the same institutions. As with research question two, it was important to use 2012-2013 academic year expenditures to determine the influence on fall 2013 retention to make the outcomes contemporaneously exogenous. These two datasets were pulled from the IPEDS Finance Survey for the 2012-2013 academic year and the Fall Enrollment Survey for fall 2013, respectively.

A multiple regression analysis was used to test research question 2 and determine whether the variation of retention rate (dependent variable) could be explained by

institutional expenditures as a dollar amount per FTE in instruction, academic support, and student services (predictor variables). This model was written as:

$$\text{Retention} = \text{constant} + B1*\text{InstructionExpendituresPerFTE} + B2*\text{AcademicSupportExpendituresPerFTE} + B3*\text{StudentServicesExpendituresPerFTE} + e$$

Dataset for Research Question 4

Research question four required gathering additional control variables believed to be influential, as derived by the researcher through the literature review, on student retention for all public, degree-granting, 2-year colleges in the contiguous United States. These included:

- Percentage of fulltime enrollment for fall 2013
- Percentage of fulltime faculty for the 2012-2013 academic year
- Poverty rate
- Crime rate

To retain integrity with the previous datasets, it was important to gather these variables for the 2012-2013 academic year and fall 2013 term so as to not misrepresent the findings. Data on percentage of fulltime students and percentage of fulltime faculty for the 2012-2013 academic year was pulled from the IPEDS Enrollment (percentage of fulltime students) and Human Resources (percentage of fulltime faculty) surveys for the 2012-2013 academic year.

Data on poverty rates was pulled from the 2013 American Community Survey (ACS), as conducted by the U.S. Census. The ACS collects and reports on a variety of data, including poverty rates, by U.S. zip code. Using institutional zip codes as provided by IPEDS, poverty rates were added to the dataset.

Data on crime rates was pulled from the Bureau of Justice Statistics' Uniform Crime Reporting Statistics (UCRS) database for 2013. The UCRS collects violent and property crime incidences as reported by local city and county law enforcement agencies. Using directory information as provided by IPEDS, city and county information was gathered for each institution and matched with crime statistics from the UCRS. The population for each city and county was also captured from UCRS and used to calculate a crime rate per 1000 individuals.

Once completed, the above datasets were combined with the final dataset for research question two using institutional identification numbers to create one dataset with each institution reporting fall 2013 retention, institutional expenditures, percentage of fulltime enrollment, percentage of fulltime faculty for the 2012-2013 academic year; as well as local crime and poverty rates for the 2013 calendar year.

A multiple regression analysis was then used to test whether the influence of institutional expenditures on student retention remained constant when important institutional characteristics were controlled.

Dataset for Research Question 5

Finally, research question five required gathering 2012-2013 academic year institutional expenditures, as a percentage of the total budget, in the areas of instruction, academic support, and student services for all public, degree-granting, 2-year and 4-year colleges in the contiguous United States. Additionally, fall 2013 retention rates were gathered for the same institutions. It was important to use 2012-2013 academic year expenditures to determine the influence on fall 2013 retention to make the outcomes contemporaneously exogenous. These data was pulled from the IPEDS Finance Survey

for the 2012-2013 academic year and the Fall Enrollment Survey for fall 2013, respectively. Data on poverty rates were pulled from the 2013 American Community Survey, as conducted by the U.S. Census. Data on crime rates were pulled from the Bureau of Justice Statistics' Uniform Crime Reporting Statistics database for 2013. Once completed, data were combined using institutional identification numbers and zip codes to create two separate datasets – public 2-year colleges and public 4-year colleges – with each institution reporting fall 2013 retention, institutional expenditures, percentage of fulltime students, percentage of fulltime faculty for the 2012-2013 academic year; as well as local crime and poverty rates for the 2013 calendar year.

Using both datasets, a multiple regression analysis was then used to compare the influence of institutional expenditures on student retention between public 2-year and public 4-year colleges.

Methodological Framework

In order to provide a clearer understanding of the variables utilized in this study, a methodological framework is provided (see Table 4). To address each research question, specific datasets were collected from the population of study. The methodological framework links each research question to the dataset from which information was drawn.

Table 3.1

Methodological Framework

Research Question	Variables Collected	Data Source
Research Question 1: Do public 2-year colleges allocate their budget similarly, both as a percentage of their total budget and as a dollar amount per FTE, on instruction, academic support, and student services when compared to public 4-year colleges?	FY 2013 Institutional expenditures for public 2-year colleges	IPEDS 2013 Survey Component - Finance (public institutions)
	FY 2014 Institutional expenditures for public 4-year colleges	IPEDS 2013 Survey Component - Finance (public institutions)
	Fall 2013 institutional size for public 2-year and public 4-year colleges	IPEDS 2013 Survey Component - Institutional Characteristics
	Geographic location for public 2-year and public 4-year colleges	IPEDS 2013 Survey Component - Institutional Characteristics
Research Question 2: Does the percentage of budget spent on instruction, academic support, and student services positively influence student retention at public 2-year colleges?	FY 2013 Institutional expenditures as a percentage of total budget for public 2-year colleges	IPEDS 2013 Survey Component - Finance (public institutions)
	Fall 2013 retention rates for public 2-year colleges	IPEDS 2013 Survey Component - Fall Enrollment
Research Question 3: Are the findings in RQ2 consistent when using the dollar amount spent per FTE, rather than percentages, for each of the predictor variables?	FY2013 Institutional expenditures as a dollar amount per FTE for public 2-year colleges	IPEDS 2013 Survey Component - Finance (public institutions)
	Fall 2013 retention rates for public 2-year colleges	IPEDS 2013 Survey Component - Fall Enrollment
Research Question 4: Are the findings in RQ2 and RQ3 consistent when important institutional and environmental characteristics are controlled?	FY2013 Institutional expenditures for public 2-year colleges	IPEDS 2013 Survey Component - Finance (public institutions)
	Fall 2013 retention rates for public 2-year colleges	IPEDS 2013 Survey Component - Fall Enrollment
	Fall 2013 fulltime enrollment for public 2-year colleges	IPEDS 2013 Survey Component - Fall Enrollment
	Fall 2013 percentage of fulltime faculty	IPEDS 2013 Survey Component - Human Resources
	2013 poverty rates	U.S. Census' 2013 American Community Survey
	2013 crime rates	Bureau of Justice Statistics' Uniform Crime Reporting Statistics Database

Research Question 5: How do the findings in RQ4 compare with public 4-year colleges for the same time period using similar variables?	FY2013 Institutional expenditures as a percentage of total budget for public 2-year and public 4-year colleges	IPEDS 2013 Survey Component - Finance (public institutions)
	Fall 2013 retention rates for public 2-year and public 4-year colleges	IPEDS 2013 Survey Component - Fall Enrollment
	Fall 2013 percentage of fulltime enrollment for public 2-year and public 4-year colleges	IPEDS 2013 Survey Component - Fall Enrollment
	Fall 2013 percentage of fulltime faculty for public 2-year and public 4-year colleges	IPEDS 2013 Survey Component - Human Resources
	2013 crime rates	U.S. Census' 2013 American Community Survey
	2013 poverty rates	Bureau of Justice Statistics' Uniform Crime Reporting Statistics Database

Data Analysis

Gretl 1.9.91 was the primary tool used in analyzing the data. Using multiple regression analysis, this study sought to use the theoretical framework and findings for the stated research questions to explain how the relationship between institutional expenditures and retention at public 2-year colleges compares with similar research conducted to date for 4-year colleges (Gansemer-Topf & Schuh, 2006; Ryan, 2004; Umfress, 2010). In doing so, this study first sought to explain how public 2-year colleges compare with public 4-year colleges for institutional expenditures during the 2012-13 academic year. This was accomplished by analyzing the summary statistics for both samples and comparing resource allocation, both as a percentage of budget and as an amount spent per FTE, for each of the predictor variables. Next the study compared findings for research questions two through four with results presented in the previous research as highlighted in the literature review in order to analyze similarities and

variances in the relationship between the predictor variables and student retention for public 2-year colleges. This allowed the study to determine if previous research conducted on 4-year colleges yields similar results when applied to the public 2-year sector. A final comparison involved applying the multiple regression models identified in research question 2 to the public, 4-year colleges identified in the data sample and analyzing the results for comparison to public 2-year colleges for the same time period.

For multiple regression analysis to be used correctly, the data must adhere to three assumptions – normal distribution of residuals, linearity between the variables, and homoscedasticity (Lane et al., 2013; Osbourne & Waters, 2002). Not meeting these assumptions could allow the model to overestimate or underestimate actual values between variables. An analysis of the appropriate histograms or scatterplots is provided to ensure that these assumptions were satisfied.

Normality was assessed by reviewing a histogram of the graphed data points when tested for normality. This is considered to be the most easily observed and commonly practiced way to identify normality (Osbourne & Waters, 2002). Upon analysis, the dependent variable was determined to be normally distributed (see Figure 4.1).

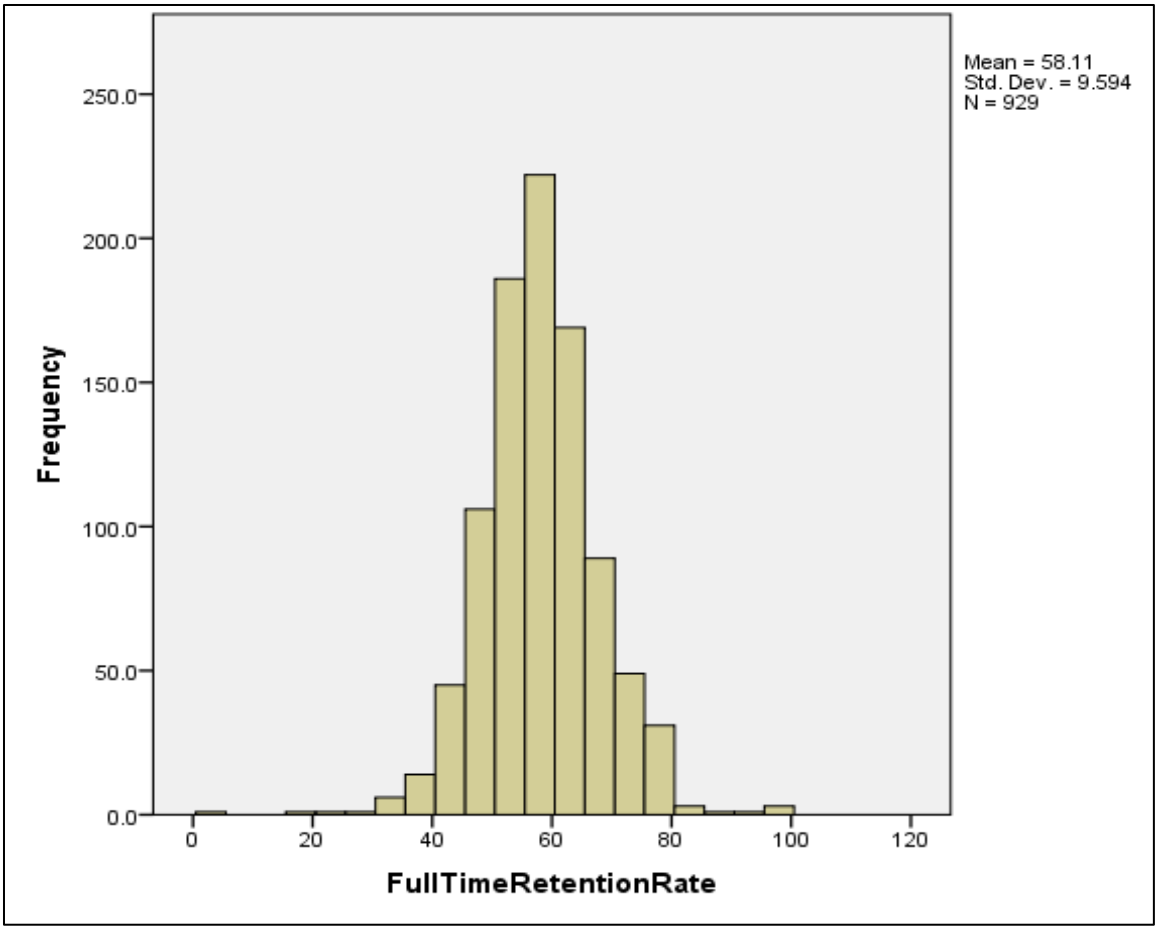

Figure 3.1. Histogram of Distribution of Dependent Variable to Assess Normality

Linearity refers to the assumption of a linear relationship between the dependent variable, identified as student retention in this study, and the independent variables, identified as institutional expenditures in the areas of instruction, academic support, and student services (Osbourne & Waters, 2002). In other words, linearity means that the amount of change, or rate of change, between values for two variables are constant for the entire range of values for the variables. Linearity is best assessed using an X-Y scatterplot to examine the linear relationship between the dependent and independent variables. Upon review of the data considered for this study, the variables were determined to be linear (see Figure 4.2).

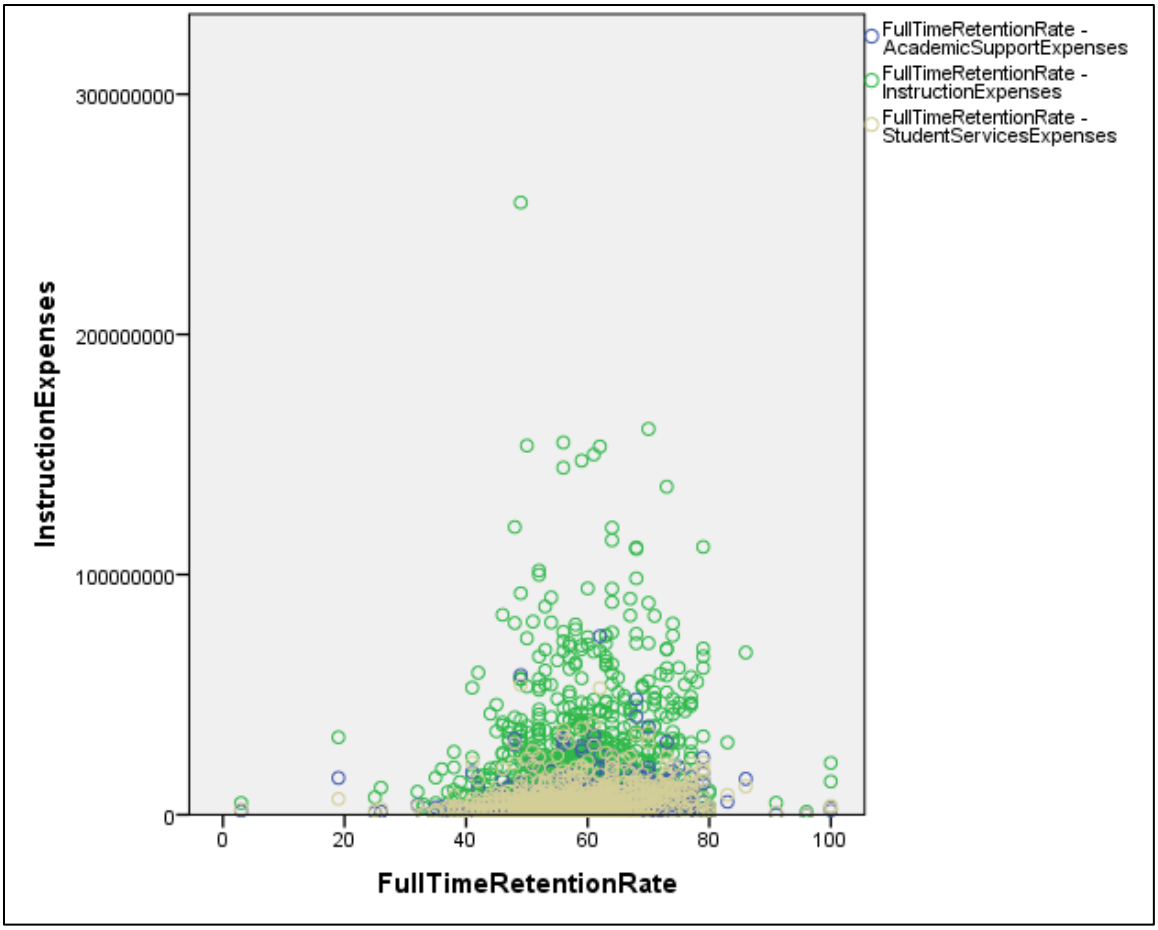

Figure 3.2. Scatterplot of Independent versus Dependent Variable to Assess Linearity

Homoscedasticity is the assumption that the standard deviations of conditional distributions are equal (Lane et. al, 2013). Homoscedasticity is best assessed by examining the relationship between the standardized residuals and standardized predicted values for the dependent variable (retention). Upon investigation of the constructed histogram, the data were determined to be homoscedastic.

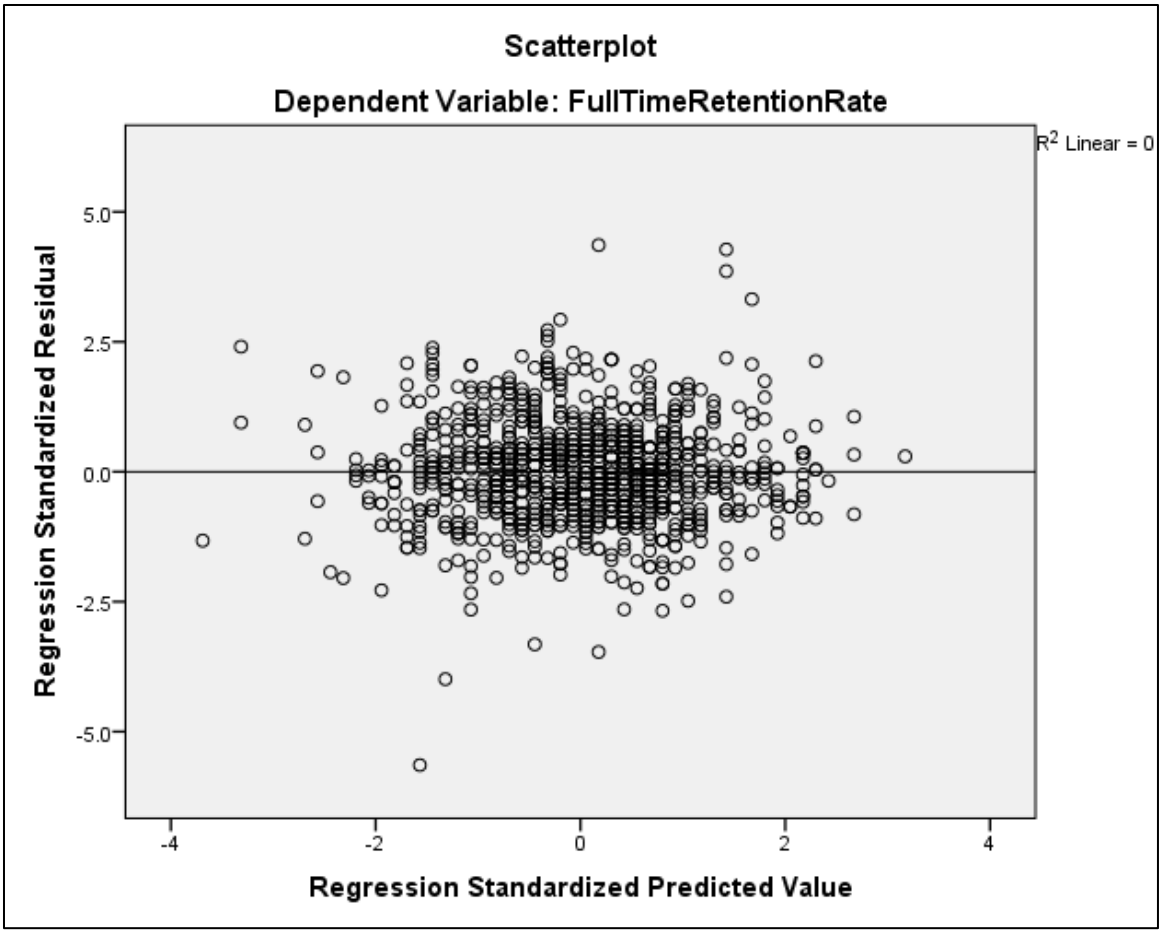

Figure 3.3. Plot of Regression Standardized Residuals for Dependent Variable to Assess Homoscedasticity

Once satisfied, the model was then used to determine the significance of each of the predictor variables on retention, both independently and when controlling for other institutional expenditures as well as other important institution variables.

In analyzing the data, this study followed the four steps necessary for completing a multiple regression analysis (Lane et al., 2013). These steps included:

1. Determining the regression model,
2. Determining the multiple correlation coefficient (R or multiple R) and the proportion of shared variance (R^2) for the model,
3. Testing the R or multiple R for statistical significance, and

4. Determining the significance of the individual predictor variables on the dependent variable.

This allowed the study to determine if there is a statistically significant relationship between any of the predictor variables (institutional expenditures in instruction, academic support, and student services) and student retention when the other predictor variables (institution expenditures, percentage of fulltime enrollment, percentage of fulltime faculty, and local crime and poverty rates) were held constant (Lane et al., 2013).

Summary

This chapter outlined the methodology chosen to investigate the relationship between retention and institutional expenditures for instruction, academic affairs, and student services at public 2-year colleges. Details were provided on the populations of study and data source, including the procedures and methods used to collect and analyze the data gathered. Verification of normality, linearity and homoscedasticity were provided.

CHAPTER 4

PRESENTATION OF FINDINGS

Introduction

In order to examine the relationship between resource allocation and student retention at public, 2-year colleges, data for institutional expenditures, institutional characteristics, and external institutional factors were analyzed to provide insight into student retention. This quantitative study used data obtained from the 2013 IPEDS survey administered by the U.S. Department of Education and the National Center for Educational Statistics, the 2013 American Community Survey administered the U.S. Census Bureau, and summary statistics gathered for 2013 from the Bureau of Justice Statistics' Uniform Crime Reporting database. Statistical analyses of the data were conducted using multiple regression analysis. The following research questions guided the analysis:

- Research Question 1: Do public 2-year colleges allocate their budget similarly, both as a percentage of their total budget and as a dollar amount per FTE, on instruction, academic support, and student services when compared to public 4-year colleges?
- Research Question 2: Does the percentage of budget spent on instruction, academic support, and student services positively influence student retention at public 2-year colleges?

- Research Question 3: Are the findings in RQ2 consistent when using the dollar amount spent per FTE, rather than percentages, for each of the predictor variables?
- Research Question 4: Are the findings in RQ2 consistent when important institutional and environmental characteristics are controlled?
- Research Question 5: How do the findings in RQ4 compare with public 4-year colleges for the same time period using similar variables?

Descriptive Analysis of the Sample

The primary sample consisted of 973 institutions representing all public, degree-granting, 2-year colleges in the contiguous United States that submitted complete data surveys to the Integrated Postsecondary Education Data System (IPEDS) for the 2013 year. A secondary sample consisted of 335 institutions representing all public, degree-granting, 4-year colleges and universities in the contiguous United States that submitted complete data surveys to the IPEDS for the 2013 year. For each sample, the entire population was utilized for this study due to the availability of the data from IPEDS.

Demographics of the Sample

IPEDS collects a variety of demographic data from reporting institutions. For this study, geographic location and institutional size were collected for both samples. Additionally, fulltime retention rates, as the dependent variable of the study, were collected and are reported across demographics. Geographic region, enrollment data, and fulltime retention rates for fall 2013 were collected using the classifications and numerical ranges as provided by IPEDS.

Geographic Region

Figure 4.1 provides a graphic illustration of the geographic regions used by IPEDS. For the primary sample, institutions located in the Southeast region represented the largest concentration of public 2-year colleges, accounting for 29.90% (n=291) of the population; whereas institutions from the Rocky Mountain region accounted for the fewest occurrences, totaling just 2.67% (n=26) of the population (see Table 4.1). In the middle, listed in descending order, are Far West region with 16.85% (n=164), Great Lakes with 13.97% (n=136), Southwest with 12.23% (n=119), Plains with 10.38% (n=101), Mid East with 9.24% (n=90), and New England with 5.03% (n=46).

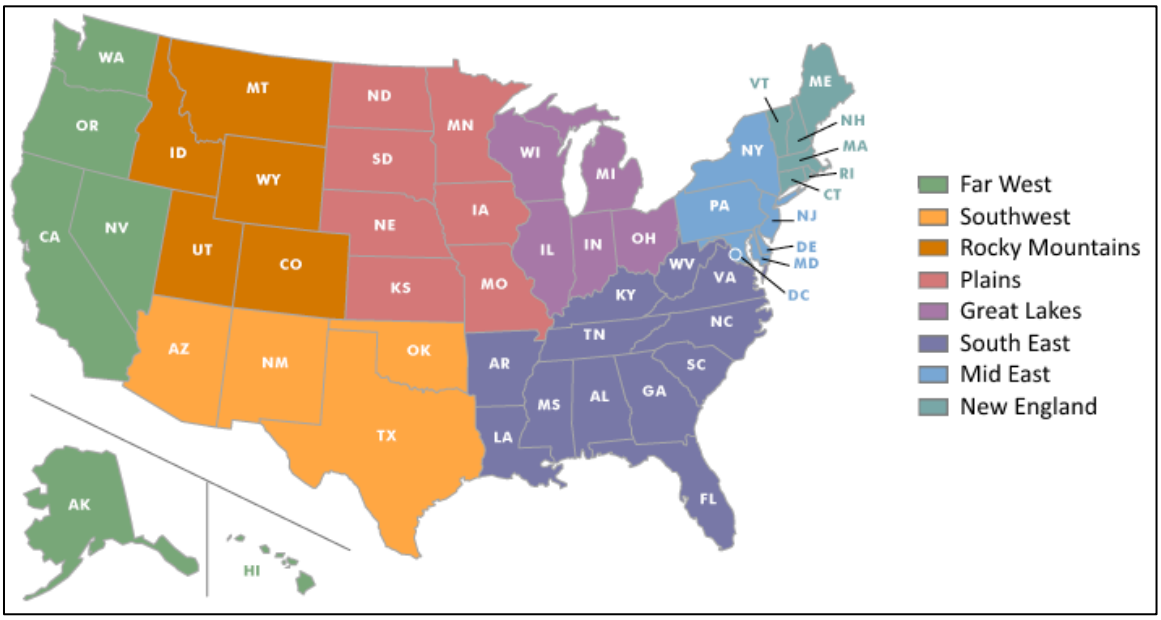

Figure 4.1. Map illustrating geographic regions used by IPEDS. Adapted with permission from the U.S. Department of Education (2007).

Table 4.1

Geographic Region Demographics for Public 2-Year and 4-Year Colleges

	Public 2-year Colleges		Public 4-year Colleges	
Geographic Region	Frequency	Percentage	Frequency	Percentage
Far West	164	16.85%	34	10.14%
Great Lakes	136	13.97%	39	11.64%
Mid East	90	9.24%	58	17.31%
New England	46	5.03%	28	8.35%
Plains	101	10.38%	35	10.44%
Rocky Mountains	26	2.67%	16	4.77%
Southeast	291	29.90%	94	28.05%
Southwest	119	12.23%	31	9.25%

For the secondary sample, institutions located in the Southeast region again represented the largest concentration for public 4-year colleges, accounting for 28.05% (n=94) of the population; whereas, as with 2-year colleges, institutions from the Rocky Mountain region accounted for the fewest occurrences, totaling just 4.77% (n=16) of the population (see Table 4.1). In the middle, listed in descending order, are the Mid East region with 17.31% (n=58), Great Lakes with 11.64% (n=39), Plains with 10.44% (n=35), Far West with 10.14% (n=101), Southwest with 9.25% (n=31), and New England with 8.35% (n=28).

Institutional Size

Enrollment data, represented as institutional size, were collected for each institution. IPEDS classifies institutional size as very large (20,000 and above), large (10,000-19,999), medium (5,000-9,999), small (1,000-4,999), and very small (under 1,000). For the primary sample, small institutions represented the largest concentration of public 2-year colleges, accounting for 46.65% (n=454) of the population; whereas very small institutions accounted for the fewest occurrences, totaling just 5.34% (n=52) of the population (see Table 4.2). In the middle, listed in descending order, are medium

institutions with 24.66% (n=240), large with 16.85% (n=164), and very large with 6.47% (n=63).

Table 4.2

Enrollment Demographics for Public 2-Year and 4-Year Colleges

	Public 2-year Colleges		Public 4-year Colleges	
Institutional Size	Frequency	Percentage	Frequency	Percentage
Very Large (20,000+)	63	6.47%	25	7.46%
Large (10,000-19,999)	164	16.85%	74	22.08%
Medium (5,000-9,999)	240	24.66%	120	35.82%
Small (1,000-4999)	454	46.65%	109	32.53%
Very Small (under 1,000)	52	5.34%	7	2.08%

For the secondary sample, medium institutions represented the largest concentration of public 4-year colleges, accounting for 35.82% (n=120) of the population; whereas very small institutions again accounted for the fewest occurrences, totaling just 2.08% (n=7) of the population. In the middle, listed in descending order, are small institutions with 32.53% (n=109), large with 22.08% (n=74), and very large with 7.46% (n=25).

Retention Rates

Data on fall 2013 retention rates were collected for each institution. Table 4.3 illustrates average retention rates; collectively for all institutions in each sample, and then by geographic region and institutional size. Public 2-year colleges reported an average retention rate of 58.11% for fall 2013, more than 13 percentage points lower than the average of 71.14% for public 4-year colleges during the same period. The gap in average retention rates between public 2-year and public 4-year colleges holds fairly consistent when analyzed for geographic region and institutional size.

Table 4.3

Fall 2013 Retention Rates for Public 2-Year and 4-Year Colleges

		Public 2-year Colleges		Public 4-year Colleges	
	Demographic	Retention	Occurrences	Retention	Occurrences
	All Institutions	58.11%	929	71.14%	328
Institutional Size	Very Large Institutions	63.37%	57	77.21%	24
	Large Institutions	61.37%	153	75.02%	74
	Medium Institutions	58.82%	229	72.78%	118
	Small Institutions	56.11%	440	65.09%	106
	Very Small Institutions	56.46%	50	73.33%	6
Geographic Region	Far West	64.91%	153	80.00%	33
	Great Lakes	57.66%	132	70.05%	38
	Mid East	60.11%	90	77.86%	57
	New England	61.20%	46	72.67%	27
	Plains	57.89%	99	67.83%	35
	Rocky Mountains	55.68%	25	64.69%	16
	Southeast	55.41%	267	68.98%	92
	Southwest	53.84%	117	62.53%	30

For both samples, retention was generally corollary to institutional size, averaging highest at the very large institutions and decreasing slightly as institutional size decreased. The exceptions to this were very small institutions which saw a slight increase in public 2-year colleges and a larger increase in public 4-year colleges. When analyzed by geographic region, there was also consistency between the samples. Institutions in the Far West, Mid East, and New England regions ranked among the top three for both public 2-year and public 4-year colleges, while institutions in the Rocky Mountain and Southwest regions rounded out the bottom.

Analysis of Research Questions

Research Question 1

Research question one asked if public 2-year colleges allocate their budgets similarly, both as a percentage of their total budget and as a dollar amount per FTE, on instruction, academic support, and student services when compared to public 4-year colleges. Table 4.4 provides a comparison of the average resource allocation of each

independent variable for 2-year and 4-year colleges, both for all institutions in the respective samples and broken down by institutional size.

Instruction. As a whole, public 2-year and 4-year institutions allocated almost identical percentages of their core budget to instruction, averaging 45.63% and 45.93% of total expenditures, respectively. However, when presented in dollars spent per FTE, public 2-year colleges spent $2,160 less per FTE on instruction than public 4-year colleges, averaging $5,371 and $7,531 per FTE, respectively. This pattern holds true when reported across institutional sizes. For each size classification, resource allocation by public 2-year colleges on instruction, as a percentage of budget, is very similar with that of public 4-year colleges – averaging between 40% and 45% with a variance of less than two and one-half percentage points when compared to similar sized institutions in the other sector. Likewise, spending per FTE on instruction by public 2-year colleges significantly lags that of public 4-year colleges across size classification, averaging between $1,500 and $2,500 less per FTE.

Table 4.4

Comparison of Resource Allocation Averages, both as a Percentage and Amount per FTE, by Institutional Size for Public 2-Year and 4-Year Colleges

		Instruction		Academic Support		Student Services	
		Public 2-Year	Public 4-Year	Public 2-Year	Public 4-Year	Public 2-Year	Public 2-Year
All Institutions	Percent	45.63%	45.93%	8.99%	11.50%	11.24%	11.61%
	$ per FTE	$5,371	$7,531	$1,057	$1,881	$1,339	$1,917
Very Large Institutions	Percent	45.35%	44.52%	9.98%	13.16%	10.90%	11.48%
	$ per FTE	$4,558	$6,477	$1,009	$1,867	$1,083	$1,675
Large Institutions	Percent	46.45%	47.86%	8.62%	11.09%	11.09%	10.54%
	$ per FTE	$4,959	$7,693	$893	$1,768	$1,173	$1,692
Medium Institutions	Percent	46.40%	48.15%	9.10%	11.83%	11.21%	11.78%
	$ per FTE	$5,157	$7,629	$999	$1,869	$1,245	$1,854
Small Institutions	Percent	45.27%	42.73%	8.89%	11.05%	11.26%	11.92%
	$ per FTE	$5,509	$7,449	$1,094	$1,944	$1,404	$2,089
Very Small Institutions	Percent	42.88%	42.43%	9.27%	11.57%	12.14%	15.71%
	$ per FTE	$7,482	$9,174	$1,589	$2,325	$2,042	$3,576

Academic Support. Both samples saw consistency in spending, both as a percentage of core budget and dollar amount per FTE, across size classifications. However, when comparing one sample to the other, public 2-year colleges spent 2.51% ($824 per FTE) less than public 4-year colleges on academic support than public 4-year colleges. Collectively, public 2-year colleges spent an average of 8.99% of their core budget on academic support, with a range of 8.62% (large institutions) to 9.98% (very large institutions) when viewed by institutional size. The dollar amount spent per FTE averaged $1,057, with a range of $893 (large institutions) and $1,589 (very large institutions). Public 4-year colleges spent an average of 11.50% of their core budget on academic support, with a range of 11.05% (small institutions) to 13.16% (very large institutions) when viewed by institutional size. The dollar amount spent per FTE averaged $1,881, with a range of $1,768 (large institutions) and $2,325 (very small institutions).

Student Services. Like instruction, public 2-year colleges and public 4-year colleges allocated very similar percentages of their core budget to student services, averaging 11.24% and 11.61% of total expenditures, respectively. However, when presented in dollars spent per FTE, public 2-year colleges spent $578 less per FTE on instruction than public 4-year colleges, averaging $1,339 and $1,917 per FTE, respectively. This pattern holds true when reported across institutional sizes. For each size classification, resource allocation by public 2-year colleges on instruction, as a percentage of budget, is very similar with that of public 4-year colleges – generally averaging between 10% and 12% with a variance of less than one percentage point when compared to similar sized institutions in the other sector. Very small institutions for both

samples prove to be an exception, leading both samples in spending for student services and slightly higher than the group average.

Research Question 2

Research question two asked if the percentage of budget spent on instruction, academic support, and student services positively influenced student retention at public 2-year colleges. Table 4.5 shows the correlation between each of the variables of interest using fall 2013 retention and institutional expenditures reported as a percentage of the institution's core budget. Note that fall 2013 retention and expenditures for instruction are positively correlated ($p<.05$). This means that as the budgeted amount for instruction increases retention also tends to increase. Conversely, expenditures for student services are negatively correlated with fall 2013 retention ($p<.05$). This means that as the budget amount for student services increases, retention rates decrease. The expenses for academic support are positively correlated when analyzed as a percentage; though the relationship is statistically insignificant.

Table 4.5

Correlation among Variables of Interest Using Expense as a Percentage of Budget for Public 2-Year Colleges

Instruction Percent	Academic Support Percent	Student Service Percent	
.068**	.009	-.066**	Fall 2013 Retention
	-.077**	-.111***	Instruction Percent
		.096***	Academic Support Percent

*p<.1 **p<.05 ***p<.01

Table 4.6 provides the results of the regression analysis model for explaining retention using identified expenditures as a percentage of the total budget. The model provided a R-squared value of .008 indicating that the three independent variables combined explain less than 1% of the variation of retention at public 2-year colleges. After holding the effect of academic support and student services constant, the model

shows that instruction is statistically significantly associated with increases in retention ($p < .1$). An increase of ten percentage points in an institution's budget for instruction would equate to an increase in student retention of about .7 percentage points. The model also shows that student services is statistically significantly associated with decreases in retention ($p<.1$). An increase of ten percentage points in an institution's budget for student services would equate to a decrease in student retention of about 1.3 percentage points. Regarding the effect of academic support, while positively associated with retention, it is not statistically significant.

Table 4.6

Fall 2013 Retention as Explained by Instruction, Academic Support, and Student Services for Public 2-Year Colleges

	Dependent variable: Fall 2013 Retention				
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	55.8108	2.18066	25.5935	<0.00001	***
Instruction Percent	0.0747016	0.0395341	1.8895	0.05913	*
Academic Support Percent	0.0407974	0.0713823	0.5715	0.56778	
Student Services Percent	-0.131103	0.0714572	-1.8347	0.06687	*
R-squared	0.008404	Adjusted R-squared		0.005184	
F(3, 924)	2.610249	P-value(F)		0.050287	

Missing or incomplete observations dropped: 45
Observations 1-973 (n = 928)
*p<.1 **p<.05 ***p<.01

Research Question 3

Research question three asked if the findings in research question two were consistent when using the dollar amount spent per FTE, rather than percentages, for each of the predictor variables. For comparison, Table 4.7 shows the correlation between the variables of interest using fall 2013 retention and institutional expenditures reported as the dollar amount spent per FTE. This was done to see if the correlation would remain consistent when the regression analysis was conducted using budgeted percentages versus dollar amount spent per FTE. When compared to the correlation analysis of research

question two (Table 4.5), there are inconsistencies in the relationships. Fall 2013 retention and expenditures for instruction remain positively correlated, but the significance has decreased to the point of no longer being statistically significant. Retention and expenditures for student services remained negatively correlated but the significance of the relationship is stronger ($p<.01$). The expenses for academic support remained positively correlated and statistically insignificant.

Table 4.7

Correlation among Variables of Interest using Expense per FTE for Public 2-Year Colleges

Instruction per FTE	Academic Support per FTE	Student Service per FTE	
.008	-.002	-.089***	Fall 2013 Retention
	.233***	.368***	Instruction per FTE
		.312***	Academic Support per FTE

*p<.1 **p<.05 ***p<.01

Table 4.8 provides the results of the regression analysis model for explaining retention using identified expenditures as a dollar amount spent per FTE. As predicted by Table 4.7, there are inconsistencies in this analysis when compared to Table 4.6. The model provided an R-squared value of .010, marginally higher than before, but still an indication that the three independent variables combined explain just 1% of the variation of retention at public 2-year colleges. After holding the effect of the other variables constant, this model showed that only student services was statistically significantly associated with retention ($p < .01$). An increase of $100 per FTE in an institution's budget for student services would equate to a decrease in student retention of about 1.5 percentage points. Both instruction and academic support, while positively associated with retention, were not statistically significant.

Table 4.8

Fall 2013 Retention as Explained by Instruction, Academic Support, and Student Services for Public 2-Year Colleges

	Dependent variable: Fall 2013 Retention				
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	58.3993	1.06141	55.0206	<0.00001	***
Instruction per FTE	0.000256054	0.000195254	1.3114	0.19005	
Academic Support per FTE	0.000329009	0.000534784	0.6152	0.53856	
Student Services per FTE	-0.00149815	0.000480918	-3.1152	0.00189	***
R-squared	0.010476	Adjusted R-squared		0.007263	
F(3, 924)	3.260662	P-value(F)		0.020950	

Missing or incomplete observations dropped: 45
Observations 1-973 (n = 928)
*p<.1 **p<.05 ***p<.01

Research Question 4

Research question four asked if the findings in research question two were consistent when important institutional and environmental characteristics were controlled. For this study the following controls were identified: percentage of fulltime students, percentage of fulltime faculty for the 2012-2013 academic year, local poverty and local crime rates. Table 4.9 provides the results of four separate regression models used to explain retention when controlling for important institutional and environmental characteristics at public 2-year colleges.

Table 4.9

Fall 2013 Retention as Explained by Institutional Expenditures when Controlled for Important Institutional and Environmental Characteristics for Public 2-Year Colleges

	Dependent variable: Fall 2013 Retention			
	Model 1	Model 2	Model 3	Model 4
const	55.8108***	57.4317***	65.8957***	67.8351***
	(2.18066)	(2.40713)	(2.75893)	(3.0025)
Instruction Percent	0.0747016*	0.0783489**	0.0192809	0.0153662
	(0.0395341)	0.0394479	(0.045916)	(0.0460688)
Academic Support Percent	0.04087974	-0.00238339	-0.0393719	-0.0502591
	(0.0713823)	(0.0722461)	(0.0892337)	(0.0899634)
Student Services Percent	-0.131103*	-0.0921525	-0.0458741	-0.0346075
	(0.0714572)	(0.0707704)	(0.0853709)	(0.0857824)
Percent Fulltime Enrollment		-0.0482613*		-0.0687757**
		(0.0248415)		(0.0307454)
Percent Fulltime Faculty		0.00375648		0.0224789
		(0.0212143)		(0.0247228)
2013 Poverty Rate			-0.112292***	-0.114943***
			(0.0396189)	(0.03976)
2013 Combined Crime Rate			-0.105188***	-0.100466***
			(0.0157795)	(0.0160314)
n	928	919	617	612
R-squared	0.008404	0.011867	0.112982	0.120508

Standard error in parentheses
*p<.1 **p<.05 ***p<.01

Model 1 in Table 4.9 is used as a control and represents the results of research question two. Model 2 shows the relationship between retention and institutional expenditures when controlling for important institutional characteristics; specifically an institution's percentage of fulltime enrollment and percentage of fulltime faculty. Compared to the control, there is an increase, both in number and significance ($p<.05$), in the relationship between instruction and retention when controlling for the percentage of fulltime enrollment and fulltime faculty. Additionally, the relationship between student services and retention increases, but the relationship is no longer significant. Finally, the relationship between academic support and retention is no longer positive; however, it continues to be insignificant.

Model 3 shows the relationship between retention and institutional expenditures when controlling for important environmental characteristics; specifically local poverty

and crime rates. When compared to the control, there is a decrease in the influence instruction and academic support have on retention and an increase in the relationship with student services when controlling for poverty and crime rates. However, none of these are statistically significant. Of note in this is model is that both poverty and crime rates have a strong statistically significant ($p<.01$) and negative correlation with retention. Moreover, this model has a significantly higher R-squared value when compared to the control, $R^2 = .113$ and $R^2 = .008$ respectively.

Model 4 shows the relationship between retention and institutional expenditures when controlling for both the institutional and environmental characteristics used in models 2 and 3. Model 4 produces similar results to that of Model 3. When compared to the control, there is a decrease in the influence instruction and academic support have on retention and an increase in the relationship with student services when controlling for poverty and crime rates. However, none of the relationships are statistically significant. As with Model 3, this model shows that both poverty and crime rates have a strong statistically significant ($p<.01$) and negative correlation with retention, with a much higher R-squared value ($R^2 = .121$).

Table 4.10 provides a robustness check of the results presented in the previous table. To accomplish this, all institutions with a missing variable were removed from the dataset, resulting in a constant number of cases (n=612). The data were again analyzed using multiple regression analysis. When compared to Table 4.9, the results of the robust check showed that, despite the results remaining numerically consistent, the relationship between retention and institutional expenditures is no longer significant for any of the four models. However, the relationship between retention and percentage of fulltime

enrollment, poverty rate, and crime rate remain numerically consistent and statistically significant. Consequently, the findings in Table 4.9 are not found to be robust.

Table 4.10

Fall 2013 Retention as Explained by Institutional Expenditures when Controlled for Important Institutional and Environmental Characteristics for Public 2-Year Colleges when Checked for Robustness

	Dependent variable: Fall 2013 Retention			
	Model 1	Model 2	Model 3	Model 4
const	56.8831***	60.6252***	65.8863***	67.8351***
	(2.69641)	(2.99983)	(2.77252)	(3.0025)
Instruction Percent	0.0425815	0.0380243	0.0192654	0.0153662
	(0.0485442)	(0.0482891)	(0.046096)	(0.0460688)
Academic Support Percent	-0.0390143	-0.062351	-0.0364583	-0.0502591
	(0.0947247)	(0.0946168)	(0.089625)	(0.0899634)
Student Services Percent	-0.0228891	-0.00479422	-0.0466734	-0.0346075
	(0.0907226)	(0.0903148)	(0.0857391)	(0.0857824)
Percent Fulltime Enrollment		-0.102957***		-0.0687757**
		(0.0319988)		(0.0307454)
Percent Fulltime Faculty		0.0198273		0.0224789
		(0.0260414)		(0.0247228)
2013 Poverty Rate			-0.11135***	-0.114943***
			(0.039806)	(0.03976)
2013 Combined Crime Rate			-0.106089***	-0.100466***
			(0.0158545)	(0.0160314)
n	612	612	612	612
R-squared	0.001893	0.018896	0.113192	0.120508

Standard error in parentheses
*p<.1 **p<.05 ***p<.01

A possible explanation for the lack of robustness is the number of institutions in the model and the observed variance in resource allocation by institutional size. To test this and better understand why the findings in Table 4.9 were not found to be robust, the findings of Table 4.10 were further analyzed through disaggregating the model by institutional size and comparing results. Table 4.11 provides the results by institutional size using all predictor and control variables. A review of the findings provided a significant amount of variance across intuitional size for each of the variables used. Generally speaking smaller institutions saw academic support positively associated and student services negatively associated. Whereas these associated relationships for both

variables is reversed for larger institutions. Crime and poverty are negatively associated across institutional size, though the level of statistical significance varies. There is also significant variance in the r-squared value for each size, ranging from as low as .0750 for Small Institutions to as high as .684 for Very Large Institutions. The findings in Table 4.11 corroborate the notion that institutional size and variance in resource allocation contribute to the lack of robustness.

Table 4.11

Fall 2013 Retention as Explained by Institutional Expenditures when Controlled for Important Institutional and Environmental Characteristics for Public 2-Year Colleges by Institutional Size when Checked for Robustness

	Dependent variable: Fall 2013 Retention					
	All Institutions	Very Small Institutions	Small Institutions	Medium Institutions	Large Institutions	Very Large Institutions
const	67.8351***	55.0267***	51.8271***	71.2946***	95.9231***	51.707***
	(3.0025)	(16.22)	(4.52754)	(4.83827)	(6.88533)	(12.8984)
Instruction Percent	0.0153662	0.0478978	0.213624***	-0.0873964	-0.544889***	-0.144165
	(0.0460688)	(0.215595)	(0.0671023)	(0.0730613)	(0.106188)	(0.166469)
Academic Support Percent	-0.0502591	-0.239595	-0.0441434	0.0704558	-0.173012	-0.405011
	(0.0899634)	(0.45306)	(0.134399)	(0.131401)	(0.204288)	(0.35113)
Student Services Percent	-0.0346075	-0.316283	-0.0877714	0.152682	0.00345955	0.578271
	(0.0857824)	(0.278902)	(0.120185)	(0.162107)	(0.22413)	(0.357872)
Percent Fulltime Enrollment	-0.0687757**	0.252673	0.0130163	-0.0633925	-0.111042	0.172248
	(0.0307454)	(0.15918)	(0.0462172)	(0.0507993)	(0.0801647)	(0.161421)
Percent Fulltime Faculty	0.0224789	0.0138379	-0.0053853	0.00845676	0.156426**	0.813786***
	(0.0247228)	(0.0994096)	(0.0336011)	(0.0413853)	(0.0705392)	(0.127203)
2013 Poverty Rate	-0.114943***	-0.00709893	-0.128401*	-0.114082	-0.0808995	-0.214619
	(0.03976)	(0.376183)	(0.0777084)	(0.0698855)	(0.0526193)	(0.14344)
2013 Combined Crime Rate	-0.100466***	-0.158312*	-0.0347416	-0.129178***	-0.158827***	-0.223932***
	(0.0160314)	(0.083788)	(0.0229972)	(0.0278761)	(0.0415388)	(0.0592697)
n	612	25	281	160	104	42
R-squared	0.120508	0.449042	0.074981	0.234597	0.387588	0.684389

Standard error in parentheses
*p<.1 **p<.05 ***p<.01

Research Question 5

Research question five asked how the findings in research question four compare with public 4-year colleges for the same time period using similar variables and controls. In order to answer this question, four separate regression models were ran for public 4-year colleges comparing the relationship between retention and the predictor variables identified in research question two and the control variables identified in research question four. The results were first analyzed to see how retention at public 4-year colleges might be explained by the stated variables. Then a comparative analysis was done with public 2-year colleges.

Results for Public 4-year Colleges. Table 4.12 provides the results of four separate regression models used to explain the relationship between retention and institutional expenditures in instruction, academic support, and student services; and when controlling for important institutional and environmental characteristics at public 4-year colleges.

Table 4.12

Fall 2013 Retention as Explained by Institutional Expenditures when Controlled for Important Institutional and Environmental Characteristics for Public 4-Year Colleges

	Dependent variable: Fall 2013 Retention			
	Model 1	Model 2	Model 3	Model 4
const	49.6594***	32.1651***	61.145***	34.8897***
	(3.95317)	(4.53689)	(5.85988)	(6.28693)
Instruction Percent	0.399616***	0.331105***	0.185966**	0.163318**
	(0.0710584)	(0.063818)	(0.0930813)	(0.0806244)
Academic Support Percent	0.41472***	0.462785***	0.667632***	0.727069***
	(0.138712)	(0.12289)	(0.19236)	(0.163185)
Student Services Percent	-0.143147	-0.234241**	-0.132884	-0.248591*
	(0.130317)	(0.116135)	(0.15485)	(0.132247)
Percent Fulltime Enrollment		0.345168***		0.349701***
		(0.035727)		(0.0433475)
Percent Fulltime Faculty		-0.0696372**		0.0307385
		(0.0310264)		(0.0435361)
2013 Poverty Rate			-0.0309966	-0.053277
			(0.0667602)	(0.0572593)
2013 Combined Crime Rate			-0.099553***	-0.0784604***
			(0.0274337)	(0.0234122)
n	328	328	187	187
R-squared	0.106202	.308842	0.144640	0.393044

Standard error in parentheses
*p<.1 **p<.05 ***p<.01

Model 1 in Table 4.12 shows the relationship between retention and institutional expenditures for instruction, academic support, and student service for public 4-year colleges. Note that instruction and academic support were positively correlated and significantly influenced retention (p<.01 for both variables). Student services was negatively correlated with retention but was not statistically significant. This model had an R-squared value of 0.106, indicating that the three variables combined explain just over 10% of the variance in retention.

Model 2 shows the relationship between retention and institutional expenditures when controlling for important institutional characteristics; specifically an institution's percentage of fulltime enrollment and percentage of fulltime faculty. Compared to the Model 1, there is a decrease in the relationship between instruction and retention, though the relationship remains positively correlated with a high level of significance (p<.01),

when controlling for the percentage of fulltime enrollment and fulltime faculty. The relationship between academic support and retention increased slightly, also remaining positively correlated and statically significant ($p<.01$). However, while the relationship between student services and retention remains negatively correlated, the level of influence nearly doubles and is now statistically significant ($p<.05$). Both percentage of fulltime enrollment ($p<.01$) and percentage of fulltime faculty ($p<.05$) were statistically significantly linked to retention with enrollment having a positive correlation and faculty being negatively correlated. This model had an R-squared value of .309; suggesting that, when important institutional variables are controlled, the model explains more than 30% of the variance of retention, nearly three times that of model 1.

Model 3 shows the relationship between retention and institutional expenditures when controlling for important environmental characteristics; specifically local poverty and crime rates. When compared to Model 1, both instruction and academic support remained positively correlated with retention, though the level of influence for instruction decreased, both in number and significance ($p<.05$), while academic support increased in number and significance ($p<.01$). Student services remained negatively correlated and statistically insignificant. Of note in this model is that crime rate had a strong statistically significant ($p<.01$) and negative correlation with retention. Poverty rates was negatively correlated but statistically insignificant. This model also had a slightly higher R-squared value when compared to the model 1, $R^2 = .145$ and $R^2 = .106$ respectively.

Model 4 shows the relationship between retention and institutional expenditures when controlling for both the institutional and environmental characteristics used in Models 2 and 3. When compared to Model 1, both instruction and academic support

remained positively correlated with retention, though the level of influence for instruction decreased, both in number and significance ($p<.05$), while academic support increased in number but decreased in significance ($p<.01$). Student services remained negatively correlated, but increased in value and become statistically significant ($p<.1$). As with Model 2, percentage of fulltime enrollment is positively correlated and statistically significant ($p<.01$). Percentage of fulltime faculty is positively correlated, but statistically insignificant. Like with Model 3, crime rate had a strong statistically significant ($p<.01$) and negative correlation with retention. Poverty rate was negatively correlated but statistically insignificant. This model also had the highest R-squared valued ($R^2=0.393$), explaining nearly 40% of the variance of retention at public 4-year colleges.

Table 4.13 provides a robustness check of the results presented in Table 4.12. To accomplish this, all institutions with a missing variable were removed from the dataset, resulting in a constant number of cases (n=187). The data were again analyzed using multiple regression analysis. When compared to Table 4.11, the results of the robust check showed that, despite variance is the numerical value of the relationship, the corollary relationship and statistical significance between retention and each of the predictor and control variables remained constant. The findings in Table 4.11 are found to be robust.

Table 4.13

Fall 2013 Retention as Explained by Institutional Expenditures when Controlled for Important Institutional and Environmental Characteristics for Public 4-Year Colleges when Checked for Robustness

	Dependent variable: Fall 2013 Retention			
	Model 1	Model 2	Model 3	Model 4
const	52.4683***	26.3816***	61.145***	34.8897***
	(5.42458)	(6.01927)	(5.85988)	(6.28693)
Instruction Percent	0.234581**	0.202608**	0.185966**	0.163318**
	(0.0951779)	(0.0823353)	(0.0930813)	(0.0806244)
Academic Support Percent	0.664039***	0.72594***	0.667632***	0.727069***
	(0.19864)	(0.168233)	(0.19236)	(0.163185)
Student Services Percent	-0.0537527	-0.185586	-0.132884	-0.248591*
	(0.158272)	(0.13515)	(0.15485)	(0.132247)
Percent Fulltime Enrollment		0.362396***		0.349701***
		(0.044541)		(0.0433475)
Percent Fulltime Faculty		0.0316898		0.0307385
		(0.0443027)		(0.0435361)
2013 Poverty Rate			-0.0309966	-0.053277
			(0.0667602)	(0.0572593)
2013 Combined Crime Rate			-0.099553***	-0.0784604***
			(0.0274337)	(0.0234122)
n	187	187	187	187
R-squared	0.077754	0.347699	0.144640	0.393044

Standard error in parentheses
*p<.1 **p<.05 ***p<.01

Comparison with Public 2-year Colleges. Table 4.14 provides a side-by-side comparative analysis of like models from Tables 4.9 and 4.12. This was done to identify similarities and differences when comparing the relationship between retention and institutional expenditures in instruction, academic support, and student services at public 2-year with that of public 4-year colleges.

Table 4.14

Comparison of Predictor and Control Variables for Public 2-Year and Public 4-Year Colleges

	Dependent variable: Fall 2013 Retention							
	Model 1		Model 2		Model 3		Model 4	
	Public 2-year Colleges	Public 4-year Colleges	Public 2-year Colleges	Public 4-year Colleges	Public 2-year Colleges	Public 4-year Colleges	Public 2-year Colleges	Public 4-year Colleges
const	55.8108***	49.6594***	57.4317***	32.1651***	65.8957***	61.145***	67.8351***	34.8897***
	(2.18066)	(3.95317)	(2.40713)	(4.53689)	(2.75893)	(5.85988)	(3.0025)	(6.28693)
Instruction Percent	0.0747016*	0.399616***	0.0783489**	0.331105***	0.0192809	0.185966**	0.0153662	0.163318**
	(0.0395341)	(0.0710584)	0.0394479	(0.063818)	(0.045916)	(0.0930813)	(0.0460688)	(0.0806244)
Academic Support Percent	0.04087974	0.41472***	-0.00238339	0.462785***	-0.0393719	0.667632***	-0.0502591	0.727069***
	(0.0713823)	(0.138712)	(0.0722461)	(0.12289)	(0.0892337)	(0.19236)	(0.0899634)	(0.163185)
Student Services Percent	-0.131103*	-0.143147	-0.0921525	-0.234241**	-0.0458741	-0.132884	-0.0346075	-0.248591*
	(0.0714572)	(0.130317)	(0.0707704)	(0.116135)	(0.0853709)	(0.15485)	(0.0857824)	(0.132247)
Percent Fulltime Enrollment			-0.0482613*	0.345168***			-0.0687757**	0.349701***
			(0.0248415)	(0.035727)			(0.0307454)	(0.0433475)
Percent Fulltime Faculty			0.00375648	-0.0696372**			0.0224789	0.0307385
			(0.0212143)	(0.0310264)			(0.0247228)	(0.0435361)
2013 Poverty Rate					-0.112292***	-0.0309966	-0.114943***	-0.053277
					(0.0396189)	(0.0667602)	(0.03976)	(0.0572593)
2013 Combined Crime Rate					-0.105188***	-0.099553***	-0.100466***	-0.0784604***
					(0.0157795)	(0.0274337)	(0.0160314)	(0.0234122)
n	928	328	919	328	617	187	612	187
R-squared	0.008404	0.106202	0.011867	0.308842	0.112982	0.144640	0.120508	0.393044

Standard error in parentheses
*p<.1 **p<.05 ***p<.01

When comparing retention as explained by institutional expenditures (see Table 4.14), public 4-year colleges saw a higher level of influence with greater significance in the relationship between retention and institutional expenditures for instruction and academic support. The influence of instruction was nearly six times greater at public 4-year colleges than at public 2-year colleges, .4000 ($p<.01$) and .0747 ($p<.1$) respectively, with a greater statistical significance. Academic support had significant correlation ($p<.01$) with retention at public 4-year colleges with more than ten times the level of influence than at public 2-year colleges, .4147 and .0409 respectively. This is noteworthy because academic support, as an expenditure, did not report a statistically significant relationship with retention in any of the models for 2-year colleges. The level of influence of student services on retention was fairly consistent for both public 2-year and public 4-year colleges, though the relationship is only statistically significant for public 2-year colleges. When comparing R-squared values, the model was able to explain a much higher level of variance for retention at public 4-year colleges ($R^2=.106$) than public 2-year colleges ($R^2=.008$).

When comparing retention as explained by institutional expenditures and controlling for important institutional characteristics, public 4-year colleges again saw a higher level of influence with greater significance for the relationship between retention and institutional expenditures for instruction and academic support. The influence of instruction was nearly five times greater at public 4-year colleges than at public 2-year colleges, .3311 ($p<.01$) and .0783 ($p<.05$) respectively, with a greater statistical significance. Academic support again had a positive correlation with retention at public 4-year colleges with much higher levels of influence than at public 2-year colleges, .4628

($p<.01$) and -.0024 respectively. The negative correlation between retention and student services increased and was significant ($p<.05$) for public 4-year colleges, while decreasing and without significance for public 2-year colleges. Of note, the correlation between retention and enrollment was negative ($p<.1$) for public 2-year colleges and positive ($p<.01$) for public 4-year colleges, with both relationships being statistically significant. Conversely, retention and percentage of fulltime faculty were positively correlated for public 2-year colleges but negatively correlated for public 4-year colleges, though only public 4-year colleges had a significant relationship ($p<.05$). When comparing R-squared values, the model was able to explain a much higher level of variance for retention at public 4-year colleges ($R^2=.309$) than public 2-year colleges ($R^2=.012$).

When comparing retention as explained by institutional expenditures and controlling for important environmental characteristics, public 4-year colleges continued to provide a higher level of influence with greater significance in the relationship between retention and institutional expenditures for instruction and academic support. The influence of instruction and academic support was numerically higher for both models, though only public 4-year colleges had a statistically significant relationship for both variables (instruction with $p<.05$ and academic support with $p<.01$). The negative correlation between retention and student services increased slightly for public 4-year colleges, while decreasing for public 2-year colleges; with neither relationship being significant. For public 2-year and 4-year colleges, the correlation between retention and poverty was negative; with only public 2-year colleges showing significance ($p<.01$). Retention and crime were negatively correlated for public 2-year and public 4-year

colleges, with both variables being statistically significant ($p<.01$). Both models had similar R-squared values, with public 4-year colleges ($R^2=.145$) being slightly higher than public 2-year colleges ($R^2=.113$).

When comparing retention as explained by institutional expenditures and controlling for both important institutional and environmental characteristics, public 4-year colleges were consistent in seeing a greater level of influence with greater significance in the relationship between retention and institutional expenditures for instruction and academic support. The influence of instruction and academic support was numerically higher for both models, though only public 4-year colleges had a statistically significant relationship for both variables (instruction with $p<.05$ and academic support with $p<.01$). The negative correlation between retention and student services increased and was significant ($p<.1$) for public 4-year colleges, while decreasing and without significance for public 2-year colleges. The correlation between retention and enrollment was negative ($p<.05$) for public 2-year colleges and positive ($p<.01$) for public 4-year colleges, with both relationships being statistically significant. Retention and percentage of fulltime faculty were positively correlated for both public 2-year and public 4-year colleges with neither relationship being significant. For public 2-year and 4-year colleges, the correlation between retention and poverty was negative; with only public 2-year colleges showing significance ($p<.01$). Also, retention and crime were negatively correlated for public 2-year and public 4-year colleges with both variables being statistically significant ($p<.01$). When comparing R-squared values, the model was able to explain a much higher level of variance for retention at public 4-year colleges ($R^2=.393$) than public 2-year colleges ($R^2=.121$).

Summary

This chapter presented the findings of the analysis of the relationship between retention and institutional expenditures for instruction, academic support, and student services at public 2-year colleges. Also presented were the observations made when comparing the analysis to public 4-year colleges for the same time period. Two populations were included in the assessment, public 2-year colleges with a total of 972 institutions and public 4-year colleges with a total of 335 institutions. When comparing how both samples allocated resources in the areas of instruction, academic support, and student services, it was discovered that both samples allocated similar amounts as a percentage of the core budget, but the amount per FTE was considerably greater for public 4-year colleges than public 2-year colleges. This discovery was consistent across institutional size and geographic region. When assessed for correlation, a significant relationship was discovered between retention and institutional expenditures for instruction and student services, indicating that there is a linear, predictive relationship between the variables.

Using multiple linear regression, it was determined that institutional expenditures for instruction and student services could predict college student retention rates at public 2-year colleges when other important institutional variables were controlled, though the significance of the relationship varied depending on the variables being controlled. However, when controlling for important environmental variables, the significance between retention and expenditures for instruction and student services went away. Instead, the controlled environmental variables of poverty rate and crime rate proved to be more significant predictors of college student retention rates at public 2-year colleges.

When comparing 2-year colleges with 4-year colleges, the latter consistently saw a higher level of influence with greater significance in the relationship between retention and institutional expenditures. Moreover, public 4-year colleges, unlike public 2-year colleges, retained the significance of these relationships when controlling for important institutional and environmental characteristics.

CHAPTER 5

DISCUSSION

Overview of Study

Gansemer-Topf & Schuh (2006), Berger (2002), and Umfress (2010) claimed that institutional behavior, specifically how institutions allocate resources, has a direct and significant impact on student outcomes in retention, persistence, and graduation. Such a claim is made largely in defense of increased pressure on institutions to reprioritize spending towards those areas viewed as causally beneficial to increased student outcomes. Furthermore, the claim is reflective of an era of increased public scrutiny on resource allocation and student outcomes for higher education (Thelin, 2003).

The demand for accountability continues today, calling for clearer and more efficient methods to assess institution efficiency, resulting in new accountability measures focused on institutional inputs and educational outcomes (Umfress, 2010). In essence, the commission calls on institutions to demonstrate how their behaviors, including how they decide to spend available resources, impact student outcomes. In an attempt to demonstrate accountability, many colleges and universities have begun to depend heavily on comparisons between institutional inputs, such as resource allocation, and outputs, such as student retention.

What needs to be considered, however, is the research to date analyzing the relationship between institutional expenditures and student outcomes. What little research does exist has produced inconsistent, inconclusive, and contradictory results. Moreover, the totality of current research has been limited to private and public colleges and

universities offering bachelor's degrees or higher. None exists examining the relationship between resource allocation and student outcomes within the 2-year sector of higher education. This study used IPEDS data for all public 2-year colleges in the contiguous United States to examine the relationship between institutional expenditures and student retention during the 2013 IPEDS reporting period. By better understanding this relationship, college leaders and public stakeholders can make better decisions when prioritizing institutional expenditures as a means of driving increased retention and college completion rates.

Discussion of Research Findings

Research Question 1: Do public 2-year colleges allocate their budget similarly, both as a percentage of their total budget and as a dollar amount per FTE, on instruction, academic support, and student services when compared to public 4-year colleges?

Findings from this study provided a few similarities and several differences. Similarities existed only when comparing expenditures for instruction and student services as a percentage of the core budget, seeing nearly identical figures when analyzing for all institutions and consistency across institutional size. However, when assessing instruction and student services for the amount spent per FTE, the findings showed a significant difference between public 2-year and public 4-year colleges. Public 2-year colleges, on average, spent $2,160 less on instruction and $578 less on student services per FTE than public 4-year colleges.

These results seem logical when considering that public 2-year colleges collect, on average, less revenue per FTE than public 4-year colleges (Desroches & Hurlburt, 2014). Generally, public 2-year colleges charge less per credit hour than any other sector

of higher education, resulting in lower tuition revenue, while also collecting fewer revenues from auxiliary enterprises and private philanthropy. On average, the revenue per FTE collected at public 2-year colleges is about 25% less than that of public 4-year colleges. Naturally, collecting less revenue per FTE will result in less spending per FTE. To match the spending per FTE of public 4-year colleges, public 2-year colleges would have needed to allocate 63.98% of their core budget on instruction and 16.29% on student services. Given the significant differences in revenue collected, the ability for public 2-year college to spend similar amounts on instruction and student service, both as a percentage and amount per FTE, faces considerable obstacles.

Unlike instruction and student services, the findings for research question one showed differences in how public 2-year colleges allocated their budget for academic support as both a percentage of total budget and the amount spent per FTE. Public 2-year colleges averaged 2.51% lower and $824 per FTE less than public 4-year colleges. A potential explanation for this is the increased residential factor more closely associated with public 4-year colleges (Laskey & Hetzel, 2011; Ryan, 2013). Academic support expenditures are intended to help improve study habits and grade point averages by easing the student's transition into college and providing more effective coping skills (Turner & Thompson, 2014) and generally include items such as libraries, organized academic activities, technology, audiovisual services, and other academic activities not included in instruction (NCES, 2015). While these type of expenditures occur at both public 2-year colleges and public 4-year colleges, the amount expended at public 4-year colleges will be higher due to greater demand from residential students. Windham, Rehfuss, William, Pugh, & Tincher-Ladner (2014) suggest that nearly 85% of students at

public 2-year colleges do not engage in any academic or social activity other than going to class, also known as the parking-lot-to-class-to-parking-lot syndrome (Staley, 2012). Consequently, the demand for academic support expenditures is arguably much less when compared to public 4-year colleges.

Research Question 2: Does the percentage of budget spent on instruction, academic support, and student services positively influence student retention at public 2-year colleges?

Drawing from existing research indicating institutional expenditures were effective predictors of college student retention (Gansemer- Topf & Schuh, 2006; Ryan, 2004; Umfress, 2010), the findings for research question two, again, provided mixed results. A statistical analysis of the relationship between retention and institutional expenditures in instruction, academic support, and student services provided a statistically significant correlation between retention and expenditures for instruction and student services only. No significant relationship existed between expenditures for academic affairs and retention. This affirms existing research that institutional expenditures, at least for instruction and student services, can be a statistically significant predictor of college student retention rates at public 2-year colleges, just as it can be for public 4-year colleges. However, only instruction had a positive correlation with retention. Student services had a negative correlation. Moreover, the level of influence, while statistically significant, was not numerically significant. With an R-squared value of .008, the three variables combined explain less than 1% of the variation of retention at public 2-year colleges.

The Conceptual and Theoretical Framework section of Chapter 2 hypothesized that institutional expenditures in instruction and academic support would reproduce Gansemer- Topf & Schuh's (2006) and Ryan's (2004) research, by finding a positive correlation with retention. This was proven partly true, as instruction did have a positive correlation. Academic support did produce a positive correlation, though the relationship was not significant. It was also expected that this study would not be able to reproduce Umfress' (2010) findings and demonstrate a positive correlation between expenditures for student services and retention. Instead, like Gansemer-Topf & Schuh (2006), the study found a negative correlation. The findings supported this expectation.

As with research question one, a potential explanation for these results is the very different cultures of learning between public 2-year colleges and public 4-year colleges. The public 2-year student is much more likely to be a commuter and make very little, if any, use of student services or other areas of expenditures other than instruction (Laskey & Hetzel, 2011; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). Consequently, while influential at 4-year institutions, student service will not have an impact on retention if 85% of students do not make use of the service (Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). Indeed, the findings support Laskey & Hetzel (2011) and Ryan (2013) by suggesting that prioritizing funding on student services can actually hurt retention at public 2-year colleges because they draw money away from other programs that might increase retention.

Research Question 3: Are the findings in research question two consistent when using the dollar amount spent per FTE, rather than percentages, for each of the predictor variables?

Seeking to identify consistencies when analyzing expenditures per FTE, rather than percentages, the findings for research question three were consistent with those in research question two. A statistical analysis of the relationship between retention and institutional expenditures in instruction, academic support, and student services provided a statistically significant correlation between retention and student services only, whereas both instruction and student services proved significant in research question two. There continued to be no significant relationship between retention and expenditures for academic affairs. The relationship between retention and student services remained negative, decreased slightly, and was statistically more significant than in research question two. However, consistent with research question two, the level of influence, while statistically significant, was not numerically significant. With an R-squared value of .010, the three variables combined explained just 1% of the variation of retention at public 2-year colleges.

Research Question 4: Are the findings in research question two consistent when important institutional and environmental characteristics are controlled?

Research question four sought to analyze the relationship between retention and institutional expenditures in instruction, academic support, and student services when controlling for important institutional and environmental characteristics. This was done to test the impact of other environmental factors on student retention as identified by Tinto's (1975) theory of student departure and Hackman's (1985) theory of resource allocation. Both Tinto (1975) and Hackman (1985) identified other factors, both internal and external, as influential on student retention and resource allocation. The model attempted to bring some of these factors into consideration by controlling for specific variables

believed to be influential as derived from the reviewed literature. Instruction, advising, and tutoring were identified as primary institutional influencers of student retention at public 2-year colleges (Mertes & Hoover, 2014; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). An additional institutional characteristic was enrollment status, with fulltime students more likely to retain when compared to part-time students (Mertes & Hoover, 2014). When assessing the primary environmental characteristics, social influencers were consistently the primary external influence on student retention (ACT, 2010a; 2010b; 2010c). With the above in mind, percentage of fulltime faculty and percentage of fulltime enrollment were used as institutional characteristics to be controlled. Poverty rate and crime rate were identified as controlling environmental characteristics.

When controlling for institutional characteristics, the relationship between instruction and retention stayed fairly unchanged, though became statistically more significant. The relationship between student services and retention remained negative but was no longer significant. Additionally, the R-squared value increased slightly, going from .008 to .012 when controlling for important institutional characteristics. This continues to support the suggestion that instruction is a primary institutional influencer of student retention at public 2-year colleges (Mertes & Hoover, 2014; Ryan, 2013; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014). However, the relationship between the percentage of fulltime enrollment and retention was both negative and statistically significant. This possibly challenges the notion that enrollment status is a positive indicator of student retention as proposed by Mertes & Hoover (2014). Another possible explanation comes from understanding that many full-time students attend a

public 2-year college with intent of later transferring on to a 4-year college. As discussed later in the limitations section of this chapter, college retention did not include college freshmen who may have transferred-out to another institution. While retained by another institution, they are not reported in college retention rates to IPEDS. It is plausible that a 2-year college with a higher proportion of students attending full-time would have also experienced a higher transfer-out rate – a situation that would negatively impact retention rates for the institutions. In either case, understanding the negative association between full-time enrollment and retention warrants further research.

When controlling for environmental characteristics, the relationship between retention and institutional expenditures in instruction, academic support, and student services decreased with each variable becoming statistically insignificant. Of note is that both crime rate and poverty rate were negatively correlated to retention and statistically very significant. Moreover, the R-squared value increased significantly, going from .008 to .113 when controlling for important environmental characteristics. This supports previous findings that social influencers, measured in this study using poverty and crime, have a significant impact on college retention at public 2-year colleges (ACT Inc., 2010a).

It is important to understand why this study used poverty rates reported by the American Community Survey as a measure of socioeconomic status. There are no shortage of suitable tools available, the more common ones being median income and the percentage of K-12 students qualifying for free or reduced lunch. The U.S. national poverty rate, like median income, is often criticized for not adjusting its rate for geographic differences in cost of living, as well as not adjusting for changes in the

standard of living over time (Institute for Research on Poverty, 2015). However, poverty thresholds, unlike median income, are updated annually to allow for changes in the cost of living. Moreover, unlike median income and unemployment, poverty is determined by comparing annual income to predetermined thresholds that vary by family size, number of related children, and the age of the head-of-household. Understandably, poverty is a better measure of the segment of population that is most at-risk from a socioeconomic standpoint. Contrastingly, median income does not relate to a percentage of population determined to be at-risk, it simply provides data on the middle wage-earner.

Finally, when controlling for both important institutional and important environmental characteristics, the findings were very similar to those when controlling for environmental characteristics only. Of note, the effect of fulltime enrollment on retention became more negative and statistically more significant, further challenging Mertes & Hoover (2014). When all variables and controls are forced into the model, the relationship between retention and institutional expenditures in instruction, academic support, and student services effectively goes away. The findings instead show poverty and crime rates as having a much greater impact and level of influence on student retention at public 2-year colleges.

Collectively, the findings for research question four support existing literature suggesting that the level to which public 2-year colleges may be able to influence student retention is largely determined by other significant factors. Variables like socioeconomic status, poverty, and crime - influencers that are believed to be beyond an institution's control; have as much or arguably more influence over student retention at public 2-year

colleges (ACT Inc., 2010a; Mertes & Hoover, 2014; Windham, Rehfuss, William, Pugh, & Tincher-Ladner, 2014).

Research Question 5: How do the findings in research question four compare with public 4-year colleges for the same time period using similar variables?

Comparing the results of research question four with public 4-year colleges for the same time period further galvanizes the notion that institutional behaviors concerning resource allocation at public 2-year colleges do not produce similar results when compared to public 4-year colleges (Laskey & Hetzel, 2011; Mertes & Hoover, 2014; Ryan, 2013). Public 4-year colleges saw a much larger and more significant relationship between retention and institutional expenditures on instruction and academic support – nearly ten times that of public 2-year colleges. Moreover, the independent variables combined explain a much larger portion of the variation of retention at public 4-year colleges – again more than ten times that of public 2-year colleges. This supports the literature that suggests retention strategies that are biased towards and heavily influenced by what works on primarily residential, 4-year college campuses will not produce similar results at public 2-year colleges, which are primarily non-residential, commuter campuses (Laskey & Hetzel,2011; Ryan, 2013). It further supports the understanding that retention strategies, used by public 4-year colleges, may actually hurt retention on public 2-year college campuses because they draw money away from other programs that increase retention.

The models for research question five indicate that public 2-year colleges are more prone to being negatively affected by poverty and crime rates than their 4-year counterparts in their attempts to retain students. In attempting to further explain the

above, the researcher explored whether public 2-year colleges were located in more adversarial areas when compared to public 4-year colleges. The summary statistics shown in Table 5.1 did not corroborate the notion that there are significant disparities in the average and median distributions across sectors. This indicates that while the two sectors are located in zones with similar levels of poverty and crime, other factors contribute to these two variables having a larger negative impact on the student retention at public 2-year colleges. A possible explanation is that, although the locality is similar, the student bodies at public 2-year and public 4-year colleges are not. It is known that public 4-year colleges generally reach greater distances to attract students, whereas public 2-year colleges mostly serve local students. It is also known that the public 2-year sector has traditionally served more at risk students. These two points considered together, the distribution of poverty and crime shown in Table 5.1 is more likely to be realized at public 2-year colleges, whereas similar distribution may not be represented in the public 4-year sector. This difference, coupled with the decreased level of resources available public 2-year colleges, contribute to greater difficulty in helping student retain and persist on to graduation.

Table 5.1

Summary Statistics for Poverty and Crime Rates at Public 2-year and Public 4-Year Colleges

		Mean	Median	Minimum	Maximum	Std. Dev.	Missing Obs.
Public 2-Year Colleges	Poverty Rate	18.4353	17.2	1.1	100.0	10.0363	12
	Crime Rate	53.7637	51.7	3.4	194.3	25.0896	312
Public 4-Year Colleges	Poverty Rate	21.2055	19.4	0.0	100.0	12.4825	28
	Crime Rate	49.6729	45.7	3.2	168.2	26.4479	125

Of note in the findings for research question five is the negative but insignificant relationship between retention and student services at public 4-year colleges. This

supports research by Ryan (2004), which found no significant relationship, but is counter to previous research by Gansemer-Topf and Shuh (2006), which found a statistically significant and negative relationship, and Umfress (2010), which found a statistically significant and positive relationship. Notably, each of the previous researchers used samples including institutional types and demographics not represented in this study.

Assumptions, Limitations and Delimitations

There were several assumptions, limitations, and delimitations to this study. Firstly, data were collected from IPEDS using self-reported surveys from participating institutions. As the surveys are self-reported, the potential for variation exists in how an institution might interpret and report expenditures for instruction, academic support, and student services. This was believed to be an acceptable delimitation on the premise that, when reported in the aggregate, the vast majority of expenditures in any one category will align with the expected interpretation as provided by IPEDS.

Second, as referenced in the theoretical framework, this study was not able to take into account the wide range of institutional and environmental characteristics that were shown in the literature to affect retention. Data that could be obtained in the aggregate and matched using like attributes (i.e. zip code, county, etc.) were included and controlled.

Third, the use of crime and poverty rates was limited to the county or zip code of record for the institution's primary address. For institutions with multiple campuses across a larger geographic region, this prevents crime and poverty rates for satellite locations to be added to the study. This could result in some discrepancy in the reporting of the variation in retention as controlled by crime and poverty.

Finally, college retention, as reported to IPEDS, only includes the fall-to-fall retention of the institution's freshman cohort, specifically those freshmen who remain at the institution. This figure does not include college freshmen who may have transferred-out to another institution. Transfers are retained students, though retained by another institution. Therefore they are not reported in college retention rates to IPEDS. This could result in some discrepancy in the reporting of the dependent variable as explained by the predictor variables and controls.

CHAPTER 6

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Conclusions

This study, its research questions, and the results herein were guided by a primary interest in whether existing research examining the relationship between institutional expenditures and student retention for 4-year colleges could produce similar results when applied to public 2-year colleges. To that point, the results of this study provided several significant findings that enable the researcher to draw several conclusions.

First, this study showed that public 2-year colleges do exercise institutional behaviors similar to public 4-year colleges when allocating resources. While disparity in revenue collection per FTE prevents similarities in spending as an amount per FTE, public 2-year colleges allocated, as a percentage of core budget, nearly identical amounts to instruction and student services as their 4-year counterparts. Both instruction and student services are identified as primary influencers of retention in Tinto's (1975) theory on student departure. This allows the researcher to logically conclude that public 2-year colleges do act like public 4-year colleges when deploying strategies to increase student retention on their campuses.

Second, this study found, as with existing research at public 4-year colleges, that institutional expenditures can be statistically significant predictors of college retention at public 2-year colleges. However, in the case of public 2-year colleges, this relationship between institutional expenditures and student retention is not a major predictor of retention. In fact, while statistically significant, institutional expenditures accounted for

less than 1% of the variance in student retention, compared to more than 10% for public 4-year colleges. In consideration of this, the results of the study concluded that, despite the presence of a statistically significant relationship for some variables, institutional expenditures are not good predictors of student retention at public 2-year colleges.

Finally, the results of the study showed that the significance of the relationship between institutional expenditures and student retention at public 2-year colleges goes away completely when important environmental characteristics are controlled. Moreover, the significance of the relationship is shifted to the controlled environmental characteristics, which provided a stronger level of significance and showed to be a better predictor of college retention. This resulted in the research concluding that socio-economic status, as measured by poverty and crime rates, is a much better predictor of student retention at public 2-year colleges.

Implications

This research study provides further insight and understanding on the current dialogue surrounding college retention and completion and the pressure on institutions to reprioritize spending towards those areas viewed as causally beneficial to increased student outcomes. When considering the different influencers of student departure and retention at public 2-year colleges, compared to public 4-year colleges, institution leaders and key decision makers must be mindful that many of the primary influencers may be beyond their control. Moreover, some of the influencers can be significant enough that any action by the institution to counteract the impact could be ineffective and unsuccessful.

Implications for Theory

This study used Tinto's (1975) theory on student departure and Hackman's (1985) theory on resource allocation in higher education. This study was able to support Hackman's theory but falls short in being able to fully integrate Tinto's theory as it might apply to public 2-year colleges.

Tinto's Theory of Student Departure. The results of this study should not be interpreted as disproving Tinto's (1975) theory. Admittedly, this study looks at Tinto from a very narrow lens as a way of analyzing just one element – institutional behavior when it comes to resource allocation and its impact on retention. Tinto (1975) asserts that academic and social integration and its impact on retention is multi-layered and involves a myriad of individual, institutional and environmental influencers. What this study does suggest is that the retention strategies utilized by public 4-year colleges, often derived from Tinto's theory, may not replicate success when similar strategies are applied at public 2-year colleges.

Public 2-year colleges must find a different way to develop and implement strategies that provide academic support and social integration, understanding that social integration for their students would look considerably different than that at 4-year colleges. For example, this study failed to demonstrate that resource allocation can affect college student retention at public 2-year colleges as currently being implemented. Admittedly, the study was able to demonstrate a statistically significant relationship between retention and institutional expenditures for instruction and student services. However, the level of influence was so small that the costs required to produce substantial improvements in retention are arguably prohibitive. For example, if public 2-

year colleges were to eliminate 100% of the institutional expenditures for student services (11.24% average for all institutions) and redirect the full amount to instruction (increasing expenditures for instruction to an average of 56.87%), the net effect of such action would only be a 2.25% increase in retention. The resulting gain would be 1.4612% by eliminating student services (negatively correlated) and .7875% from increasing instruction (positively correlated). Doubling the cost on instruction would only yield a 3.19% increase in retention. These results are considerably lower than what is experienced at public 4-year colleges, despite allocating similar percentages of budget to instruction and student services. In consideration of this, it might be argued that Tinto's theory is not disproven by public 2-year colleges; it is, instead, misapplied.

Hackman's Theory of Resource Allocation. The study does support Hackman's theory on resource allocation in higher education. Hackman (1985) theorizes that resource allocation in higher education favors core units, as well as those units believed to be revenue generators for the institution. When analyzing how public 2-year colleges allocate their budgets, in comparison to public 4-year colleges, the former consistently spent a similar percentage of core budget on areas that were proven to be influential on retention at public 4-year colleges. Increased retention would result in increased revenue due to the tuition revenue collected from retained students, as well as increased public funding for those institutions in states utilizing performance-based funding.

Implications for Practice

This study supported research by Laskey & Hetzel (2011) and Ryan (2013), showing that the more common retention strategies can actually hurt retention on public 2-year college campuses because they draw money away from areas that do increase

retention. This study also lends itself to Windham, Rehfuss, William, Pugh, & Tincher-Ladner's (2014) suggestion, understanding that 84% of public 2-year college students do not participate in other activities outside the classroom, that public 2-year colleges might consider decreasing their allocation for student services and increase their investment in areas of instruction. Given retention's positive association with instruction and negative association with student services, with both relationships being statistically significant, such a strategy could increase retention, although any increase would be incremental. Such a strategy, however, would likely prove beneficial only in areas with low crime and poverty rates, as the level of influence for these two variables is far greater than any institutional behavior.

Foley (2013), when analyzing the factors that influence degree attainment within the Technical College System of Georgia, suggests that public 2-year colleges have no ability to influence or change the social, economic, and cultural backgrounds of their students. What they can do is create an environment that supports the learning and developmental needs of the student and provide services that help them better navigate the external influencers that could potentially influence degree attainment. Degree attainment begins with retention. The success of Foley's recommendation would need to be anchored in the understanding that efforts should be made to develop services that uniquely serve the public 2-year sector. Strategies drawn from and heavily influenced by the 4-year sector will not likely provide meaningful results. Foley (2013) makes several recommendations that are supported by this study. These include helping students select disciplines in which they can be successful, increasing academic and career advising to

new students, and providing testing and competency-based assessment to help match a student's skillset and knowledge with the correct professional discipline.

When reconsidering ACT Inc.'s (2010a) reasons for student attrition in the literature review, additional action should include collaborative efforts between public higher education and secondary school systems to identify gaps in college readiness and develop strategies to better prepare students for college. This requires a broader strategy, where local, state, and federal governments approach education as inclusive of both higher and secondary education. Such a collaborative effort has the potential to improve the college readiness, study skills, and personal coping skills for student attending public 2-year colleges.

When considering the effect on retention of crime and poverty rates, both indicators of social influence on student success, public 2-year colleges, key stakeholders, and policymakers cannot dismiss the level of influence these variables have. Public 2-year colleges, with the support of local, state, and federal government, should work to identify ways to help socioeconomically at-risk students attend college. The easy solution is to provide more needs-based funding for tuition. But that may not be enough. Again, revisiting ACT Inc.'s (2010a) reasons for student attrition, paying for tuition was just one of the financial burdens associated with student departure. Other financially linked influencers on students included inadequate personal financial resources, family responsibilities, and job demands. In addition to the cost of tuition, many socioeconomically at-risk students are overburdened by the costs of home, family, and work; costs that can be magnified if they take time away from any one area to attend college.

Each of the suggested implications for practice comes with a cost and would reflect an institutional behavior of resource allocation for the sake of improving student outcomes, including retention. Consequently, if one or more of the recommendations were implemented, one might find a situation where Tinto's (1975) theory of student departure might be supported by public 2-year colleges. More simply, one might create a situation where institutional behavior and resource allocation are able to influence retention at public 2-year colleges, specifically at a level that overcomes the significant influence of important environmental characteristics.

Recommendations

Further research is needed to understand the level of influence additional environmental factors have on student retention. ACT Inc. (2010a) identified other factor for student attrition not considered by this study. These included a student's motivation to succeed and the personal commitment to earning a degree. As this study assessed retention as influenced by institutional behavior from a macro level, the ability to consider individual behavior and characteristics was not possibility. A future study analyzing retention as influenced by personal commitment and motivation would provide researchers, administrators, and policymakers with a better understanding of how much these individual behaviors and characteristics influence retention.

This study also analyzed retention as influenced by institutional behaviors at a national level, grouping all institutions under the category of a public 2-year college. Consequently, the study suggests that a large institution in a metropolitan setting would see similar results to a small institution in a rural setting. A future study that analyzed public 2-year colleges, using a similar conceptual and methodological framework, but

broken out by geographic location and Carnegie classification would provide additional information to leadership and decision makers at public 2-year colleges. This would allow a single institution to better understand its ability to influence retention using size and location.

Public 2-year colleges were the primary population of interest for this study. Public 4-year colleges were analyzed as a comparison. Both private and for-profit 2-year colleges were not considered. Accepting that all sectors of higher education allocate resources for the purpose of increasing student outcomes, a replication of this study for both populations would allow researchers and administrators to better understand the influence of institutional behaviors on retention for these types of institutions.

Finally, this study identified several studies that have attempted to better understand the relationship between institutional behavior and student retention. Each study provided conclusive results, but lacked consistency when compared to similar studies. Contributing to this inconsistency were the populations of study, each different in size and type of institution, and the period of time considered, spanning from the early-1970s (Sprady, 1971) to the present (Foley, 2013). Accepting that the influencers of student retention and attrition likely evolve with time, a future study analyzing the relationship between retention and institutional behaviors by the higher education sector could provide current and relevant information for institutional leaders, policymakers, and key stakeholders to consider when developing and implementing future strategies to improve student outcomes in America.

Summary

The results of this study have important implications for leadership at public 2-year colleges. This study suggests that, whether due to the process of public policy and politicking or the result of inattentiveness by institutions to the influencers of student retention, public 2-year colleges approach retention strategies in similar ways as public 4-year colleges. Clearly, public 2-year colleges should look at different strategies. Because public 2-year colleges are primarily nonresidential with the vast majority of students electing to leave campus when not in class, those institutions may benefit from decreasing expenditures in student services in order to increase expenditures for instruction. Moreover, by understanding that the greater influencers of retention generally lay beyond the institution's direct control of public 2-year colleges, key stakeholders and policymakers should consider, as a means of increasing retention, collaborating with secondary education systems to improve college readiness and working with local, state, and federal governments to enhance access for socioeconomically at-risk students.

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