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# Regret Theory and Decision-Making in Retention Program Funding

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2017

Abstract

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MS, East Carolina University, 2006

BS, Pembroke State University, 1986

Doctoral Study Submitted in Partial Fulfillment

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## Abstract

Senior leaders of higher education institutions make management-related funding decisions that meet the needs of the institution without incurring financial loss. By classifying groups of students into strategic business units, these leaders can make targeted fund management decisions. Researchers have demonstrated that higher education institutions have successfully implemented student retention programs for students in the freshman unit, but in this early adoption stage, have been unable to establish a pattern in the sophomore unit decision-making process. This study was designed to determine the relationship between the management decisions to allocate funding for retention programs for students in the sophomore year in relation to the annual cost and the anticipated increase in student retention. The design was a quantitative correlation study, with a population of 49 senior leaders from 4-year higher education institutions in North Carolina, most of whom held the position of provost. The researcher developed the electronic survey instrument to measure the outcomes of this study and the results were analyzed using both regression analysis and Bradley-Terry pairwise analysis. The findings of this study suggest a significant relationship exists between the decision to fund retention programs and both the cost of the programs and the anticipated increase in student retention after program implementation. The management decision to allocate funds for the implementation of retention programming for students in a sophomore strategic business unit may improve the retention/graduation rates of students, which may increase the potential earning power of the college graduates while reducing the default rate of student loans.

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# Dedication

I dedicate this work to my colleagues and family who have provided me with unceasing support throughout this 5-year journey. To Marie D. Winfree and Melody L. Trotto, your friendship has proven priceless in all possible ways. Thank you both for your patience and your daily support of my efforts. Lastly, this work is dedicated to the memory of my parents, Ernest Eugene and Mary Jo Johnson.

Yes, Mom and Dad, I finally completed my college education.

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# Chapter 1 - Introduction to the Study

Senior leaders of higher education institutions across the United States are concerned about the problem of declining student retention. This issue has been the focus of strategic planning for the higher education leaders for decades, with the efforts focused on retaining first-year students into the second year (Kalsbeek & Hossler, 2010). The importance of student retention has increased with the advent of additional federal regulations governing how students qualify for federal financial aid to include rules regarding satisfactory academic progress (United States Department of Education, 2012). Senior leaders of higher education institutions must respond to these regulations by expanding the retention focus beyond the first year to remain competitive with other institutions and remain compliant with government regulations.

If senior leaders of higher education institutions manage each classification of the undergraduate student body (freshman, sophomore, junior, and senior) as strategic business units, these leaders can make better fund management decisions (Lewis, Andriopoulous, & Smith, 2014). The decision to allocate funds for the development and implementation of retention programs for students in the sophomore strategic business unit may have effects that reach beyond the student body. The students who remain in college until graduation may be better prepared to handle the financial commitment of repaying student loans, due to a college degree that increases earning potential. Increasing the number of college graduates may increase the overall education level of the general population that, in turn, may translate into positive social change nationwide.

As more college graduates return to their local communities, these individuals may contribute financially to these communities and possibly improve society as a whole.

## Background of the Study

The retention of students has been a subject of research for over 75 years (Raju & Schumacker, 2015). Leaders of higher education institutions have attempted to determine the reasons students do not continue to graduation as well as attempting to define a set of demographics to describe the typical student who does not persist to graduation (Tinto, 2012). While prior research indicates many possible causes of the declining rate of student retention, not one definitive cause has been identified (Raju & Schumacker, 2015). This lack characteristics identifying the students most likely to drop out of college has caused the leaders of higher education institutions to seek other solutions to the issue of declining retention.

Many institutions began to offer social integration programs for students, based largely on the research of Tinto (2012). Tinto has indicated that students who are socially engaged in extra-curricular activities at higher education institutions tend to persist to graduation in larger numbers than students who do not participate in extra-curricular activities on campus (2012). Tinto emphasized the importance of degree completion as a factor in improving socio-economic conditions over the span of an individual's lifetime. Tinto reports that college graduates not only make more money, but that they also exhibit better decision-making, vote in larger numbers, have lower rates of unemployment, and volunteer within their communities at higher rates than individuals who do not graduate from college (Tinto, 2012).

While Tinto focused his research on how institutions can retain students, Bean (1981) researched the reasons why students drop out. Bean's research was rooted in behavioral psychology, and he examined the following six sets of variables. The first set included background variables such as the educational level of the student's parents and the geographical distance between the institution of higher education and the student's home town. The second set of variables Bean called organizational variables which included the student's grades, his or her interactions with faculty, and the student's participation in clubs and other campus groups. The third set Bean named personal variables and included the student's level of commitment to goals and his or her level of self-confidence. The fourth set of variables Bean named environmental variables which included the likelihood that the student could easily transfer to another institution and the level of difficulty that the student experienced in getting financial support for education. The fifth set of variables Bean identified as attitudinal variables which included the level of loyalty the student felt toward the institution and his or her level of satisfaction with the value of the educational offerings at the institution. The sixth and final variable was whether the student possessed an intent to leave the institution. Bean concluded that the strongest variables in a student's decision to persist or to drop out were the receipt of low grades and a high intent to leave (Bean, 1981).

Forsman, Linder, Moll, Fraser, and Andersson (2014) introduced the concept that the issue of student retention is both organic and non linear and should be explored through the lens of complexity theory. Forsman et al. (2014) posited that complexity thinking is trans-disciplinary, and as such, is the proper format for researching student

retention by utilizing techniques such as exploratory factor analysis to address the multiple interactions that comprise the relationship between a student and an institution of higher education. Forsman et al. observed that Tinto's (2012) theory of student retention and Bean's (1981) theory of student attrition both regard the issue of student retention is based on a complex interaction of factors and therefore actually support each other in term of explaining student behavior. (Forsman, 2014). Therefore, the leaders of higher education institutions face a complex problem that must be addressed in a way that fits the needs of the students in attendance at each campus.

## Problem Statement

Retention of students is a primary concern within higher education (Willcoxson, Cotter, & Joy, 2011). Low student retention has adverse effects on those who do not complete their degree programs (College Board, 2013b). Financial consequences for senior leaders of higher education include the additional costs associated with the recruitment of new students and the potential negative impact of low student retention and graduation rates on the image of an institution of higher education (Center for the Study of College Student Retention, 2015).

Senior leaders of higher education institutions have not been managing funding decisions in a way that is both beneficial for students and that avoids operating at a financial loss. Sophomore students represent a strategic business unit for administrative leaders. According to Reyes (2011), sophomore students are the second most likely group of students to drop out, with "53% of students completing the second year returning for the third year" (p. 373). The cost of recruiting a student at a 4-year institution of higher

education averaged $2,433 in the academic year 2012-2013, which was 3 times the cost of retaining a student (Noel-Levitz, 2013). According to Kalsbeek and Zucker (2013), there are only a few senior leaders in the higher education industry who have decided to extend retention programming to students in the sophomore strategic business unit. Additionally, there is a lack of research into the decision-making process of senior leaders of higher education institutions regarding the management of funding for sophomore strategic business unit retention programming (Kalsbeek & Zucker, 2013).

## Purpose Statement

The purpose of this study was to determine whether a correlation exists between the decision-making process for the management of institutional funds (dependent variable) and the cost of implementing retention programming for students in the sophomore strategic business unit (independent variable) in North Carolina. I also wanted to determine whether a correlation exists between the decision process for management of institution funds (dependent variable) and the anticipated increase in retention of students in the sophomore strategic business unit (independent variable) at higher education institutions in North Carolina; and to if there was a significant difference in the decision-making process of institution funding between public and private higher education institutions regarding the retention programming for students in the sophomore strategic business unit. This study was designed to address a gap in the literature regarding the decision-making process of senior leaders of higher education institutions as related to the management of funds for sophomore strategic business unit retention programming.

## Significance of the Study

This study addresses a problem associated with the management of decision-making of a strategic business unit, which impacts an entire industry (see Willcoxson, Cotter, & Joy, 2011). For over 50 years, those in the field of higher education have observed a phenomenon known as the *sophomore slump*. The sophomore slump is a term used to describe the disillusionment experienced by students in the second-year of college, many of whom choose to drop out rather than to persist to graduation (Isakovski, Kruml, Bibb, & Benson, 2011). To improve the retention of sophomore students as a strategic business unit, the senior leaders of higher education institutions have been exploring the development of retention programming exclusively for sophomore students (McBurnie, Campbell, & West, 2012).

If a correlation can be established between the cost of implementing sophomore-level retention programming and the decision to fund this programming, researchers could attempt to determine the optimum price point for sophomore-level retention programs. If a correlation can be established between the anticipated increase in student retention associated with sophomore-level programming and the decision to fund retention programming, researchers could try to determine the desired rate of return on investment into sophomore-level retention program implementation. If a difference can be established between public and private institutions regarding the decision-making process for the management of funds for sophomore-level retention, researchers can determine if differentiated retention programming for public and private higher education institutions should be developed.

The results of this research study may be beneficial to the senior leaders of higher education institutions by facilitating the decision-making process regarding the management of financial resources for sophomore strategic business unit retention programming. Rutherford and Meier (2014) researched the decision-making processes at higher education institutions. An analysis of the results indicated that when making decisions, the leaders of higher education institutions take one of two paths. The senior leaders either assess the potential benefit of each alternative course of action and choose the alternative with the most benefit, or they choose a course of action based on the performance of competitors. As decision-making is time-consuming, the results of this study could be useful by providing institutional leaders with trend information from the sample population.

By analyzing the results of this study, I found a significant difference in the decision-making process for funding sophomore-level retention programming as the anticipated annual implementation cost increases. In addition, I found a significant difference in the decision-making process for funding sophomore-level retention programming as the retention of students in the sophomore strategic business unit increases. Lastly, I did not find a significant difference in the decision-making process for sophomore-level retention programming between public and private higher education institutions in the North Carolina.

A correlation between the decision to allocate the funds to implement retention programming for sophomore-level students and the cost of implementation rising, as well as the potential for increasing student retention could lead to positive social change.

Senior leaders of higher education institutions could use the results of this study as a tool to determine if they are maximizing the potential for a positive return on their investment. These leaders may choose to compare the decision-making process they currently use with the results of this study in an attempt to facilitate the funding decision process. As funding decisions are made regarding retention programming, the potential for retaining students may increase. Increased retention of students may reduce the amount of state, federal, and institutional aid dollars that are allocated to students who do not graduate. A higher graduation rate could ease the financial burden of student loan debt shouldered by those students who have a diminished earning capacity as a result of dropping out (Bergman, Gross, Berry, & Shuck, 2014).

## Theoretical Framework

This study was grounded in Loomes and Sugden's (1982) regret theory of decision-making. Loomes and Sugden theorized that whenever a choice between alternatives is made, there is an element of regret that the alternative chosen may be inferior to the alternatives not chosen. A secondary element of Loomes and Sugden's regret theory is that when a decision is made in an environment of uncertainty, the decision-maker takes into consideration the way competitors have decided on the same issue (Loomes & Sugden, 1982). When the senior leaders of higher education institutions make decisions, they illustrate the theory of regret in decision-making.

This study was designed to determine the existence of relationships between variables contained in the decision-making process regarding funds for developing and implementing retention programs for students in a sophomore strategic business unit. The

results of this study indicated that there is a correlation between the decision.-making process for the funding sophomore-level retention programming and the cost of developing retention programming. The results of this study also indicated that there is a correlation between the decision to allocate funds for sophomore-level retention programming and the anticipated increase in student retention after implementation of sophomore-level retention programming. Subsequent research should determine if the regret experienced by senior leaders of higher education institutions after making a management funding decision affects the long-term sustainability of the implemented retention program.

Leong and Hensher (2012) supported the use of regret theory in the study of decision-making. Leong and Hensher indicated that decisions are not independent entities; rather, decisions are made based on a combination of environmental factors coupled with past decision-making experiences. Ridge, Kern, and White's (2014) also supported the concept that risk aversion and experiencing a sense of regret influence the decision-making process. Forsman, et al. (2014) stressed the importance of incorporating complexity thinking into decisions made in the higher education industry. Complexity thinking involves flexibility and adaptability as mitigating factors to the decision-making process in an environment of risk. The application of regret theory and complexity thinking to the decision-making process requires senior leaders of higher education institutions to consider all possible outcomes when deciding to fund the implementation of new student retention programs.

## Research Questions and Hypotheses

I used the following research questions and hypotheses in my study of the decision-making process regarding the management of funds for the implementation of sophomore-level retention programs:

$RQ_1$: To what extent, if any, is there a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina?

$H1_0$: There is no correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

$H1_a$: There is a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

$RQ_2$: To what extent, if any, is there a correlation between the decision-making process regarding for funding sophomore-level retention programming and the anticipated increase in the retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina?

$H2_0$: There is no correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of

students in a sophomore strategic business unit at institutions of higher education in North Carolina.

$H2_a$: There is a correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

$RQ_3$: What is the difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina?

$H3_0$: There is no difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

$H3_a$: There is a difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

## Nature of the Study

This was quantitative, correlational study through which I attempted to determine to what extent, if any, senior leaders of public and private higher education institutions in North Carolina differentiate in the decision-making process regarding funding for sophomore-level retention programs when the cost of program development and implementation and the anticipated increase in student retention varies. The quantitative research method was appropriate for this study, as quantitative research is used to

determine causation (Hoe & Hoare, 2012) and the basis of quantitative research is the assumption that phenomena exist independently from the individual subjects under observation. Quantitative research is also rooted in the concept of positivism, the idea that data is reducible to one absolute truth (Yilmaz, 2013). As the primary purpose of this study was to determine if there is a correlation between decision-making processes for sophomore-level retention programs and the cost of program implementation at public and private higher education institutions in North Carolina, the quantitative method was appropriate for this study.

The qualitative method of research was not chosen for this study, as qualitative methods would require a researcher to conduct interviews with the senior leaders of institutions on an individual basis (Bailey, 2014). Such interviews would not be possible in many instances due to difficulties with scheduling face-to-face meetings with senior leaders of higher education institutions. Qualitative researchers focus on an individual's experience of a phenomenon to explain how an individual has been affected by that phenomenon (Hazzan & Nutov, 2014), whereas the purpose of this study was to establish the existence of a phenomenon. A study into the ways individuals may be affected by the decision-making process regarding the funding for the development and implementation of sophomore-level retention programming at higher education institutions in North Carolina is premature without the demonstration of a correlation with the management of funds for sophomore-level retention programming through quantitative research, therefore, a qualitative design was not appropriate for this research study.

A correlation research design was appropriate for supporting the collection of the data by allowing for the comparison of the level of financial support for management of funds for the implementation of strategic business unit retention programming at varying levels of cost between public and private higher education institutions in North Carolina (see Teicher, 2014). This data comparison was necessary for determining the existence of a significant level of support for the management of funding for the development and implementation of strategic business unit retention programming. A correlation research design was appropriate for the study in which participants were a total population sample of 49 senior leaders from public and private higher education institutions in North Carolina.

In contrast, the quasi-experimental equivalent group design was not appropriate for this study. Individual participants were not assigned to experimental and control groups nor did the study contain a treatment to distinguish patterns of behavior between groups of participants. The survey responses were examined as a single cohort, and therefore the use of randomly assigned groups was not appropriate. The requirements of a quasi-experimental equivalent design dictate that individual participants are randomly assigned to the experimental and control groups; and that the groups are equivalent in membership (Çaliskan, 2011), neither of which were appropriate to this study.

## Definition of Terms

*Senior leaders:* Those who exercise control over the decisions affecting the management of funds for academic support programs at the institution of higher education (Bok, 2013).

*Sophomore:* The University of North Carolina defines a sophomore as a student who has successfully completed a minimum of 30 semester hours of coursework at an institution of higher education. (The University of North Carolina at Chapel Hill, n.d.).

*Strategic business unit:* Four undergraduate strategic business units are identified as the freshman strategic business unit, the sophomore strategic business unit, the junior strategic business unit, and the senior strategic business unit (Lewis, Andriopoulous, & Smith, 2014).

## Assumptions

The development of this research study required five assumptions. The first assumption was that senior leaders of North Carolina higher education institutions have an interest in funding the retention programs for students in the sophomore strategic business unit. The second assumption was that there is a difference between public and private institutions in the decision-making process for funding the development and implementation of retention programming for students in the sophomore strategic business unit. The third assumption was that the senior leaders of higher education institutions included in the sample would complete the survey. The fourth assumption was that the respondents' answers would accurately represent the decision-making process for funding sophomore-level retention programming for students in the sophomore strategic business unit. The fifth assumption was that the validity of this study would be negatively impacted by a low response rate.

## Scope and Delimitations

The scope of this study was an examination of the management decision-making processes of senior leaders at higher education institutions in North Carolina. I examined the decision-making process regarding the management of funds for sophomore-level retention programming. The population of the study consisted of 49 senior leaders of 4-year higher education institutions in North Carolina. I identified all 49 members of the population by reviewing the website of each institution individually. I contacted all 49 members of the population by e-mail, and invited them to participate in this management decision-making correlation study. Of the 49 members of the population, 27 senior leaders agreed to participate in this study, and completed the survey. The survey instrument was created specifically for this study, and the participants completed the survey by following a digital link to the survey, and the responses were submitted electronically. The quantitative design of the study did not allow for the free discussion of the varying costs associated with the development and implementation of retention programming; the funding levels included in the study were chosen as a representation of the actual funding required to develop and implement retention programs for students in the sophomore strategic business unit. The anticipated increases in student retention are chosen as a representation of various levels of anticipated increases in student retention. Neither set of figures are representative of actual costs or increases in student retention associated with an existing retention program. In the future, this study may be expanded beyond North Carolina to include other states in the southeastern region of the United States. Additionally, a replication of this study could compare states from different

regions of the United States to determine if the findings of this study may be applicable to multiple states.

## Limitations

The first limitation was the sample population included only the senior leaders of higher education institutions in North Carolina, which limits the applicability of the results to higher education institutions in other states. A second limitation was that although all 49 members of the population were contacted with an invitation to participate in this study, only 27 members of the population accepted the invitation and completed the survey. A third limitation was that at the time of the study, I was employed by a private institution of higher education in North Carolina. As an employee of a private institution of higher education, I was more familiar with the decision-making processes of private institutions than with the decision-making processes of public institutions. This familiarity did not constitute bias on my part in favor of the decision-making processes of private higher education institutions.

## Summary

The senior leaders of higher education institutions must make funding decisions based on the needs of specific strategic business units in conjunction with the overall needs of the institution. For many years, the focus of retention efforts has been placed on retaining students within the freshman strategic business unit, while the retention of students within the sophomore strategic business unit has been largely ignored (McBurnie, Campbell, & West, 2012). Senior leaders must work to meet the educational needs of the student body in the most fiscally responsible manner possible. Senior leaders

must make management decisions regarding the development and implementation of new programs prudently, taking into consideration how the decision will affect all stakeholders (Ascend Learning, LLC, 2012).

In Chapter 1, I provided the purpose and background of the research were provided and introduced the social and economic impact of the funding management decisions of senior leaders of higher education institutions on both internal and external stakeholders. I also presented the nature pf the study, the theoretical framework, as well as assumptions, scopes and delimitations, and limitations. The purpose of this study was to provide management decision-making information to senior leaders of higher education institutions. This information could potentially increase the retention of sophomore-level college students. Chapter 2 contains a review of the literature pertaining to the management decision-making process of higher education, the importance of retaining students in the sophomore strategic business unit, the economic impacts of student attrition, and the negative impact of student attrition on the institution of higher education.

## Chapter 2: Literature Review

Making decisions regarding the management of funds for student retention programming is the responsibility of senior leaders of higher education institutions (Forsman, et al., 2014). By designating each classification of undergraduate students as a strategic business unit, the senior leaders of higher education institutions can make funding decisions based on the needs of students in each strategic business unit, as opposed to allocating funding for programs that may not be as effective to students in all strategic business units equally.

Students in the freshman strategic business unit have the lowest retention rate of the four undergraduate strategic business units (DeAngelo, 2014); senior leaders of higher education institutions have concentrated the management of funding for retention programming to address the needs of the students who are a part of this unit (Willcoxson, Cotter, & Joy, 2011). By concentrating their funding decisions on freshman-level retention programming, senior leaders of higher education institutions have not focused on sophomore-level retention, even though sophomore students are the second largest group of students to drop out (Reyes, 2011).

The purpose of this quantitative correlation research study was to determine to what extent, if any, there is a correlation between the decision-making process for funding retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and the costs associated with retention programming. Additionally, this study was designed to determine to what extent, if any, there is a correlation between the decision-making process for funding sophomore-level

retention programming and the anticipated increase in the retention of students in the sophomore strategic business unit retention at higher education institutions in North Carolina. Lastly, this quantitative correlation research study was designed to determine to what extent, if any, there is a correlation between public and private institutions regarding the decision-making process for funding sophomore-level retention programming in North Carolina. I organized this literature review around the history of the decision-making process of senior leaders in higher education, with an emphasis on the decision-making process regarding the management of funds for the development and implementation of retention programming. By providing a comprehensive review of the current literature, I will describe the foundation of the study.

The first section of this literature review consists of an overview of how the senior leaders of higher education institutions have approached the issue of student retention, while in the second section of the literature review, I contrast the traditional decision-making process with the changing focus of decision-making in higher education. The third section of this literature review is comprised of a discussion of current literature on the decision-making process regarding funding for the development of retention programming at higher education institutions. The fourth section of the literature review is an exploration of the current literature regarding the present state of student retention efforts within the higher education industry, and I also include a comparison of the importance of the management of funds for retention efforts for students in the freshman strategic business unit with students in the sophomore strategic business unit. In the fifth section of the literature review, I describe Loomes and Sugden's regret theory of

decision-making as the theoretical framework for this study. I also included an examination of how the decision-making process of senior leaders at higher education institutions is affected by risks within the decision-making environment. This examination was expanded to include Festinger's theory of cognitive dissonance and the application of this theory to economic decision-making (Salti, El Karoui, Maillet, Naccache, & Daunizeau, 2014). In the sixth section, I describe the research design I used to assess the various levels of support among senior leaders of higher education institutions in North Carolina. I discuss both quantitative research and correlation research as the appropriate design for this research study. The seventh section of the literature review is devoted to the implications for social change associated with this research study, and in the final section I discuss how my study addresses the gaps in the current literature.

## Strategy for Searching the Literature

I searched the databases available through the Walden University library, the Davis Memorial Library at Methodist University in Fayetteville, North Carolina, and by searching Google Scholar. The following databases were utilized: the Thoreau multidisciplinary database, the Business Source Complete database, the ABI/Inform Complete database, the Emerald Management database, and the SAGE Premier database. I used the following keywords: *student retention, senior leadership, decision-making in higher education, freshmen retention, sophomore retention, retention programming in higher education, student attrition,* and *student debt*.

I conducted the literature review from peer-reviewed journal articles, interviews, books, and reports as listed in Table 1. The subjects, concepts, and keywords contained therein were examined to the degree they were significant to the problem statement, the purpose statement, and the research questions.

*Table 1*.

Overview of Major Literature Title Searches

| **Topic of Examination** | **Peer Reviewed Articles** | **Interviews** | **Books** | **Reports** |
|---|---|---|---|---|
| Decision-Making | 25 | 1 | 1 | |
| Leadership | 7 | | | |
| General Student Retention | 9 | | 2 | 6 |
| Freshman Retention | 6 | | | |
| Sophomore Retention | 5 | | 2 | |
| Retention Programming: Sophomore Students | 6 | | | 1 |
| Loomes and Sugden | 5 | | | |
| Research Methodology | 22 | | 10 | 2 |
| Social Change | 9 | | | 1 |

The lack of existing research at the time of the study required that I expand the title searches to include related topics, such as *general student retention* and *freshmen retention*. I used the resources listed in Table 1 to provide information on the lack of

retention programming that was in place at the time of the study for students in the sophomore strategic business unit.

## Senior Leadership in Institutions of Higher Education

The senior leaders of higher education institutions are tasked with making decisions regarding the management of funds in the most efficient manner possible. These decisions have wide-reaching effects throughout the institution (Knight, Folkins, Hakel, & Kennell, 2011). Senior leaders have expressed concern over the retention rate of students for over 40 years (Grillo & Leist, 2013). Poor student retention rates are important to campus leaders, as a high dropout rate subjects a university to "economical, social and psychological costs" (Alkan, 2014, page 1079). Leaders of businesses and higher education institutions must make decisions in an increasingly complex environment in the 21st century (Hempsall, 2014). While making decisions in an environment of increased complexity and competition, senior leaders of higher education institutions also face increasing pressure to increase access to a wider range of students, maintain high academic standards, improve retention and graduation rates, and make fund management decisions that do not waste institutional funds (Hempsall, 2014).

There is no established framework that describes the decision-making process of senior leaders regarding the management of funds for the development and implementation of retention programming for students. According to White (2014, p. 230), it has become commonplace for higher education institutions in the United States to develop campus-wide "sustainability plans" that address many diverse issues, including retention programming. The problem with these comprehensive, multi-year campus-wide

sustainability plans is that they are not specific, which can lead to "a low-level of correlation between the specifics of plans and ensuing development" (White, 2014, ). For the purposes of this study, literature regarding comprehensive multi-year campus-wide sustainability plans has not been included.

## Decision-Making in Higher Education

Higher education in the United States began in 1638 at an all-male institution in Cambridge, Massachusetts. Since that time, higher education has grown into an industry of over 4,500 colleges and universities with an enrollment greater than 20 million students annually. The higher education industry employs 1.4 million faculty members, with average annual expenditures of over $400 billion. Like the decisions of leaders in the private sector, the decisions made by senior leaders of higher education institutions affect individuals throughout the campus, the local community, and the general population of the United States (Bok, 2013).

Historically, leadership models in higher education institutions mirrored the prevailing leadership models in private business. During the latter part of the 20th century, leaders of higher education institutions realized that the leadership models that result in successful business ventures did not always translate directly to success in higher education (Middlehurst, 2012). The senior leaders of higher education institutions determined that distributive or shared leadership produces successful outcomes. Private business enterprises have now begun to emulate higher education institutions by implementing shared leadership (Hempsall, 2014). Therefore, much of the decision-making process in higher education is accomplished through committees which consist of

senior leaders and faculty members; illustrating the theory that “effective leadership is best achieved through teams, not heroes” (Hempsall, 2014, p. 384).

## Traditional Model of Decision-Making

Nonprofit higher education institutions have a Board of Trustees comprised of individuals who have been appointed to make financial decisions, set policies, and make top senior personnel decisions for the faculty, staff, and students of the institution (Business Dictionary, 2015). Traditionally, the top senior leaders work in concert with the Board of Trustees to recommend the most effective course of action. The original function of the Board of Trustees was that of a caretaker for the entire campus, and the nature of the relationship between the Board of Trustees and the top senior leaders was integral to the success or failure of the institution of higher education (Smith, Miller, & Morris, 2014). Decision-making was a top-down process, with the Board of Trustees controlling the institution of higher education through the management of assets, the setting of policies, and by controlling the personnel appointed to positions of senior leadership.

The relationship between the Board of Trustees and the senior leadership of an institution of higher education is based on a delicate balance of power that requires constant monitoring. Legon, Lombardi, and Rhoades (2013) observed that too much control from the Board of Trustees may result in a diminished level of respect for the academic and senior leadership personnel, whereas too little control can result in a breakdown of the governance process. In extreme cases, this breakdown can result in public scandal. The Board of Trustees is not only legally accountable for the actions of

the institution of higher education but also must consider the needs of external stakeholders. In contrast, the senior leadership of an institution of higher education is more focused on the needs of internal stakeholders such as students, faculty, and staff. When the vision of the Board of Trustees aligns with the purpose of the senior leadership, the proper balance of power is achieved, and the institution of higher education prospers. If these two governing bodies clash, the institution of higher education can become stagnant, and experience various forms of difficulty including the resignation of board members and the termination of senior leaders (Smith, Miller, & Morris, 2014).

## Changing Focus of Decision-Making

As the landscape of the higher education industry becomes more complex, the role of the Board of Trustees has shifted toward a collaborative partnership with the senior leadership (Legon, Lombardi, & Rhoades, 2013). In the 21st century, the senior leaders of higher education institutions face a unique market situation. According to Smith, Miller, and Morris (2014), traditional brick-and-mortar institutions are experiencing increased competition from private institutions and online institutions. Stukalina (2014) also concluded that as the competition among higher education institutions has increased, the senior leadership and the Board of Trustees must identify how to create a competitive advantage to attract students. Strategic decisions require understanding both the external and internal environments to deliver a valuable education. Therefore, strategic management must be a collaborative effort between the Board of Trustees and the senior leadership to create an atmosphere that is both forward

thinking and continuously concerned with delivering a high-quality educational experience for all students (Stukalina, 2014).

To remain competitive in an environment of increased risk, higher education institutions are shifting the focus of decision-making away from the traditional, top-down system to a more collaborative process. The collaborative course of action involves input from the deans of various schools, who work in conjunction with the academic dean or provost to create proposals that are submitted to the Board of Trustees for final approval. Smith et al. (2014) also noted that in some institutions, the role of the Board of Trustees has evolved completely away from the caretaking role and assumed a fund-raising role instead.

Stukalina (2014) advocated the creation of a strategic plan based on setting broad "corporate level strategic goals" that govern the entire institution of higher education, coupled with "functional area-specific strategic goals" that allow the institution of higher education to create an educational environment that facilitates the academic excellence of students (p, 79). Stukalina's research supports the premise that each of the four classifications of undergraduate students can be treated as a separate strategic business unit to facilitate the decision-making process of senior leaders of higher education institutions regarding the management of funding for the development and implementation of retention programs.

Smith et al.'s (2014) study into the interactions between senior leaders and Board of Trustees members indicated that the senior leadership of higher education institutions viewed the predominant role of the Board of Trustees as a duty to approve senior

administrative appointments. The secondary role of the Board of Trustees according to the senior leadership is to determine financial priorities for the institution of higher education, with the tertiary role of the Board of Trustees being to engage in strategic mission development for the institution of higher education. At the other end of the spectrum, the senior leaders expressed the opinion that the Board of Trustees did not participate significantly in efforts to influence state legislative agencies on behalf of the institution of higher education, nor did Board of Trustees members participate significantly in the oversight of the actions of the administrators of athletic departments (Smith, et al., 2014). These changes in the decision-making processes at higher education institutions are reflected in the way that the funding decisions for specific programs are made.

## Fund Management Decisions in Higher Education

Rutherford and Rabovsky (2014) noted that during the decade between 2002 and 2012, college tuition increased dramatically while the average graduation rate was less than 60% for students to attend college for 6 years. The 4-year graduation rate was an alarming average of 39% (Snyder & Dillow, 2015). This dichotomy between escalating cost and languishing graduation rates has resulted in a desire by the general population for greater transparency and accountability on the part of the higher education industry regarding improving undergraduate student outcomes. There is a lack of quantifiable data, as the higher education industry is a mixture of both public and private institutions, all of which are subject to different rules and regulations depending upon their status (Rutherford & Rabovsky, 2014).

To rectify the lack of quantifiable data, many higher education institutions have instituted systems of performance funding as an accountability measure to justify the management of funds for both programming and staffing decisions. Tahar and Boutellier (2013) discussed the benefits of the New Public Management (NPM) paradigm, which is a financial management system developed originally for the public domain and has subsequently been successfully applied to the higher education industry. The NPM was developed on several premises including efficient resource management, formulation of competitive organizational systems, and the use of performance measurement as a tool for organizational improvement. The NPM is not without its critics, who claim that as a system originally derived for business applications, it does not conform to the requirements of application to scientific systems. According to Tahar and Boutellier, the application of NPM to an institution of higher education can result in conflict between the predominately business-oriented members of the Board of Trustees and the predominately scientific oriented members of the senior leadership and faculty. Conversely, Tahar and Boutellier also noted that certain iterations of NPM have resulted in greater levels of efficiency. The tipping point between the two extremes appears to be how the institution of higher education applies the NPM paradigm to resource management (Tahar & Boutellier, 2013).

While NPM is one specific example of performance-based funding, there are many versions of performance-based funding that have been implemented in the higher education industry. Rabovsky (2012) explored the impacts of performance-based funding in higher education on management of state budget funds. Supporters of the performance-

based accountability structures claim that these systems are an excellent evaluation tool for political leaders and the public to determine the efficiency of public agencies, including higher education institutions and to impose sanctions as necessary if desired results do not materialize. In contrast, critics of performance-based accountability systems purport that the policies lack the practicality necessary to be successful in real-world situations, and can be implemented in such manner as to result in negative impacts to the delivery of services. Rabovsky noted that both proponents and critics of performance-based accountability systems concede that when properly implemented, performance-based mechanisms of accountability can facilitate the management of budgetary funds and positively impact transparency and accountability in the higher education industry (Rabovsky, 2012).

The continuing debate over transparency, accountability, and performance-based funding leads to questions regarding the efficiency of traditional senior leadership in the higher education industry. Knight, Folkins, Hakel, and Kennell (2011) investigated the patterns of resource management by senior leaders in higher education institutions based on four factors: first, the academic discipline requesting funding; second, the home discipline of the academic administrator; third, the length of time the administrator has been in a leadership position at the institution of higher education; and fourth, are resource management decisions affected significantly by aggregate increases or decreases in financial resources at the institution of higher education. Knight et al. addressed each of the factors separately within the course of the study.

The results of Knight et al.'s (2011) study indicated that differences in funding based on academic discipline, "hard" or "applied" disciplines such as engineering or business-related fields with large alumni databases tend to receive extra funding as requested when compared to "soft" or "pure" disciplines such as the arts, humanities, or social sciences. Knight et al.'s examination of the influence of the leader's academic discipline upon resource management decisions revealed that senior leaders of higher education institutions tend to react in one of two very different fashions. Knight et al. discovered that senior leaders would either favor their discipline regarding resource management due to a familiarity with the needs of that discipline, or senior leaders will favor other disciplines over their discipline due to the familiarity with their discipline's weaknesses. Knight et al. also found that there is an inverse relationship between the amount of time an individual has been a senior leader and the way that individual views resource management of academic different departments. The longer an individual has been a senior leader, the less likely they are to favor their discipline over other disciplines. Regarding the fourth factor, senior leaders tend to favor disciplines with large enrollments and alumni in times of shrinking financial resource availability but are more egalitarian in the allotment of resources in times of increasing financial resource availability (Knight, et al., 2011).

The complex decision process regarding the funding and implementation of student programming involves the incorporation of all the factors discussed above. The senior leadership of an institution of higher education must take into consideration the aggregate amount of financial resources available, the number of individual stakeholders

affected, the senior leaders must determine whether the programs in question are capable of producing quantifiable results that can be reported in terms of transparency and accountability to state and federal funding agencies (Legon, Lombardi, & Rhoades, 2013). The importance of student retention affects stakeholders across the campus, regardless of discipline. Much of the decision-making process revolves around the amount of available funding coupled with the likelihood that the program will produce desirable results that can be easily reported to governing agencies (Knight, et al., 2011). An additional concern for the senior leadership of higher education institutions is the reputation of the institution, a large portion of which is based on the ability of students to graduate in a timely fashion. An institution with a serious retention problem and low graduation rate quickly gains a poor reputation as a bad financial risk with little prospect of a positive outcome (Rabovsky, 2012). It is important for senior leaders at higher education institutions to work collaboratively with the Board of Trustees, the faculty, and representatives from the local community to develop a strategic plan to address problems specific to the campus rather than attempting to pigeonhole the unique identity of an institution of higher education into a generic management format (Stukalina, 2014).

## Student Retention in Higher Education

Siekpe and Barksdale (2013) posited that student retention is a problem of great importance to the senior leaders of higher education institutions in the United States. Each student who does not return has a negative impact on the institution financially and results in a lower graduation rate. Student attrition also can affect the institution's reputation with various external stakeholders including local community members,

potential students and their parents, and legislators. Senior leaders of higher education institutions in the United States expend great amounts of energy in pursuit of the perfect solution to raise the retention/graduation rate, which is increasingly becoming a determining factor in the ability of the institution of higher education to obtain funding for campus projects and financial aid for students (Tinto, 2012). Given the amount of potential harm caused by falling retention rates, the senior leaders of higher education institutions in the United States are constantly attempting to determine the causes of student attrition and develop remedies to retain students to graduation (Siekpe & Barksdale, 2013).

For decision-making purposes, senior leaders of higher education institutions can characterize the four classifications of undergraduate students as strategic business units. Each of these strategic business units is comprised of students with unique issues that can negatively impact retention rates; the majority of student attrition occurs in students within the freshman strategic business unit and in the sophomore strategic business unit (Alarcon & Edwards, 2013). Historically, the emphasis of fund management has been placed on funding programs to improve the retention of the freshman strategic business unit (DeAngelo, 2014). Recently, the senior leaders of higher education institutions have begun to explore the value of designing retention programming to address retention in the sophomore strategic business unit (Wang & Kennedy-Phillips, 2013). According to Hossler and Bontrager (2015), student retention was not originally a major consideration for senior leaders of higher education institutions, as many individuals did not attend college, but were still able to find adequate employment to live comfortably. In the latter

half of the 20th century, there was a rapid expansion of college access initiatives that was driven by societal pressure to increase the number of college graduates within the United States. Unfortunately, increased access has led to an unintended result: a decrease in retention and graduation rates (Beattie, et al., 2013). It is estimated that to recoup the decrease in degree production, the graduation rate of higher education institutions within the United States will need to increase by an average of 4.2% per year until 2020 (Hossler & Bontrager, 2015).

A reduction in the rate of student retention has negatively impacted higher education institutions financially, as the recruitment costs associated with recruiting a new student averaged $2,433.00 per student at private higher education institutions in 2013 which was approximately three times the cost of retaining an enrolled college student (Noel-Levitz, 2013). While increased college access has been identified as having a negative impact on the retention and graduation rates at higher education institutions throughout the United States, there is no single cause of student attrition nor is there a single set of circumstances that can predict student success. In the past, the higher education industry has placed a great emphasis upon student performance on standardized tests such as the SAT and the ACT as a predictor of student success, one such example being the state legislature of Ohio in 1996 proposed that institutional funding should be tied to the standardized test scores of students accepted to a given institution. This action was designed to encourage institutions to admit only those students who scored well on either the SAT or the ACT (Olivas, 2012). Other accepted indicators of student success include the student's high school grade point average,

socioeconomic background, gender, and education level of the student's parents (Gardiner, 2014). Masui, et al. (2014) considered the above indicators in their study of the academic performance of students in higher education and concluded that demographic traits did not influence student success to the degree once thought. As a result, senior leaders of higher education institutions must carefully consider the potential benefit of deciding to implement retention programming to get an acceptable return on investment (Beattie, et al., 2013).

## Importance of Freshmen Retention

Retention programming at higher education institutions is primarily developed for the freshman student population. This emphasis on freshman retention is a direct result of the statistical analysis indicating that students in the freshmen strategic business unit are the most likely group of students to drop out of college prior to graduation. Freshman student attrition rates are estimated to range between 30% and 50% (O'Keeffe, 2013). Thammasiri, et al. (2013) noted that students who do not enjoy the college experience are 60% less likely to return for their sophomore year; students who do not feel a "sense of belonging" are 39% less likely return; and students who have problems connecting with their academic advisor are 17% less likely to return. Therefore, the high probability of a freshman student failing to return for the sophomore year is a cause for concern on the part of senior leaders of higher education institutions.

O'Keeffe (2013) noted that a high attrition rate has negative repercussions for an institution of higher education in several areas. The loss of tuition revenue is the most immediately visible impact of a high attrition rate. There are also different types of grants

and scholarships that are lost if a student does not graduate. An institution with a high attrition rate also suffers from a loss of reputation and prestige, which makes recruiting new students a more difficult and more expensive endeavor. Finally, an institution of higher education with a high attrition rate may find it difficult to persuade donors to invest, either through cash donations, endowments or by sponsoring capital projects. In aggregate, high attrition rates have a negative impact on the economy. Individuals who drop out prior to graduation have more difficulty in competing against others in the job market and are more likely to experience a lower standard of living. To compound the social problem, many students borrow their tuition money either through federally subsidized loans or private lending institutions. When a student drops out prior to graduation, their diminished earning capabilities make it difficult for them to repay their student loans, which increases the default rate on those loans. Billions of dollars are lost annually due to student loan defaults. These losses are made up for by increased taxes, thus decreasing the earning power of all citizens (O'Keeffe, 2013).

There has been extensive research into the reasons why freshmen students drop out of college and the reasons why freshmen students choose to stay in college. DeCarlo (2014) completed a longitudinal study to determine how the experiences of the freshman year affect a student's decision to return for the sophomore year. The results of DeCarlo's research supported Tinto's (2006-2007) conclusion that student attrition is most likely to occur between the freshman and sophomore year. Tinto surmised that students who were connected to the campus through a variety of positive experiences both in and out of the classroom are less likely to drop out. While the efforts of the senior leadership of higher

education institutions have resulted in improvement of the retention rate of students from the freshman to the sophomore year, significant gains in overall retention remains elusive (Tinto, 2006 - 2007). As a result, research into how to retain sophomore students into the junior year is beginning to pique the interest of both senior leaders of higher education institutions and educational experts.

## Importance of Sophomore Retention

The term *sophomore slump* is used to describe the overall lack of engagement experienced by students when they return to campus for their second year (McBurnie, Campbell, & West, 2012). According to Milsom, et al. (2015), many researchers concluded that primary cause of the sophomore slump is that students feel disconnected or overlooked by the university during the sophomore year, especially after receiving so much attention in their freshman year through extensive retention programming. Wang and Kennedy-Phillips (2013) validated the theory that sophomore students feel overlooked. The results of their research indicated that the senior leadership of higher education institutions turned their attention to the incoming freshman cohort as soon as possible, leaving sophomore students feeling abandoned. While the results of both Milsom et al.'s (2015) and Wang and Kennedy-Phillips (2013) research validated the premise that feeling disconnected or overlooked was a reason that sophomore students may experience a drop in academic performance, such feelings on the part of sophomore students were not the single cause of the sophomore slump. Milsom et al. concluded that student academic performance is based on three dimensions: the psychological makeup of the student to include their level of commitment to completing their college degree;

curriculum development matters such as program design, and the alignment between student and faculty expectations. Factors outside the control of the institution of higher education, such as social interactions, financial issues, and unforeseen life events also distract the student.

The retention programming for students in the freshmen strategic business unit emphasizes the successful transition of the student from high school to college. After making this transition, many college students may suffer a lack of confidence in their choice of a major program of study, or they may feel somewhat alone as they have left high school students behind but may have not yet solidified friendships with college students. Also, the students in the sophomore strategic business unit may feel confused by the new learning paradigms that emphasize performance and independent learning as they progress away from general education requirements into their major coursework (Milsom, et al., 2015). Therefore, retention programs for students in the sophomore strategic business unit should emphasize career choices, networking with peers, pairing students with both faculty and peer mentors in their major field of study, and developing independent learning skills (Pullins, 2011).

The senior leaders of higher education institutions are under tremendous pressure to improve retention rates (Grillo & Leist, 2013). With estimated sophomore retention rates as low as 53%, senior leaders of higher education institutions can no longer fail to support the students in the sophomore strategic business unit (Reyes, 2011).

## Decision-Making in an Environment of Risk

The increase in competition in the higher education industry that began at beginning of the 21st century introduced the elements of risk and uncertainty to the decision-making processes of senior leaders at higher education institutions. The senior leaders of higher education institutions responded to these elements by changing the decision-making process. Application of Loomes and Sugden's (1982) regret theory explains how the decision-making processes within the higher education industry were affected by an increase in both risk and uncertainty. Birnbaum and Diecidue (2015) incorporated Loomes and Sugden's regret theory with the concept of decision-making based on majority rule when decisions are made in a group setting such as either the Board of Trustees or a committee of senior leaders at an institution of higher education (Birnbaum & Diecidue, 2015). Birnbaum and Diecidue's decision-making experiments clearly indicated that when members of a group are presented with information that infers a majority preference for one alternative in a set of given alternatives, the group members tend to decide in favor of the alternatives that appear to be the preference of the majority. Conversely, when a group is presented with a set of alternatives, but there is no information provided regarding a preference, group members tend to make choices based on their preferences independently (Birnbaum & Diecidue, 2015).

As the environment of complexity and risk increased in the higher education industry, the senior leaders were forced to make decisions that considered the actions of peer institutions to remain competitive in the market (Cooper & Rege, 2011). This interaction between peer institutions illustrates what Cooper and Rege have described as

the "peer group effect." According to Cooper and Rege (2011), the peer group effect is defined as the increase in utility that occurs when peers within a group choose to take the same course of action. In the field of higher education, decisions are often reached based on observation of the decisions made by "peer institutions" (Gardiner, 2014). The senior leaders of an institution of higher education identify other institutions with similar demographic characteristics, and make management decisions to remain competitive or perhaps even gain a competitive edge by observing how the chosen peer institutions are responding to risk in the marketplace (Gardiner, 2014). One possible explanation for the use of peer institutions in the management decision-making process is an attempt to reduce the possibility of experiencing what Cooper and Rege (2011) have termed as "social regret." By applying the concepts of Loomes and Sugden's regret theory of decision-making, Cooper and Rege posited that the regret experienced by choosing one course of action when an alternative course of action may have led to a better outcome is reduced if other peer institutions have made the same or similar choices.

## Quantitative Research Design and Higher Education

Reale (2014) advocated for the use of quantitative research design when researching phenomena in the field of higher education. Basing her theory on the research of Teichler (1996), Reale examined the value of using quantitative research methods to identify both commonalities and differences among various higher education institutions. Both Teichler and Reale supported the use of quantitative research design when studying phenomena in the field of higher education, as the use of quantitative research design allows for a broad field of observation. According to Reale, the use of quantitative

research design allows a researcher to gain a better understanding of the phenomena under study; by first testing hypotheses and then using the results to establish causality in relationships (Reale, 2014).

Andrei and Irina (2013) investigated the concept of causality within the framework of conducting social research, with special attention paid to the importance of the relationship between cause and randomness. Andrei and Irina defined randomness as being "determined by multiple random factors, which are rather difficult to take into account." Decisions made within a complex system such as an institution of higher education are affected by multiple random factors and meet the criteria to be defined as random by Andrei and Irina. The multiple random factors that influence the decision-making process at an institution of higher education necessitate the use of quantitative research design to address the complexity of the cause-and-effect relationship between the multiple random contributing factors and the final decision that is eventually reached (Andrei & Irina, 2012).

According to Farrelly (2013a), quantitative research design should be utilized when the object of the research study is to "project results to a larger population; identify evidence concerning a cause and effect relationship; describe features of relevant groups of people; and test hypotheses and examine specific relationships." Critics of quantitative research design have stated that an inherent weakness in the research design is that quantitative research design is based on the search for one single truth. In contrast, supporters of quantitative research design have stated that quantitative research design

allows the researcher to objectively observe and apply statistical analysis to achieve unbiased results (Farrelly, 2013).

The findings of Hoe and Hoare (2012) supported Farrelly's findings, adding that not only does quantitative research allow for the testing of hypotheses, but is also traditionally considered to be more rigorous than qualitative research design methods. Hoe and Hoare supported their theory by noting that quantitative research design yields data that can easily be counted and categorized. Quantitative research design also includes randomized trials and systematic review processes to ensure unbiased results. These unbiased results can then be generalized to a larger population (Farrelly, 2013). In contrast, qualitative research design is used primarily to illustrate specific experiences within a small population, and may not be easily generalized to a larger population (Hoe & Hoare, Understanding quantitative research: Part 1, 2012).

## Correlation Research

Connelly (2012) explored some of the basic ideas regarding correlations and their usefulness in predicting the interactions between pairs of variables that have been tested on a single sample or population. If a strong correlation between a pair of variables can be established, then a prediction can be made regarding the effects of the behavior of one variable upon the behavior of the other variable. After the presence of a relationship between two variables has been established, the correlation coefficient can be used to describe both the magnitude and the direction of the relationship. The term *magnitude* refers to the strength of the relationship between the two variables, while the term *direction* is used to delineate whether the two variables have a positive or a negative

relationship to each other. Variables with a positive or a direct relationship move in the same direction. In a positive relationship, as one variable increases, the other variable will increase proportionately. The same holds true if one variable decreases, the other variable will decrease proportionately as well. In a negative or a reciprocal relationship, the variables move in opposite directions. In a negative relationship, as one variable increases, the other variable will decrease proportionately (Connelly, 2012).

The most common correlation coefficient for statistical analysis is the *Pearson's r* coefficient which is used to identify an interval level linear relationship between pairs of variables (Connelly, 2012). Emerson (2015) concurred with Connelly regarding the function of the *Pearson's r* coefficient, and noted that the range of the *Pearson's r* coefficient is from 1 to -1, and this range defines both the direction and the strength of the relationship between the two variables. According to Emerson, if two variables have a *Pearson's r* coefficient of 0, that is an indication that there is no relationship between the two variables, while a *Pearson's r* coefficient of 1 indicates that the two variables are both moving in the same direction and are in perfect sync with each other. Conversely, a *Pearson's r* coefficient of -1 indicates that the two variables are moving in the opposite directions from each other, but are in perfect sync with each other (Emerson, 2015).

While Emerson (2015) stated that it is highly unlikely that two variables would have a *Pearson's r* coefficient of either a 1 or a -1, both Connelly (2012) and Emerson agreed that a *Pearson's r* coefficient that falls between .5 and 1 or, a *Pearson's r* coefficient that falls between -.5 and -1 are indicative of a strong relationship between the two variables in question. Connelly and Emerson agreed that a *Pearson's r* coefficient

that is equal to zero is an indication that there is no correlation between the two variables included in the research question. Connelly also described how the *Pearson's r* coefficient could be used to explain a graphic representation of the correlation between two variables. As noted by Connelly, as the *Pearson's r* coefficient is close to either 1 or to -1, the graphic representation of the relationship will appear as a regular line and will almost become a straight line as the coefficient approaches either 1 or -1. As the *Pearson's r* coefficient is further from either 1 or from -1 and begins to approach zero, the graphic representation of the relationship will appear as an irregular line that is indicative of a weaker relationship (Connelly, 2012).

Emerson (2015) cautioned individuals who use correlation research against equating correlation with causation. Correlation research defines the relationship between two variables in a given situation but does not translate into an assumption that the existence of one variable is responsible for the behavior of the other variable in each situation. The example used by Emerson to illustrate this phenomenon was: in the summer, there exists a correlation between the instances of home invasions and the consumption of ice cream. It would be erroneous to assume that the consumption of ice cream is the cause of an increase in the rate of home invasions. Emerson's example served as a reminder to researchers that correlational research is used to determine relationships, rather than assign causation (Emerson, 2015).

## Management of Funding Decisions and Social Change

The decisions of senior leaders of higher education institutions affect both internal and external stakeholders. higher education institutions receive funding from many

sources, including both federal and state governments, alumni contributions, corporate contributions and endorsements, endowments and trusts, and from the students and their families in the form of tuition dollars (Powell, Gilleland, & Pearson, 2012). Therefore, to positively impact social change, the senior leadership of an institution of higher education should be comprised of a diversified group that is both willing and able to represent all the various stakeholders to the best of their ability (Legon, Lombardi, & Rhoades, 2013). The American model of governance for higher education institutions has remained fairly constant since the establishment of higher education institutions in the United States. Fortunately, while the overall governance model has remained constant, the role and the authority of the Board of Trustees and other senior leaders have evolved to meet the ever-changing needs of all stakeholders of higher education institutions (Legon, Lombardi, & Rhoades, 2013).

The senior leaders of higher education institutions must make their funding management decisions based on the following criteria: the decisions must accurately reflect both the needs and the desires of both internal and external stakeholders, while simultaneously ensuring the delivery of an educational experience that is not only a consistently high-quality education, but also is an enjoyable social experience that is provided at a reasonable cost to students and their families (Legon, Lombardi, & Rhoades, 2013). Gardiner (2014) supported this position by stating, “Decisions regarding the management of funds must be made with utmost care primarily to meet the needs of the students, and secondarily to achieve other organizational goals that serve the community-at-large while allowing the senior leaders of the institution of higher

education to remain good stewards of institutional resources." The fund management decision-making process must be strategic due to the diversity of the student academic needs, which are not consistent throughout the college experience (Spittle, 2013). Research into the funding management decision process for retention programming at higher education institutions has the potential to impact social change in three measurable ways: first, the funding of retention programs has the potential to increase student retention and graduation rates, which may result in a better-educated populace. Second, students who graduate are more likely to become gainfully employed in a manner that would allow them to repay their student loans rather than default upon their student loans; and the anticipated reduction in the number of student loan defaults may, in turn, result in improvement in the overall economic status of the general population (Beattie, Thornton, Laden, & Brackett, 2013). The third potential for positive social change as a result of research into funding management decisions for retention programming at higher education institutions is that as the senior leaders of higher education institutions make management decisions in favor of funding the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions, the result may be a more efficient use of financial resources provided to higher education institutions through both federal and state government funding programs (College Board, 2013b).

## Gap in the Literature

I designed this study to address a gap in the literature regarding the decision-making process followed by senior leaders of higher education institutions regarding the

funding for sophomore-level retention programs. Existing research into retention of college students has emphasized the importance of retaining students from the freshman into the sophomore year (DeAngelo, 2014). The majority of senior leaders of higher education institutions have decided to allocate funds to develop and implement programming to retain students in the freshmen strategic business unit based on recommendations from experts in the field of statistical analysis that indicated a higher education student is more likely to drop out at the end of the first year than at any other time during the undergraduate experience, with an average retention rate of 50% in first-year students (Thammasiri, et al., 2014).

In contrast, senior leaders of higher education institutions have only recently decided to sporadically begin to allocate funding for the development and implementation of retention programming for students in the sophomore strategic business unit. Students in the sophomore strategic business unit average a 53% retention rate (Reyes, 2011) which is only a slightly higher retention rate than their counterparts in the freshman strategic business unit. Yet research into the development of retention programs that are designed to meet the unique needs of students in the freshman strategic business unit is prolific, while research into the decision-making process of senior leaders of higher education institutions regarding the management of funds for the development and implementation of retention programming to meet the unique needs of students in the sophomore strategic business unit is practically nonexistent.

## Summary

I explained in this review of the literature included in this chapter the problem and outlined the theoretical framework of this research study. First, I presented information from the literature regarding general decision-making processes in an environment of risk and competition (Cooper & Rege, 2011). Second, I presented an overview of decision-making processes by senior leaders of higher education institutions, which led me to present an exploration of Loomes and Sugden's regret theory and other research that supported regret theory and decision-making. Next, I described the research methods, concentrating upon insight into correlation research. I also included an outline of how the results of the research study may result in positive social change. I concluded this literature review by identifying a gap in the existing research that I designed this study to address.

The literature I presented underscores the need for research into the decision-making process that senior leaders of higher education institutions employ when funding retention programming of a specific set of students, namely those in the sophomore strategic business unit. While there is some existing research on the topic of retention programming for students in the sophomore strategic business unit, this existing research focuses on educational outcomes rather than on the decision-making process that precedes the development and implementation of retention programming. This gap in the literature underscores the importance of this research study to determine to what extent, if any, there exists a relationship between the management decision-making processes of senior leaders in public higher education institutions and the management decision-

making processes of senior leaders in private higher education institutions in North Carolina regarding the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit. The main topics addressed in the review of the current literature are incorporated into the findings of this research study presented in chapter five in such a manner that the findings of this study contribute to a better understanding of fund management decision-making processes at higher education institutions in North Carolina.

## Chapter 3 – Methodology

The purpose of this quantitative correlational study was to determine to what extent, if any, there exists a correlation between the decision-making process for funding sophomore-level retention programming (dependent variable) and the annual implementation cost of sophomore-level retention programming at higher education institutions in North Carolina (independent variable). I attempted to determine if there is a correlation between the decision-making process for funding sophomore-level retention programming (dependent variable) and the anticipated increase in sophomore-level student retention (independent variable). I also tried to determine to what extent, if any, there exists a difference between public and private institutions in the decision-making process regarding the management of funds for the development and implementation of sophomore-level retention programming in North Carolina. This study was designed to address a gap in the literature regarding the decision-making process of senior leaders of higher education institutions for funding the development and implementation of sophomore-level retention programming.

The first section of the methodology is a presentation of the research design and a rationale for this design in comparison to other research designs. In the second section, I describe and define the target sample population and the sampling procedures. In the third section of this chapter, I justify the sampling procedure and data collection methods. In the fourth section of this chapter, I justify the choice of data collection instrument and discuss the recruitment and participation requirements. I also explain the administration of the pilot study. The fifth section of this chapter is comprised of an explanation of how

the independent and dependent variables were manipulated, while the sixth section of this chapter is a discussion of threats to the validity of the data collection instrument. The seventh section of this chapter is an examination of any ethical issues. This chapter concludes with a summary of the research design, the selection of participants, and the data collection procedures.

## Quantitative Research

Quantitative research started with the positivism school of thought and can be used to reduce the data gathered during research into a single absolute truth (Yilmaz, 2013). According to Punk (2014), quantitative research involves the examination of an identified set of variables that includes the conceptualization of and the measurement of the relationships between the chosen variables. The two categories of quantitative research design are survey research and experimental research. The primary goal of survey research is to yield results that can be used to investigate various aspects of psychosocial reality, while the primary goal of experimental research is an attempt to prove the validity of a set of given circumstances (Davies & Hughes, 2014).

Quantitative research has been used to test theories and determine the nature of relationships between variables, while qualitative research has been used as a research tool for the exploration of new topics and to gain a better understanding of how humans experience a given phenomenon. Recently, there has been a tendency toward applying quantitative and qualitative research methods in a complementary or mixed-methods fashion when appropriate (Hoe & Hoare, 2012). A concern in quantitative research is that the results give a synthetic version of reality rather than taking into consideration the

nuances of the human condition that can be better described through qualitative research. This concern is usually expressed when discussing the use of quantitative research in the social sciences (Reale, 2014).

## Appropriateness of Quantitative Research

The quantitative research method was appropriate for this research study because it was designed to determine if a relationship exists and to quantify the relationship between defined independent and dependent variables (see Farrelly, 2013). For my first research question, I examined the decision-making process for sophomore-level retention programming as the dependent variable and the cost of retention programming as my independent variable. For my second research question, I examined the same dependent variable with regard to the anticipated increase of sophomore-level retention as the independent variable. Finally, I attempted to determine the difference in decision-making for public and private institutions regarding sophomore-level retention programming.

According to Balkin (2014), quantitative research is ideal for exploring relationships between variables; which was the basis of this research study. The quantitative research method facilitated the use of this study's results to address the lack of literature on retention programming for the sophomore strategic business unit. There is not much literature regarding sophomore-level retention programming, and the small amount of literature is focused on student outcomes rather than the decision-making process that precedes the development and implementation of retention programming.

## Qualitative Research

In contrast to quantitative research, the focus of qualitative research is to gain an understanding of human behavior, and the reason(s) that cause the behavior that is under examination (Oun & Bach, 2014). Qualitative research is rooted in the concept of social research, wherein the researcher interprets how humans are affected by the phenomenon under examination; it is grounded in the lived experiences of individuals (Marshall & Rossman, 2016). The basic characteristics of qualitative research are the use of a natural setting rather than a laboratory for research purposes, using interactive methods of data collection, the production of emerging data rather than the examination of existing data, and the researcher interprets the data based on observations (Campbell, 2014).

## Inappropriateness of Qualitative Research

The qualitative research method was not appropriate for this study, which was designed to determine the existence of a correlation between public and private institutions on North Carolina regarding the decision-making process for funding retention programming for students in the sophomore strategic business unit. An appropriate application of the qualitative research method would be an exploration of the unique experiences of senior leaders of higher education institutions that are involved with the decision-making process (Toles & Barroso, 2014). Qualitative research is interpretive in nature and is used to generate theories (Bryman & Bell, 2015), whereas this research study was designed to determine the existence of a phenomenon.

## Correlation Research

Correlation research has been described by Mukaka (2012) as a method by which a possible linear association can be established between two continuous variables. The correlation coefficient is the method of statistical analysis used to determine the strength of a relationship between the variables in question. The correlation coefficient can range from -1 up to +1, with a value of -1 indicating a perfectly inverse relationship between the two variables, and a value of +1 indicating a perfectly direct relationship between the two variables. A correlation coefficient of zero indicates that there is no relationship between the two variables (Mukaka, 2012).

Correlation research has been characterized by the scientific community as not as effective method of statistical research; the phrase "correlation does not prove causation" expresses the opinion that correlation research is less scientific than other methods of quantitative research (Verhulst, Eaves, & Hatemi, 2012). However, the argument against the validity of correlation research is weakened by evidence that the use of correlation research can be used to determine the magnitude of the relationship between the independent and dependent variables for use in multiple regression statistical analysis (Nathans, Oswald, & Nimon, 2012).

## Appropriateness of Correlation Research

The purpose of this study was to determine to what extent, if any, there exists a correlation between funding retention programming for students in the sophomore strategic business unit and the cost of the development and implementation of the retention programming. The purpose of this study was also to determine to what extent, if

any, there exists a correlation between funding sophomore-level retention programming and the anticipated increase in the retention of students in the sophomore strategic business unit. Correlation research is used to determine the nature of the relationship between variables (Mahdavi et al., 2015), and is an appropriate research design for this research study.

The correlation research design is an appropriate choice for an initial study into the factors that influence how variables relate to each other, which can lay the foundation for further research (Mullan, Todd, Chatzisar, & Hagger, 2014). The results of this study defined the existence of a correlation between the decision-making process for funding the development and implementation of retention programming for students in the sophomore strategic business unit and the cost of the retention programming. The results of this study also defined the existence of a correlation between the decision-making process for the management of funding for the development and implementation of retention programming for students in the sophomore strategic business unit and the anticipated increase in student retention. Further research regarding the effectiveness of various programs about how the variables cost and anticipated increase in student retention influence the management decision-making process should be undertaken in an experimental format to learn more about the value of the development and implementation of retention programming for students in the sophomore strategic business unit.

## Causality Research

In contrast to correlation research design, researchers using a causality research design attempt to explain the behavior of variables in relation to each other. Causality researchers employ two terms: *explanans*, which is defined as the explanation of the phenomenon under exploration, while *explanandum* is the phenomenon to be explained (Bell, Staines, & Michell, 2001). According to Klein, Rasmussen, Lin, Hoffman, and Case (2014), causal explanations are used for several purposes, including diagnosis of failures; justification of treatments; rationalization of tasks, and explaining complexities. Causality research is tied to three specific criteria to be an appropriate research method.

1. Reversibility: refers to the likelihood that an effect would disappear if the putative cause had not occurred.
2. Covariation: refers to the observed coincidence of causes and effects; when the effect is present, so is the alleged cause, and when the cause is not present, the effect is not either.
3. Propensity: refers to the plausibility that the alleged cause could have produced the effect.

   (Klein, Rasmussen, Lin, Hoffman, & Case, 2014, p. 1380)

If the three criteria above are not evidenced in the design of a research study, then causality research is not an appropriate method of research.

## Inappropriateness of Causality Research

This research study was not designed to explain the correlation between the decision-making process for funding for the development and implementation of

retention programming for students in the sophomore strategic business unit and the costs associated with sophomore-level retention programming. This study was also not designed to explain the correlation between the decision-making process for funding retention programming for students in the sophomore strategic business unit and the anticipated increase in student retention associated with sophomore-level retention programming. This research study was designed to determine whether a correlation between the above variables existed at the time of the study; and this study did not include the application of any form of treatment. In such cases, quasi-experimental research designs, including causality research, were not appropriate (Lewis & Reiley, 2013).

Marwala (2013) stated that correlation and causality are often confused with each other, yet they are not the same thing. If the existence of the first variable causes the second variable to exist, then there exists both a correlation (relationship) and causality between the two variables. Conversely, the existence of a correlation between two variables is indicative of a relationship between the variables, but not necessarily a causal relationship (Marwala, 2013). The purpose of this research study was to determine if a relationship between the dependent variable and the two independent variables existed at the time of the study. Until the existence of such a relationship was determined, any speculation regarding the existence of causality between the dependent variable and the two independent variables would have not been appropriate. Therefore, the purpose of this study was not aligned with the application of the causality research design.

## Purpose of Quantitative Research Questions

The general purpose of a research study is described in a series of statements that explain why the research is important and how the research can be applied to solve a problem. The purpose statement outlines in broad terms the overall goal of the researcher. In contrast, the research question(s) provide an explicit interrogatory statement of what information the researcher is seeking in completing the research study (Bryman, 2012). The research question must also include both rigor and direction to produce a quality research study. Trivial questions that do not contribute to the existing literature on a given topic are considered unworthy of the time and resources necessary to design and conduct a formal research study (O'Dwyer & Bernauer, 2014). The development of research questions in a quantitative study is a necessary preliminary step, as the research questions help to define the variables, determine the research design, and serve as a guideline for the overall study (Siedlecki, Butler, & Burchill, 2015).

## Research Questions for the Study

The following three research questions were asked:

$RQ_1$: To what extent, if any, is there a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina?

The independent variable was the cost per student annual development and implementation of sophomore-level retention programming, and the dependent variable

was the decision-making process for funding sophomore-level retention programs by the senior leaders of institutions of higher education in North Carolina.

$RQ_2$: To what extent, if any, is there a correlation between the decision-making process regarding for funding sophomore-level retention programming and the anticipated increase in the retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina?

For the second research question, the independent variable was the anticipated increase in the retention of students in the sophomore strategic business unit, and the dependent variable was the decision-making process for funding retention programs for students in the sophomore strategic business unit at institutions of higher education in North Carolina.

One purpose of this study was to determine if there is a difference in the decision-making process between public and private institutions in North Carolina regarding the management of funds for retention programming. To determine if such a difference exists, the following research question was asked:

$RQ_3$: What is the difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina?

The third research question compared the responses from the senior leaders of private higher education institutions in North Carolina to the responses from the senior leaders of public higher education institutions in North Carolina.

## Purpose of Quantitative Hypotheses

Researchers use quantitative hypotheses to make predictions or assumptions about possible answers to the research questions or possible outcomes of experimental research (Cunningham, 2014). Typically, the null hypothesis illustrates an outcome which the researcher hopes to reject (Auspurg & Hinz, 2015). The alternative hypotheses illustrate the outcome(s) that the researcher hopes to support through evidence-based research (Rowley, 2014). The quantitative hypotheses represent the actual statistical tests and experiments run upon the variables defined in the research questions to prove or disprove the questions posed by the researcher.

## Quantitative Hypotheses for this Study

The purpose of this research study was to determine whether there is a correlation between the decision-making process for funding for sophomore-level retention programming and the costs associated with the development and implementation of retention programming for students in the sophomore strategic business unit. I asked the first research question determine whether such a relationship exists. The null hypothesis associated with the first research question is as follows:

*$H1_0$:* There is no correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

The alternative hypothesis associated with the first research question is as follows:

$H1_a$: There is a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

The expected increase in student retention may also be a consideration in the decision-making process for the funding for sophomore-level retention programming. I asked the second research question determine whether such a relationship exists. The null hypothesis associated with the second research question is as follows:

$H2_0$: There is no correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

The alternative hypothesis associated with the second research question is as follows:

$H2_a$: There is a correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

I asked the third research question to determine if there is a difference between the responses from the senior leaders of public and private higher education institutions in North Carolina. The null hypothesis associated with the third research question is as follows:

$H3_0$: There is no difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

The alternative hypothesis associated with the third research question is as follows:

$H3_a$: There is a difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

I developed the quantitative hypotheses as an attempt to answer the questions regarding the existence of a relationship between the independent and dependent variables.

## Population

The population for the study was comprised of the senior academic officer from each non-profit 4-year public and private higher education institutions in North Carolina. Only non-profit institutions were included in the study due to the diverse nature of proprietary institutions. At the time of the study, there were 16 4-year public higher education institutions within the University of North Carolina system (The University of North Carolina, 2016). At the time of the study, there were 34 4-year private institutions of higher education under the umbrella of the North Carolina Independent Colleges and Universities, the governing body representing the nonprofit liberal arts, research, and comprehensive colleges and universities accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (North Carolina Independent Colleges and Universities, 2016). The senior academic officer of one of the private higher education institutions informed me in advance that per academic policies at that

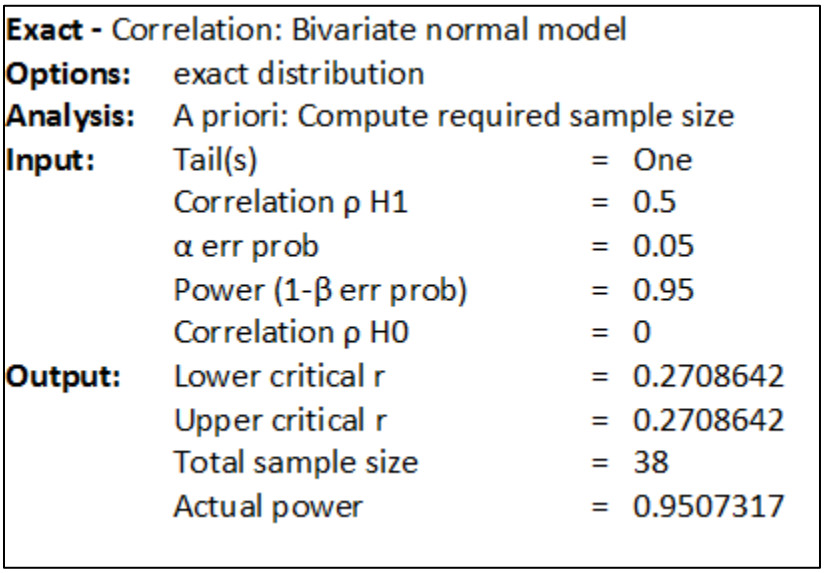
institution, they could not participate in the study. Therefore, the population for the study consisted of 49 senior academic officers of 4-year higher education institutions in North Carolina. Most of these senior academic officers held the title of provost. The senior academic officers of 4-year public higher education institutions numbered 16 (30.77% of the population), and the remaining 33 (69.23% of the population) were represented by senior academic officers of 4-year private higher education institutions. The target population of this study was the primary person responsible for the decision to fund programs of academic support at each institution. I included 4-year public and private institutions in this study to learn about the decision-making habits of institutions that serve various student populations.

## Sampling Strategy

The sampling strategy was a purposive sampling strategy that combined the total population strategy and the expert sampling strategy (Lund Research, Ltd., 2012). Purposive sampling strategy is described as a non-probability sampling strategy, as the sample is not randomly chosen or assigned. The use of non-probability sampling has the potential to introduce the possibility of allowing researcher bias to affect the sampling selection process (Bryman & Bell, 2015). The introduction of researcher bias to the sampling selection process was minimized by employing the total population strategy. By including all public and private nonprofit higher education institutions in North Carolina within the sampling frame, the potential for personal bias to influence the sampling process was effectively minimized.

## Sample Size

To determine the desired representative sample size, the G*Power 3.1.9.2 power analysis calculator was employed to determine the appropriate sample size for the research study. The input parameters used was a correlation bivariate normal model with a one-tailed *t* test. The default level of error probability of 0.05 and the default confidence level of 0.95 was accepted. The results of the G*Power 3.1.9.2 power analysis calculator are displayed in Figure 1:



| | | | |
|---|---|---|---|
| **Exact -** Correlation: Bivariate normal model | | | |
| **Options:** | exact distribution | | |
| **Analysis:** | A priori: Compute required sample size | | |
| **Input:** | Tail(s) | = | One |
| | Correlation ρ H1 | = | 0.5 |
| | α err prob | = | 0.05 |
| | Power (1-β err prob) | = | 0.95 |
| | Correlation ρ H0 | = | 0 |
| **Output:** | Lower critical r | = | 0.2708642 |
| | Upper critical r | = | 0.2708642 |
| | Total sample size | = | 38 |
| | Actual power | = | 0.9507317 |

*Figure 1.* Power analysis. This figure displays the results of the G*Power 3.1.9.2 power analysis calculator.

Based on the results of the power analysis, the sample should consist of 38 units, which is contained within the population of 50 possible units. The number of units used in the G*Power 3.1.9.2 power analysis contained the private institution that was ultimately excluded due to an institutional policy regarding research.

## Recruitment Procedures and Informed Consent

To properly complete the study, a great deal of planning was necessary to assure that the study research process followed the Walden University IRB guidelines. To facilitate the planning process, I created a graphic organizer to assist me in making sure that I complied with the Walden University IRB guidelines. The graphic organizer was a helpful tool to assist me in the research process. The graphic organizer that I developed displays the procedure for recruitment, gaining informed consent, data collection, data analysis and validation, and presentation of the conclusions of the study, and is illustrated in Figure 2:

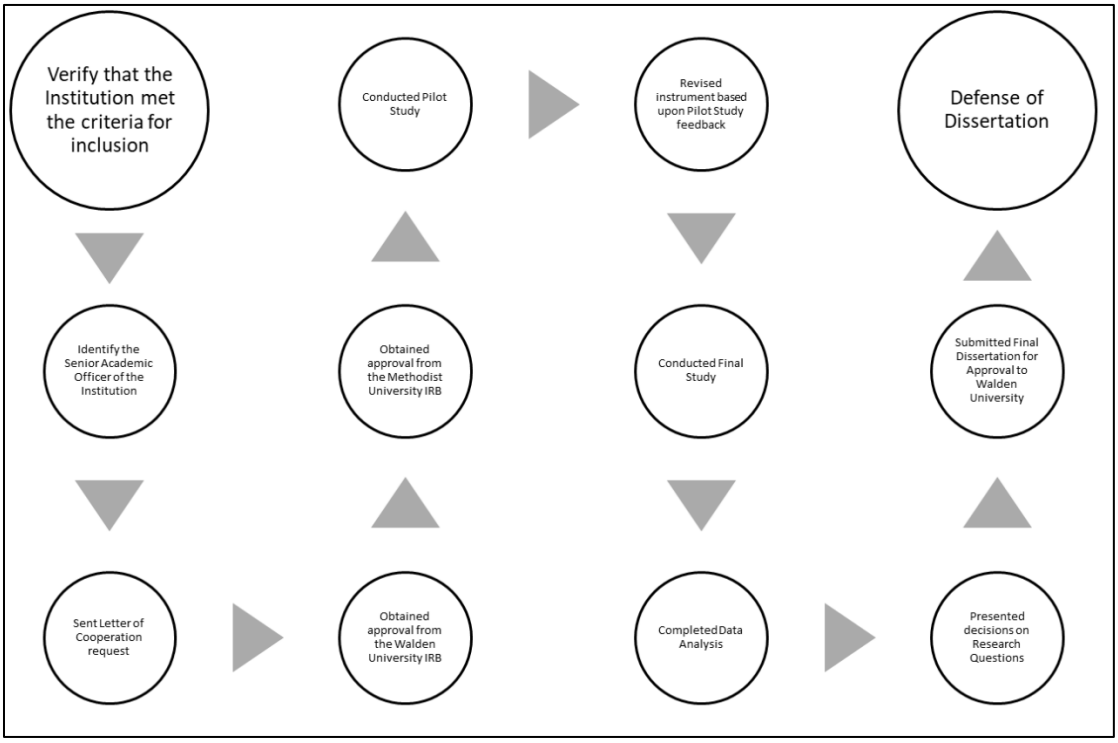



*Figure 2.* Recruitment procedure flowchart. This figure illustrates the step-wise format of the research process beginning with the recruitment of participants.

The recruitment process began by verifying that each institution of higher education met the criteria for inclusion into the study. Potential participants were

identified by reviewing each institution of higher education's website. After potential participants were verified, a customized version of the letter of cooperation template provided by the Walden University Institutional Review Board (IRB) (Walden University, 2016) was sent to each potential participant to determine whether that institution of higher education was willing to be included in the study. The Walden University IRB approval number was: 03-14-17-0358412. The customized version of the IRB consent form is presented in Appendix A. I then obtained permission from the Walden University IRB to conduct a pilot study to validate the survey questions. After reviewing and validating the survey questions, the validation process did not alter the study. Therefore, no alterations were submitted to the Walden University IRB for approval.

**Pilot Study**

A pilot study is an important step in the development of a research study. A pilot study serves as a means of ensuring methodological rigor within a study. By conducting a pilot study, a researcher can test the validity of the survey instrument; practice and evaluate the intended data analysis method; and accurately estimate the necessary resources to properly conduct the intended research study (Hassan, 2016). Conducting a pilot study gives a researcher the opportunity to practice conducting the intended research on a smaller scale, to make any necessary changes to ensure all aspects of the research study work well together and form an effective way to determine answers to the research questions included in the study (Doody & Doody, 2015).

A pilot study was conducted to check for errors in construction and validity. When attempting to determine the proper sample size for the pilot study, I encountered many different theories and formulas to determine the sample size. Many of these theories and formulas were based on the confidence interval and the probability level. At issue with such formulas was that the total population of the study was not known. The sample size returned by using the formulas returned a sample size for the pilot study which was larger than the entire population of this study. I chose to use Cohen's (1988) suggested pilot study sample size of a minimum of 10% of a known study population. Therefore, there were eleven participants in the pilot study, and the total population of the final study consisted of 49 participants.

**Pilot Study Population**

The population of the pilot study consisted of eleven individuals, ten of the participants at the time of the study held positions of leadership at a private institution of higher education. The eleventh participant was an individual who served in an editorial capacity. The individuals in the pilot study population were chosen to evaluate the survey instrument regarding content, relevance, and to provide constructive criticism to improve the survey instrument. The eleven pilot study participants were contacted via e-mail, and all responded to the invitation by completing the survey. The eleven responses constituted a 100% participation rate in the pilot study and constituted 11 (32%) of the 38 responses that the G-Force Power analysis determined as necessary for the final study to be significant. The pilot study responses also constituted 11 (22%) of the possible survey responses from the total survey population of 49 participants.

**Pilot Study Data Collection**

The pilot study was administered by using as close an approximation of the final study environment as possible. The pilot study was constructed and administered through Qualtrics, which is an electronic survey software system that is used in the academic domain for research purposes, and in the commercial domain for consumer behavior research, product testing and advertising, along with other applications (Qualtrics, Inc., 2017).

The initial contact with the pilot study participants was by e-mail, and the invitation included the consent form for participation as approved by both the Walden University IRB and the Methodist University IRB. The invitation also included a hyperlink to the survey, and the pilot study participants were instructed that by clicking on the hyperlink, they were giving their consent to participate in the pilot study. After clicking on the hyperlink, the pilot study participants were presented with an additional explanation of the purpose of the study, and an opportunity to opt out of the survey if they wished to do so. With a 100% participation rate in the pilot study, the projected participation rate in the main study of 69% appeared to be achievable, and it was expected that the goal of receiving 38 completed surveys out of a total population of 49 in the main study would be reached.

**Pilot Study Demographics**

The individuals that comprised the population of the pilot study were invited to mimic the education level and the areas of responsibility and expertise of individuals in the population of the final study. Ten of the eleven pilot study participants hold Ph.D.

degrees, in a variety of disciplines. The eleventh participant served in an editorial capacity, and that person holds an M.B.A. degree. The use of purposeful sampling negated the necessity of including demographic questions. The ten participants in the pilot study with Ph.D. degrees were at the time of the study, a combination of Department Chairpersons, School Deans, and two Associate Vice-Presidents at a private institution of higher education. The eleventh participant in the pilot test holds an M.B.A, and at the time of the study was an office manager in a private company. The pilot study's participants were purposely selected to provide a representation of the leadership responsibilities and the decision-making skills demonstrated by the main study population.

**Pilot Study Data Treatment**

The data collected during the pilot study were first viewed in the Qualtrics survey software in a graphical representation. The collected data were then exported from the Qualtrics survey software into an Excel spreadsheet. The Excel spreadsheet containing the collected data was then imported into the SPSS statistical software system to perform the correlation statistical analysis and into STATA to perform the Bradley-Terry model for paired preferences statistical analysis. The survey did not contain open-ended questions; therefore, all the collected data were examined through either the SPSS statistical analysis software program or the STATA statistical analysis software program.

## Instrumentation

I created the survey instrument for this research study in March 2016 (Appendix B). The survey consisted of 14 Likert-type questions, followed by a series of pairwise

evaluation questions designed to determine an acceptable return on investment levels for the management of funding to develop and implement retention programming for students in the sophomore strategic business unit. The Likert-type questions were designed to collect data from the participants about his or her decision-making process regarding the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit. The pairwise evaluation questions were included to collect participant data that were analyzed to determine whether there exists a difference in the management of funds for the development and implementation of retention programs for students in the sophomore strategic business unit between public and private higher education institutions in the State of North Carolina.

Figure three illustrates a sample of questions from the Likert-type portion of the survey:

1. To what extent is my institution considering the implementation of retention programming for sophomore students?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

2. When deciding to fund a retention program, to what extent is the cost of the program the primary concern?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

3. When making a retention program fund allocation decision, to what extent is the retention programming decisions of leaders of similar institutions of higher education a consideration?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

*Figure 3*. Sample Likert-type survey questions. This figure provides examples of survey questions.

In addition to the Likert-type questions, the survey also consisted of pairwise evaluation questions.

The pairwise evaluation questions allowed the participants to indicate their preferences regarding the management of a specific level of program funding per student when paired with an expected percentage increase in student retention. The Bradley-

Terry logistic model for paired evaluations was used to determine indifference curves based on the preferences of participants. The Bradley-Terry logistic model for paired evaluations was developed to determine an individual's preference for alternative *"a"* over alternative "*b"* (Agresti, 2013). To determine an individual's preference over a series of items, each alternative "*a"* must be paired separately with each possibility for alternative "*b*." In a graphic representation, the X-axis displays the participant's choices for the management of funds per student, in $1,000 increments ranging from $1,000 per student to $5,000 per student. The Y-axis displays the expected increase in sophomore student retention, in 1.0% increments ranging from 1.0% to 5.0%, as displayed in figure four:

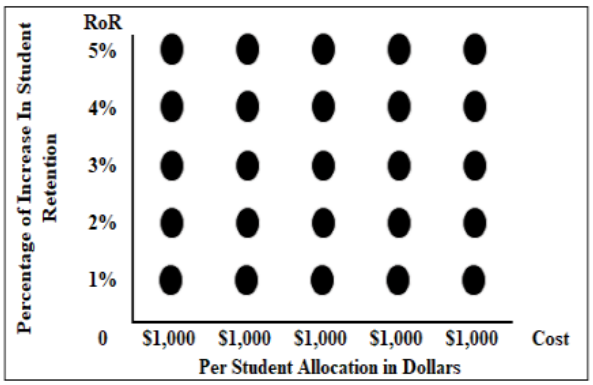



*Figure 4*. Bradley-Terry pairwise evaluation grid. Illustrates the ratios included in the pairwise analysis.

Each dot on the grid represents a pair for evaluation. The Bradley-Terry model for paired preferences does not require that each participant indicate a preference for all possible pairs, and allows for the use of a randomized sample when employing a pairwise comparison (Baker & McHale, 2015). The survey included a randomized sample of 25 pairs for each participant to compare. While the Bradley-Terry model is most commonly

used in conjunction with sports statistics, the model was designed to determine the rank of preferred outcomes in any scenario where there are more than two items in a comparison (Baker & McHale, 2015). Figure five illustrates the format of the pairwise evaluation portion of the survey. The participants were asked to choose between a pair of options, each containing a cost per student figure and an expected increase in student retention for the given program.

1. Which funding decision would you most likely support?
    a. Invest $ 1,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 2% increase in sophomore student retention

2. Which funding decision would you most likely support?
    a. Invest $ 1,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 3% increase in sophomore student retention

3. Which funding decision would you most likely support?
    a. Invest $ 1,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 4% increase in sophomore student retention

4. Which funding decision would you most likely support?
    a. Invest $ 1,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 5% increase in

*Figure 5*. Sample Bradley-Terry survey questions. This figure illustrates the format of the pairwise analysis questions.

The survey was purposely designed to contain both the 14 Likert-type survey questions and the randomized pairwise evaluation questions. The questions are designed to gauge the mindset of the participants regarding the decision-making process for the

management of funds for the implementation of retention programming for students in the sophomore strategic business unit.

There were 400 possible pairwise comparisons included in the survey. Each participant was presented with 25 randomly assigned pairs. The Bradley-Terry model requires that the participant indicate a preference between the presented choices (Agresti, 2013). Therefore, the participants were asked to indicate which option in each pair represents the program development and implementation cost per student and the anticipated increase in sophomore student retention that the participant would be *more likely* to support. The answer is not an indication of a hard choice on the part of the participant, but rather an indication of the preference between the two presented options in each pair.

## Reliability and Validity

The survey instrument incorporates two established methods of quantitative inquiry. The 5-point Likert scale and the Bradley Terry model for paired evaluations model are both regarded as reliable and valid methods of inquiry within the behavioral sciences (Koksal, Ertekin, & Çolakoglu, 2014) (González-Díaz, Hendrick, & Lohmann, 2014). While the reliability and validity of both methods of inquiry have been established, the reliability and validity of the instrument must be tested. The instrument was put through two pilot tests, to establish a level of reliability. The survey questions were re-examined after the first pilot test, as a 90% level of reliability was not achieved. The survey questions were corrected, and the reliability pilot test was re-administered. After the second administration, a 90% level of reliability was confirmed. The instrument

was examined by participants who at the time of the survey, held Ph.D. degrees in the fields of psychology, economics, computer science, and management respectively, to determine content, predictability and construct validity.

## Threats to Validity

### Threats to External Validity

The term *external validity* refers to the ability for researchers to successfully generalize the results of a research study. The term *generalization* is used to describe the ability of researchers to perform a study with different participants, in a different location, or even at a different time, and the results of the studies are similar to each other or even duplicate each other (Trochim, Donnelly, & Arora, 2016). A high level of generalization is an indicator that a research study has strong external validity.

One of the main threats to external validity in a quasi-experimental research design is the possibility of selection bias. Selection bias occurs when the participants are not randomly assigned into groups for comparison purposes. The nature of this correlation research study did not allow for the random assignment of participants into groups. To minimize the possibility of selection bias, a senior leader from all higher education institutions in North Carolina that are both non-profit and accredited to confer degrees at the bachelor-level or higher was invited to participate in the study. The use of a population sampling strategy successfully reduced the possibility of selection bias.

The second threat to external validity arises out of how the study is constructed. If a study is designed using either: single constructs, single measurements, or both, then the external validity of the study may be reduced (Lund Research, Ltd., 2012). The research

study was constructed to explore the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit. The research design construct eliminates the possibility that any conclusions regarding the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit can be generalized to conclusions regarding the management of funds for retention programming for students in the sophomore strategic business unit at two-year higher education institutions. Additionally, the research design measurement eliminates the possibility that any conclusions regarding the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in the State of North Carolina can be generalized to conclusions regarding the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions outside of the State of North Carolina.

**Threats to Internal Validity**

The concept of internal validity is more closely related to experimental research design, which is used to determine whether the manipulation of one variable is the causation of a change in another variable. One possible threat to internal validity is that the sample is improperly selected (Trochim, Donnelly, & Arora, 2016). The possibility of this type threat to internal validity was minimized by inviting the senior officer from 49

higher education institutions in North Carolina that are both non-profit and accredited to confer degrees at the bachelor-level or higher to participate in the study.

### Threats to Construct Validity

The concept of construct validity is a test of how well the research study is designed. Construct validity is achieved by the researcher completing a thorough literature review to determine whether the research study contributed to the body of knowledge, and so that the researcher properly operationalize the variables. The researcher must make sure the survey questions are relevant to the research questions and that the survey questions are properly worded so that they measure the construct that is the purpose of the research study (Lund Research, Ltd., 2012). In this research study, the Likert-type survey questions and the pairwise evaluations were all related to the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit at public and private higher education institutions in the State of North Carolina.

## Operationalization of Variables

The construct under examination in the research study was the decision-making process for funding for sophomore-level retention programming at private and public four-year higher education institutions in North Carolina. To properly measure the construct, I created a Likert-type survey that allowed participants to indicate their level of agreement with 14 statements regarding the decision-making process for the management of funds for the development and implementation of retention programming. The survey also contained a pairwise evaluation section, in which the participants were asked to

choose their preference between two options that included a per-student cost paired with an anticipated increase in student retention. The pairwise evaluation consists of a cost range from $1000 to $5000 per student, and an expected increase in student retention ranging from 1% to 5%. Using these parameters, there are 400 pairwise comparisons. Each survey contained the single opt out question, the same 14 statements within the Likert-type section, and contained 25 randomized pairwise evaluation questions.

The independent variables that were used to define the decision-making process for funding for sophomore-level retention programming employed by the senior leaders of higher education institutions in North Carolina are both continuous ratio variables. The independent variable for research question one was the cost associated with the development and implementation of retention programming for students in the sophomore strategic business unit. The independent variable for research question two was the anticipated increase in the retention of students in the sophomore strategic business unit. Research question three utilized the two independent variables and the dependent variable from research questions one and two, to compare the responses from the senior leaders of public 4-year higher education institutions in North Carolina with the responses from the senior leaders of private 4-year higher education institutions in North Carolina.

## Data Analysis Plan

Qualtrics survey software was used to create and administer the survey, and the Statistical Package for the Social Sciences (SPSS) version 24.0 and the STATA statistical analysis software system were both employed to analyze the data collected from the

participants in the study. The Qualtrics survey software can be configured to assist with the data screening process. The survey was configured to prevent participants from entering more than one answer choice per question and was also configured to prompt participants to respond to all survey items to reduce the number of incomplete submissions. Any incomplete submissions were eliminated through the data entry process into SPSS and STATA. During the data analysis step, the descriptive statistical analysis functions in both SPSS and STATA were used to screen for outliers and also to screen for the possibility of multicollinearity among the independent variables.

To properly explore the opinions expressed by the participants in the study and determine whether the results support the hypotheses, two separate types of statistical tests were performed. To address the three research questions, the *Pearson's r correlation coefficient* test was used to determine to what extent, if any, a relationship exists between the independent and dependent variables. To address research question number three, an *intraclass correlation coefficient* was computed to determine to what extent, if any, the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit for senior leaders of private higher education institutions in North Carolina differs from the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit for senior leaders of public higher education institutions in North Carolina (Landers, 2015).

The results of the Pearson's r correlation coefficient test were reported at a 95% confidence level by an examination of both the sign and the number included in the results. A positive sign indicated that the variables under examination moved in the same direction, that is, as the value of one variable increased, the value of the other variable increased at the same rate, as presented in figure six:

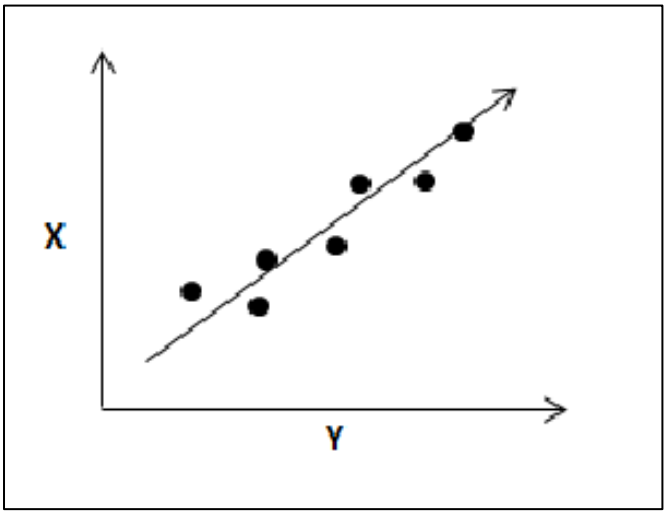



*Figure 6*. Sample positive correlation relationship. This figure illustrates a positive correlation.

Conversely, if the sign was negative, that indicated that the variables under examination moved in the opposite direction, that is, as the value of one variable increased the value of the other variable decreased, as presented in figure seven:

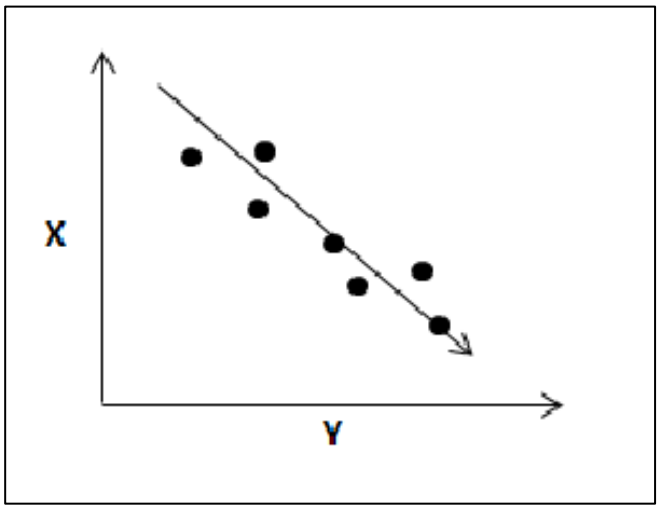



*Figure 7*. Sample negative correlation relationship. This figure illustrates a negative correlation.

The number value of the Pearson's r correlation coefficient test ranged from -1 through 0 up to +1. As a value approached either -1 or +1, which indicated the strength of the correlational relationship between the two variables. A perfect correlation would be represented by a straight line. A Pearson's r correlation coefficient value that equals 0 indicated that there is no relationship between the two variables (Connelly, 2012).

The *intraclass correlation coefficient* test was reported at a 95% confidence level by an examination of the output of the two-way random SPSS data analysis, examining a mean of the raters for reliability and consistency. The intraclass correlation coefficient average measures output represented the percentage of consistency between responses of the senior leaders of four-year public higher education institutions in the state of North Carolina and the responses of the senior leaders of four-year private higher education institutions in the state of North Carolina regarding the decision-making process for the management of funding for the development and implementation of retention programming for students in the sophomore strategic business unit (Landers, 2015).

The pairwise evaluation analysis was accomplished by using the Bradley-Terry model for paired preferences as a quasi-symmetry logistical analysis based on the binomial distribution in STATA. The output was analyzed in terms of how many times a participant preferred option X over option Y, as presented in figure eight:

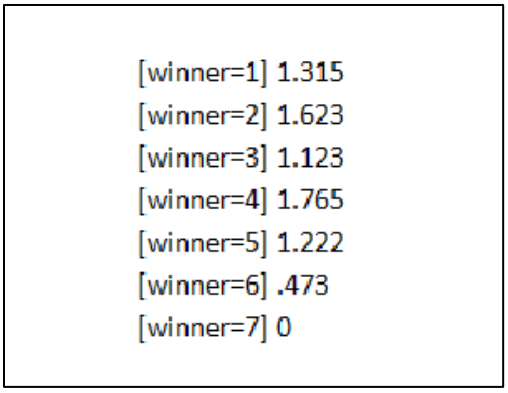



*Figure 8*. Sample output – Bradley-Terry Model. This figure illustrates a sample output from STATA.

In the sample above, options one through six are being compared to option seven, which is listed as a dummy variable. The number listed beside each option represents the natural log of that option "winning" or in the case of this study, being the preferred option when compared to option number seven. To complete the analysis, the two probabilities must be compared by executing an exponentiation of the first variable in the pair to the second variable in the pair, then dividing the exponentiation of the first variable by one plus the exponentiation of the first variable to get the probability of the first variable being preferred to the second variable (IBM, 2016).

## Ethical Procedures

The research study was designed with ethical procedures in place to assure the safety of all participants regarding all foreseeable psychological, relationship, legal,

economic/professional, physical, and any other foreseeable risks associated with participation. The above categories of risk were mitigated through the quasi-experimental research design that only required the participant to complete an electronic survey. The survey design included an opportunity for participants to opt out of the survey before answering any questions. Additionally, participants were also informed that they could exit the survey prior to completing all questions if they chose to do so without any form of penalty.

To minimize the likelihood of interference with the participants on the part of the researcher, the survey items were designed to minimize the likelihood that a participant could be identified by an individual reading the participant's responses to the survey items. At the time of the study, I was employed at a private institution of higher education in the State of North Carolina. The provost of the private university at the time of the study was aware that I was developing a research study, but there were no conversations between he and I regarding the specifics of the research study prior to the deployment of the survey. He did contact me briefly to let me know that he had received the invitation to participate in the survey and that he had completed the survey, but we had no further discussion about my research study.

The Walden University Research Ethics Planning Worksheet was completed as a part of the planning stages of this study and all elements of IRB approval and participant approval were in place prior to the collection of data. The Walden University IRB approval number was: 03-14-17-0358412. Participants were not identified by name nor by institution of employment in any documentation that was viewed by anyone, including

me. All data was sent and received via a password-protected e-mail account, the data was stored on a private password-protected external hard drive, and participant data information will be kept for a minimum of five years after the conclusion of the study. When discarded, the electronic data stored on the external hard drive will be deleted, and the external hard drive will be reformatted to minimize the likelihood that the data can be retrieved.

## Summary

Student retention is a documented concern of the senior leaders of higher education institutions (Grillo & Leist, 2013). Historically, senior leaders of higher education institutions have concentrated their efforts upon the retention of freshmen students into their sophomore year (DeAngelo, 2014). While many forms of retention programming have been developed to address the issue of retaining freshman students into the sophomore year, there is very limited research into the importance of retaining sophomore students into the junior year. This lack of research was surprising, given that sophomore students are the second most likely group to drop out, with approximately 50% of students designated as sophomores returning to the same institution of higher education for their junior year (Reyes, 2011). This research study was designed to examine the decision-making process for the management of funding for the development and implementation of retention programming for students in the sophomore strategic business unit. This examination was an attempt to determine to what extent, if any, there exists a correlation between the management decision to allocate funds for the development and implementation of retention programming for students in

the sophomore strategic business unit and the annual implementation cost for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina. Also, this examination was an attempt to determine to what extent, if any, there exists a correlation between the management decision to allocate funds for the development and implementation of retention programming for students in the sophomore strategic business unit and the anticipated increase in student retention in the sophomore strategic business unit at higher education institutions in North Carolina.

The survey instrument was developed for use in this research study and was field-tested and corrected as necessary before dissemination to study participants. After receipt of approval from both the Walden University IRB and the Methodist University IRB, the survey was sent via electronic mail to an individual identified a provost or as a dean of academics at each campus of the University of North Carolina, and was sent to an individual identified a provost or as a dean of academics at every campus recognized by the North Carolina Independent Colleges and Universities organization. Data analysis included using descriptive statistics, the Pearson's r correlation coefficient, an intraclass correlation coefficient, and the Bradley-Terry model for paired preferences. The answers to the research questions and the appropriate charts and tables to properly report the results of the data collection follow in chapter four.

# Chapter 4 – Results

The purpose of this quantitative correlational study was to determine to what extent, if any, there exists a correlation between the decision-making process for the management of institution funds (dependent variable) and the cost of implementing retention programming for students in the sophomore strategic business unit (independent variable) at higher education institutions in North Carolina; to determine to what extent, if any, there exists a correlation between the decision-making process for the management of institution funds (dependent variable) and the anticipated increase in retention of students in the sophomore strategic business unit (independent variable) at higher education institutions in North Carolina ; and to determine if there is a significant difference in the management of institution funds between public and private academic higher education institutions in North Carolina regarding sophomore-level retention programming. This study addresses a lack of research regarding the decision-making process of senior leaders of higher education institutions related to funding the development and implementation of retention programming for students in the sophomore strategic business unit.

This research study was based on two premises from Loomes and Sugden's (1982) regret theory of decision making. Loomes and Sugden surmised that whenever a choice between alternatives is made, there is an element of regret that the alternative chosen may be inferior to the alternatives not chosen. Loomes and Sugden concluded that when a decision is made in an environment of uncertainty, the decision-maker considers the way competitors have decided the same issue.

The independent variables for the study were the cost of retention programming for students in the sophomore strategic business unit and the anticipated increase in sophomore-level retention at higher education institutions in North Carolina. The dependent variable was the decision-making process for the management of institution funds at higher education institutions in North Carolina. The variables were explored within the scope of the following research questions and hypotheses:

$RQ_1$: To what extent, if any, is there a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina?

$H1_0$: There is no correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

$H1_a$: There is a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

$RQ_2$: To what extent, if any, is there a correlation between the decision-making process regarding for funding sophomore-level retention programming and the anticipated increase in the retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina?

$H2_0$: There is no correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

$H2_a$: There is a correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

$RQ_3$: What is the difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina?

$H3_0$: There is no difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

$H3_a$: There is a difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

## Survey Instrument and Pilot Study

I developed the survey instrument for this research study. The survey instrument was designed using the Qualtrics survey software. I then conducted a pilot study to check for errors in construction and validity. The pilot study population consisted of 11 participants; 10 of the participants were chosen to mimic the education level of the final

study, as all ten of these participants had earned a Ph.D. degree in various disciplines, and at the time of the pilot study; served in leadership positions in a private institution of higher education. The eleventh participant earned an M.B.A., and was served in an editorial capacity. At the time of the pilot survey, the eleventh participant was employed by a private company. The data collected during the pilot study were first viewed in the Qualtrics survey software in a graphical representation. The collected data were then exported from the Qualtrics survey software into an Excel spreadsheet. The Excel spreadsheet containing the collected data was then imported into the SPSS statistical software system to perform the correlation analysis and into STATA to perform the Bradley-Terry model for paired preferences statistical analysis. The survey did not contain open-ended questions; therefore, all the collected data were examined through either the SPSS statistical analysis software program or the STATA statistical analysis software program.

**Outcome of Pilot Study**

The outcome of the pilot study was summarized in four points. First, the participants understood the premise of completing the Likert-type section of the survey, then switching to the pairwise comparison section of the survey. Second, both the Likert-type and pairwise comparisons provided valid data to support a valid analysis of data. Thirdly, recommendations from the pilot study participants improved the wording and organization of the final survey. Last, the execution of the pilot study followed the plan as outlined by the Walden University IRB guidelines provided in the approved consent form.

## Final Study

After receiving final approval from the Walden University IRB to conduct the research study, an invitation to the previously verified participants was sent via an e-mail that included a web link to the survey. A sample of the survey questions appears in Appendix A. After completing the survey, participants were sent a follow-up e-mail to thank the participant for his or her time. After the data collection was complete, further data validation consisted of removing any incomplete surveys prior to using the statistical analysis programs SPSS and STATA to complete an electronic data analysis.

The final study was structured similarly to the pilot study using the Qualtrics electronic survey software system. Based on feedback from the participants in the pilot study, the final study was divided into three sections. The first section included an opportunity for participants to opt out. If the participant decided to opt out, he or she was taken to an exit screen and thanked for their time. The exit screen also included a statement informing the participant that he or she could still follow the e-mail link provided and complete the survey if he or she changed his or her mind. If the participant agreed to complete the survey, the participant continued to the second section, which consisted of 14 Likert-type questions, designed to gauge the participant's opinions about regretting decisions and about the decision-making process for funding a retention program for students in the sophomore-level business unit at his or her current institution.

The third section consisted of pairwise analysis questions. This section was divided into five subsections to prevent the participant from becoming confused, as the

pairwise analysis questions were worded in a very similar fashion. Figure nine is an example of the format of the pairwise analysis questions included in the final study.

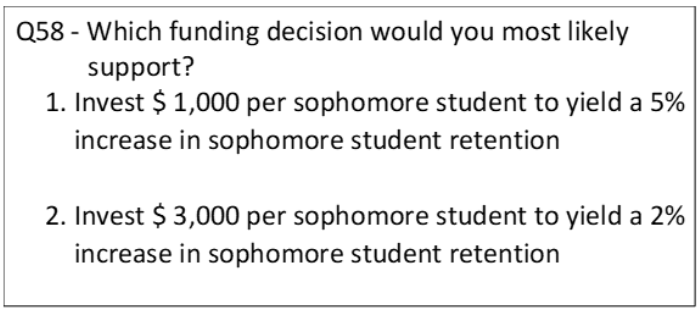



*Figure 9*. Sample question – Pairwise Analysis. This figure illustrates the format of the pairwise analysis questions included in the final study.

Each subsection was designed to compare the participant's willingness to support the implementation of various student retention programs based on the cost per-student investment and the expected percentage of increase in student retention. Section three was divided into five subsections:

1. **Subsection 1:** five questions, which were designed to compare an investment of $1,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5% to investments of $2,000.00, $3,000.00, $4,000.00, and $5,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5%.
2. **Subsection 2:** five questions, which were designed to compare an investment of $2,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5% to investments of $1,000.00, $3,000.00, $4,000.00, and $5,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5%.

3. **Subsection 3:** five questions, which were designed to compare an investment of $3,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5% to investments of $1,000.00, $2,000.00, $4,000.00, and $5,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5%.
4. **Subsection 4:** five questions, which were designed to compare an investment of $4,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5% to investments of $1,000.00, $2,000.00, $3,000.00, and $5,000.00 per student at expected increases in student retention at 1%, 2%, 3%, and 5%.
5. **Subsection 5:** five questions, which were designed to compare an investment of $5,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5% to investments of $1,000.00, $2,000.00, $3,000.00, and $4,000.00 per student at expected increases in student retention at 1%, 2%, 3%, 4% and 5%.

Each subsection contained a bank of 80 questions, and five questions from each subsection were presented in a randomized order to each of the participants, for a total of 25 pairwise analysis questions presented to each participant.

To complete the final survey, the participants had to answer a total of 41 questions. The format of the final study is presented in Table 2:

*Table 2.*

Question format of the Final Study

| Section of the Final Study | Number of Required Questions | Style of Question(s) | Purpose of Question(s) | Presentation of Question(s) |
|---|---|---|---|---|
| Section One | 1 | Yes/No | Opt Out of the Survey | Single Question |
| Section Two - A | 14 | Likert-type | Funding Decisions and Regret theory | Sequential Order |
| Section Two - B | 1 | Private/ Public | Identify type of Institution | Single Question |
| Section Three – Subsection One (See explanation above this table.) | 5 | Pairwise Analysis | Comparison of a $1,000 investment. | Random Order |
| Section Three – Subsection Two (See explanation above this table.) | 5 | Pairwise Analysis | Comparison of a $2,000 investment. | Random Order |
| Section Three – Subsection this table.) | 5 | Pairwise Analysis | Comparison of a $3,000 investment. | Random Order |
| Section Three – Subsection Four (See explanation above this table.) | 5 | Pairwise Analysis | Comparison of a $4,000 investment. | Random Order |
| Section Three – Subsection Five (See explanation above this table.) | 5 | Pairwise Analysis | Comparison of a $5,000 investment. | Random Order |
| Total Number of Questions | 41 | | | |

The participation rate of 27 completed surveys out of a total population of 49 potential participants constituted a 55% response rate. Unfortunately, the 27 completed surveys constituted only 77.5% of the 38 responses that the G-Force Power analysis determined necessary for the final study to be significant. Due to the anonymous nature of the survey, it is not possible to identify which members of the population completed

the surveys, which members of the population partially completed the surveys, or which members of the population chose not to participate at all.

## Population

The intended population of the study consisted of the senior academic officer from each of the public and private 4-year higher education institutions in the State of North Carolina, except for one private institution. This private institution declined the initial invitation to participate, as it was an institutional policy that a research partner employed at that institution was a requirement for participation in any research study. As a result, no invitation to complete the survey was sent to the senior academic officer of that private institution. To identify the sample population, I used a purposive sampling strategy that combined the total population strategy with the expert sampling strategy (see Lund Research, Ltd., 2012). The process of population identification included viewing the institutional website of each institution of higher education that confers a bachelor's level degree, in multiple disciplines, and therefore is not considered to be a specialty institution.

Identification of the senior academic leader of the various higher education institutions was accomplished by accessing publicly available information from the individual institution of higher education's website. Most commonly, the senior academic leader held the title of provost. The information retrieved from the individual institution of higher education's website included the senior academic leader's name, office e-mail address, and office telephone number.

## Data Collection

Invitations to participate in the final survey were sent to the identified population via e-mail, utilizing the distribution feature of Qualtrics survey software. Data collection began on April 17, 2017, with the initial distribution consisting of 49 invitations. The initial e-mail contained the consent form as approved by the Walden University and Methodist University IRB, the link to access the survey, and the password to access the survey. After the initial e-mail, a series of reminders were sent to anyone on the original potential participant list who had not completed a survey. These reminders were sent to individuals with partially completed surveys in addition to individuals who had not attempted to complete the survey at all.

*Table 3.*

Log of messages sent to potential participants in the final study

| Type of Message Sent | Date | Number of E-mails Sent | Number of E-mails Returned | Reason for Returned E-mail |
|---|---|---|---|---|
| Invitation/Consent Form | 4/17/2017 | 49 | 0 | |
| First Reminder | 4/20/2017 | 49 | 0 | |
| Second Reminder | 4/24//2017 | 47 | 0 | |
| Third Reminder | 4/27/2017 | 45 | 0 | |
| Fourth Reminder | 4/30/2017 | 45 | 0 | |
| Fifth Reminder | 5/4/2017 | 45 | 0 | |
| Sixth Reminder | 5/8/2017 | 45 | 0 | |
| Seventh Reminder | 5/12/2017 | 45 | 0 | |
| Eighth Reminder | 5/16/2017 | 45 | 0 | |
| **End of Original Data Collection Period** | **5/17/17** | **0** | **0** | |
| Ninth Reminder | 5/18/2017 | 44 | 0 | |
| Tenth Reminder | 5/22/2017 | 42 | 0 | |
| Eleventh Reminder | 5/30/2017 | 41 | 0 | |
| Thank You Message to Participants with Completed Surveys | 5/31/2017 | 27 | 0 | |

The data collection period was originally scheduled to end on May 17, 2017, one month after the data collection process began. Due to the low response rate, an extension of data collection time was requested and granted. Reminders were sent via e-mail until May 30, 2017. On May 31, 2017, a *thank you for your participation* e-mail was sent to those from the original potential participant list who had completed the survey.

On June 1, 2017, the mode of contact was shifted from e-mail to telephone. The office telephone numbers that were obtained from the public information on each institution of higher education's website were called to attempt to collect more surveys. There were two difficulties with this process: the first difficulty was that the survey participation was anonymous, therefore everyone on the list had to be called. The second difficulty was that the potential participants were not easy to contact directly via telephone. Messages were left either with an administrative assistant or by voicemail. As of June 30, 2017, the 27 useable responses from May 31 were the only ones completed. On June 30, 2017, I requested permission from Dr. Richard Schuttler (Dissertation Chairperson), Dr. Kathleen Barclay (Dissertation Committee Member), and Dr. Danielle Wright-Babb (University Research Reviewer) to proceed with the 27 collected responses, even though that total was 11 responses less than the 38 responses that the G-Force Power analysis determined as necessary for the final study to be significant. I was approved to proceed with the data that was collected from the 27 complete responses that were collected between April 15, 2017 and May 30, 2017. The 27 useable responses out of the population of 49 represent a 55% response rate for the final study.

## Demographics

The individuals who comprised the population of the final study were sampled purposely as the senior academic leaders of higher education institutions in the State of North Carolina. All participants in the final study population attained a Ph.D. degree, in a variety of disciplines. The use of purposeful sampling negated the necessity of including demographic questions. Most of the participants in the final study held the title of provost at an institution of higher education. Other titles held by participants included: vice-president for academic affairs, dean of academic affairs, and chief academic officer. The demographics of the total population consisted of: 33 private institutions, 16 public institutions, 31 males, and 18 females. This demographic information was gathered during the process of defining the population for the survey. While viewing the individual websites for each institution of higher education to learn the identity of the senior academic leader, the gender of the individual was noted along with his/her e-mail address and telephone number.

## Data Treatment

The data collected during the final study were manipulated in the same manner as the data for the pilot study. The data collected were first viewed in the Qualtrics survey software. The collected data were then exported from the Qualtrics survey software into an Excel spreadsheet. The Excel spreadsheet containing the collected data was then imported into the SPSS and STATA statistical software systems to perform the correlation statistical analysis and the Bradley-Terry model for paired preferences statistical analysis. The survey did not contain any open-ended questions. All the

collected data were examined through the SPSS and STATA statistical analysis software programs.

## Data Analysis

The process of data analysis began with an inspection of all responses, specifically to identify and remove any responses that were incomplete. The first step was to import the data into Excel to manage the data and easily delete the incomplete responses. There were originally 34 responses, but after deleting the incomplete surveys, the final number of usable responses was 27. The data template was created in Excel from the data exported from Qualtrics. The data was kept in two locations: one copy was located on my laptop, and a duplicate copy was kept in an online cloud storage through Dropbox. Both locations were password protected to preserve data integrity.

The second step consisted of changing the responses from the original format of alpha-numeric text into numerical text to facilitate the statistical analysis. For the Likert-type questions, this step consisted of changing the responses from alpha-numeric to a dummy variable as follows: *Very Rarely* = 1, *Rarely* = 2, *Occasionally* = 3, *Frequently* = 4, and *Very Frequently* = 5.

Similarly, the responses to the pairwise comparison questions were also changed from alpha-numeric format to a dummy variable, as represented in Table 4:

Table 4

*Data Cleaning, Pairwise Comparison Questions*

| Original Response | Numerical Response if Picked | Numerical Response if Not Picked |
|---|---|---|
| The first money investment/student retention pair in the comparison: **Example:** Invest $ 3,000 per sophomore student to yield a 2% increase in sophomore student retention | 1 | 0 |
| The second money investment/student retention pair in the comparison: **Example:** Invest $ 2,000 per sophomore student to yield a 1% increase in sophomore student retention | 1 | 0 |

The third step of the data cleaning process was to calculate a Cronbach's Alpha for the Likert-type questions. Using SPSS, the Cronbach's Alpha for questions 6 – 19 is displayed in Table 5:

Table 5

***Cronbach's Alpha, Likert-type Questions***

| Reliability Statistics | | |
|---|---|---|
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| 0.676 | 0.689 | 14 |

While a reliability coefficient of .70 or higher is generally considered to be acceptable (University of California at Los Angeles, 2017), the small sample size of this survey

negatively impacted the Cronbach's Alpha. If the targeted sample size of 38 responses had been received, the Cronbach's Alpha test of reliability might have reached the .70 level. With the smaller sample, a Cronbach's Alpha level of .676 was only .024 below the desired level of .70, and the Cronbach's Alpha based on standardized items of .689, which was only .011 below the desired level of .70. These two Cronbach's Alpha levels still indicated a high level of reliability, despite the small sample.

In the fourth step of the data cleaning process, a check for multicollinearity among the Likert-type questions was conducted. The results of the test are displayed in Appendix B. The Variance Inflation Factor (VIF) was used as a test of multicollinearity, as described by Katrutsa and Strijov (2017) According to Katrutsa and Strijov, the VIF is an indicator of the linear dependence between variables. A VIF that is greater to or approximately equal to 5 is an indicator of multicollinearity issues between variables. The data presented in Appendix B confirms that no VIF values greater to or approximately equal to 5 exist between the Likert-type questions in the survey, and therefore, there are no issues with multicollinearity with the Likert-type questions.

In the fifth step of the data cleaning process, an examination of the responses to the Likert-type questions was conducted to determine how many of each choice was represented within the results. This examination was used to determine if there were patterns within the answer choices. Also, this information was used to create a record to compare the answers given to the Likert-type questions to the answers given to the pairwise comparison questions.

In the sixth step of the data cleaning process, a series of spreadsheets were created that contained the numerical responses to the pairwise analysis questions. This series of spreadsheets facilitated the analysis of the questions, allowing for an examination of the questions individually, in groups according to specific criteria, or in aggregate. The spreadsheet data was organized as follows: column "P" contains the number of times the first choice presented was "picked," or chosen by a respondent. Column "C" contains the number of times the first choice presented was compared another choice. The columns with the numbers 11 through 55 represent the various choices presented. The first digit represents the amount of money (in thousands) per sophomore student invested, and the second digit represents the percentage of expected increase in sophomore student retention based on the money invested. For example, the column headed with the number "21" represents a $2,000 investment per sophomore student to gain a 1% increase in sophomore student retention. If the number 1 inside a column is a positive number, that choice was the first choice presented in the question. If the number 1 inside a column is a negative number, that choice was the second choice presented in the question. Therefore, in the first row of table 8, an investment of $1,000 per sophomore student to gain a 1% increase in sophomore student retention was compared once to an investment of $2,000 per sophomore student to gain a 2% increase in sophomore student retention. The investment of $1,000 per sophomore student to gain a 1% increase in sophomore student retention was not picked as an alternative in this comparison. The last two columns contained the question number in which the comparison was first presented and the question number in which the comparison was presented in reverse order, respectively.

Each of these tables originally contained 400 rows, one for each possible pairwise comparison. After the original table was populated, the data were collapsed into a table with 200 rows, which presented an aggregate of the picks and comparisons for each column, combining the "Picked" and Compared" columns from the original question and the reverse order question. The original table contains all answers from all respondents. Next, the original table was reproduced to compare the responses from respondents from public higher education institutions with the responses from the respondents from private higher education institutions. A sample from the spreadsheet containing all responses is presented in Appendix C. The tables were then reproduced to display each respondent's choices, and again to represent the breakdown of responses for each of the Likert-type questions. In all, 58 versions of the pairwise comparison table were created to facilitate the Bradley-Terry pairwise comparisons.

The Bradley-Terry pairwise comparisons were analyzed using the STATA statistical analysis software system. STATA was developed by Willian Gould and first released in 1985 (STATACorp, Inc., n.d.). The indifference curves served as an indication of the level of risk aversion expressed by the respondents in the pairwise comparison section of the survey. Also, the indifference curves also were useful in examining the relationship between the choices provided by the respondents to the Likert-type questions in comparisons to the answers provided to the pairwise comparison questions. The indifference curve for all responses is displayed in figure 10:

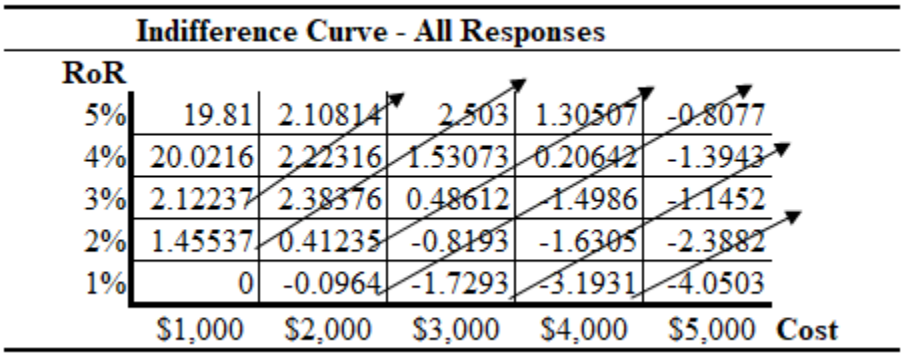



*Figure 10.* Indifference curve for all responses

The arrows that start on the lower left and move toward the upper right of the indifference curve indicate the different levels of risk aversion based on the responses from the participants. The further to the left on the indifference curve, the more risk averse the respondent. Also, an indifference curve can be interpreted as an estimate of cardinal utility for each pair, with the choice representing the highest level of utility displayed at the upper left corner, and the choice representing the lowest level of utility displayed at the lower right corner. There is an issue in the way that the Bradley-Terry model estimates coefficients for options that are unanimously dominate in that these choices are either always chosen or never chosen. The design of the survey contained two unanimously dominant choices: the choice of $1,000 investment per sophomore student to possibly achieve a 5% increase in sophomore student retention, and the choice of a $5,000 investment per sophomore student to possibly achieve a 1% increase in sophomore student retention. In the Bradley-Terry model, the unanimously dominate choices skew the regression analysis, and either an unusually large or small value is displayed. If the extreme values are ignored, the indifference curve displays a greater

range of shading, which better defines the curve (Dras, 2014). To address this issue with the extreme choices, the analysis was run again, this time without the extreme choices. The process of removing the extreme values is called trimming. Figure 11 displays the trimmed analysis, in which the indifference curves are better defined.

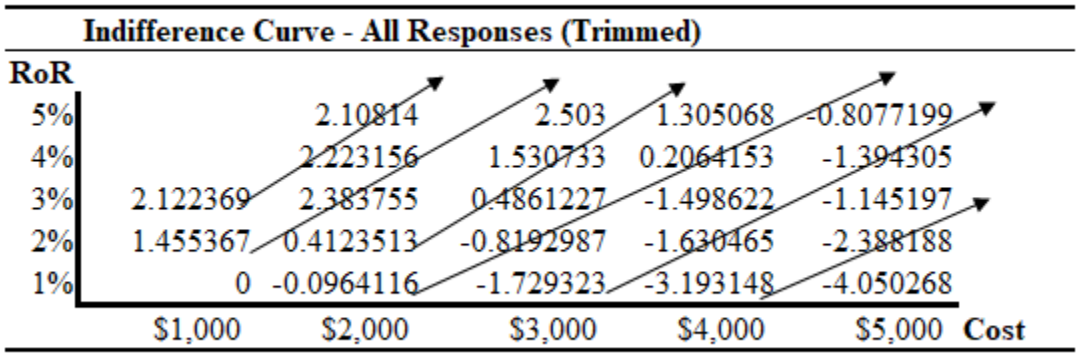



*Figure 11.* Indifference Curve – All Responses (Trimmed)

The regression analysis summary output results are presented in Appendix D. The regression analysis for all responses had a positive correlation relationship, and the *p*-value for all responses was 0.0074896; the responses from private institutions had a positive correlation relationship, and the *p*-value for the private institution responses was 0.109260005; the responses from public institutions had a positive correlation relationship, and the *p*-value for the public institution responses was 0.001524877. The low *p*-value s for both all responses and public institution responses were indicative of a high level of significance, whereas the higher *p*-value for the private institution responses was indicative of a low level of significance.

## Hypotheses Testing

After the correlation analysis and the pairwise analysis were completed, the following outcomes were observed regarding the research questions and hypotheses:

$RQ_1$: To what extent, if any, is there a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina?

*$H1_0$:* There is no correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

*$H1_a$:* There is a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

An analysis of results of both the Likert-type questions and the Bradley-Terry pairwise questions revealed that the responses to both types of questions determined that a significant correlation exists between the decision-making process to allocate funds for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and the costs associated with the development and implementation of retention programming for students in the sophomore strategic business unit. The

responses, when examined in aggregate, all indicated that the funding required to develop and implement a retention program was a significant factor in the decision-making process. Figure 12 displays the summary output of the regression analysis of all Likert-type questions:

**Summary Item Statistics**

| | Mean | Minimum | Maximum | Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|---|---|---|---|
| Item Means | 3.399 | 2.000 | 4.296 | 2.296 | 2.148 | 0.444 | 14 |
| Item Variances | 0.755 | 0.533 | 1.105 | 0.573 | 2.075 | 0.034 | 14 |
| Inter-Item Covariances | 0.098 | -0.462 | 0.463 | 0.925 | -1.003 | 0.029 | 14 |
| Inter-Item Correlations | 0.137 | -0.483 | 0.630 | 1.114 | -1.303 | 0.049 | 14 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 47.5926 | 28.405 | 5.32959 | 14 |

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig |
|---|---|---|---|---|---|---|
| Between People | | 52.751 | 26 | 2.029 | | |
| Within People | Between Items | 156.013 | 13 | 12.001 | 18.279 | 0.000 |
| | Residual | 221.915 | 338 | 0.657 | | |
| | Total | 377.929 | 351 | 1.077 | | |
| Total | | 430.680 | 377 | 1.142 | | |

Grand Mean = 3.3995

**Intraclass Correlation Coefficient**

| | Intraclass Correlation[b] | 95% Confidence Lower Bound | 95% Confidence Upper Bound | F Test with True Value 0 Value | df1 | df2 | Sig |
|---|---|---|---|---|---|---|---|
| Single Measures | .130[a] | 0.058 | 0.259 | 3.090 | 26 | 338 | 0.000 |
| Average Measures | .676[c] | 0.464 | 0.830 | 3.090 | 26 | 338 | 0.000 |

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

*Figure 12.* Summary Output – All Responses to Likert-type Questions

An examination of the data in figure 12 revealed that the maximum inter-item correlation of 0.630, coupled with the low *p*-value of 0.000 indicated the existence of a significant correlation between the decision-making process for the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and the costs associated with implementation with the development and implementation of retention programming for students in the sophomore strategic business unit.

The summary statistics for the Bradley-Terry pairwise analysis questions are presented in figure 13:

| *Regression Statistics* | |
|---|---|
| Multiple R | 0.965726139 |
| R Square | 0.932626975 |
| Adjusted R Square | 0.921398137 |
| Standard Error | 0.537039506 |
| Observations | 22 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 71.86325717 | 23.95441906 | 83.05641346 | 9.76827E-11 |
| Residual | 18 | 5.191405757 | 0.288411431 | | |
| Total | 21 | 77.05466293 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | 1.180369003 | 0.805599149 | 1.465206367 | 0.160114217 | -0.512132006 | 2.872870012 | -0.512132006 | 2.872870012 |
| Cost | -1.185088168 | 0.224668683 | -5.274825803 | 5.14159E-05 | -1.657099557 | -0.71307678 | -1.657099557 | -0.71307678 |
| RoR | 0.784378734 | 0.263658855 | 2.974975877 | 0.008114864 | 0.230452034 | 1.338305434 | 0.230452034 | 1.338305434 |
| Cost*RoR | 0.029568109 | 0.072429519 | 0.40823285 | 0.687917952 | -0.122600664 | 0.181736882 | -0.122600664 | 0.181736882 |

*Figure 13*. Summary Output – All Responses to Bradley-Terry Pairwise Analysis Questions

An examination of the data in figure 13 revealed that the $R^2$ of 0.93 coupled with the low *p*-value of 9.76827E-11 indicated the existence of a significant correlation between the decision-making process regarding the management of funds for the development and

implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and the costs associated with the development and implementation of retention programming for students in the sophomore strategic business unit. Based on the statistical analysis of the data; *$H1_0$:* There is no correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina was rejected.

$RQ_2$: To what extent, if any, is there a correlation between the decision-making process regarding for funding sophomore-level retention programming and the anticipated increase in the retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina?

*$H2_0$*: There is no correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

*$H2_a$*: There is a correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

In the Likert-type question section of the survey, there were two questions designed to determine the existence of a correlation between the decision-making process regarding

the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and the anticipated increases in student retention of students in the sophomore strategic business unit. The two questions are presented in figure 14:

| |
|---|
| Q15 - When making fund allocation retention programming decision, how often do I believe that the program that leads to the highest anticipated retention rate is the best choice, regardless of cost?<br><br>Q19 - How often do I make retention fund allocation decisions based solely on the anticipated increase in student retention? |

*Figure 14.*
Likert-type questions related to anticipated increase in sophomore student retention

When the responses to questions 15 and 19 were examined, an analysis of the results indicated that the anticipated increases in sophomore student retention after the implementation of a retention program was a significant factor in the decision-making process. Figure 15 displays the output of the regression analysis of Likert-type questions 15 and 19.

**Descriptive Statistics**

| | | | Bootstrap[a] | | | |
|---|---|---|---|---|---|---|
| | | | | | 95% Confidence Interval | |
| | | Statistic | Bias | Std. Error | Lower | Upper |
| Q15 | Mean | 3.4444 | 0.0010 | 0.1646 | 3.1481 | 3.7778 |
| | Std. Deviation | 0.84732 | -0.02313 | 0.10032 | 0.62929 | 1.01414 |
| | N | 27 | 0 | 0 | 27 | 27 |
| Q19 | Mean | 3.2222 | -0.0013 | 0.1715 | 2.8889 | 3.5556 |
| | Std. Deviation | 0.93370 | -0.02000 | 0.10978 | 0.67937 | 1.11452 |
| | N | 27 | 0 | 0 | 27 | 27 |

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

**Correlations**

| | | | | Q15 | Q19 |
|---|---|---|---|---|---|
| Q15 | Pearson Correlation | | | 1 | .405* |
| | Sig. (1-tailed) | | | | 0.018 |
| | Sum of Squares and Cross-products | | | 18.667 | 8.333 |
| | Covariance | | | 0.718 | 0.321 |
| | N | | | 27 | 27 |
| | Bootstrap[c] | Bias | | 0 | -0.013 |
| | | Std. Error | | 0 | 0.221 |
| | | 95% Confidence Interval | Lower | 1 | -0.086 |
| | | | Upper | 1 | 0.784 |
| Q19 | Pearson Correlation | | | .405* | 1 |
| | Sig. (1-tailed) | | | 0.018 | |
| | Sum of Squares and Cross-products | | | 8.333 | 22.667 |
| | Covariance | | | 0.321 | 0.872 |
| | N | | | 27 | 27 |
| | Bootstrap[c] | Bias | | -0.013 | 0 |
| | | Std. Error | | 0.221 | 0 |
| | | 95% Confidence Interval | Lower | -0.086 | 1 |
| | | | Upper | 0.784 | 1 |

*. Correlation is significant at the 0.05 level (1-tailed).

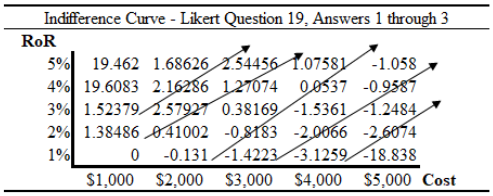
c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

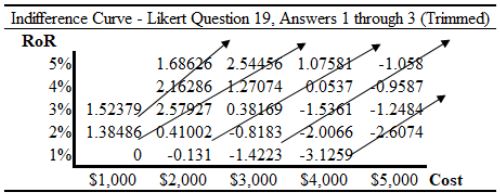
*Figure 15.* Regression Analysis – Likert- type Questions 15 and 19

An examination of the data in figure 15 revealed a Pearson's R correlation of 0.405, coupled with the low *p*-value of 0.018 indicated the existence of a significant correlation between the decision-making process regarding the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and

the costs associated with the development and implementation of retention programming for students in the sophomore strategic business unit.

The summary statistics for the Bradley-Terry pairwise analysis of Likert-type question 15 and 19 are presented in figures 16 through 19. For the sake of comparison, both the trimmed and the untrimmed indifference curves are presented.




SUMMARY OUTPUT

| *Regression Statistics - Likert Question 19, Answers 1 through 3* | |
|---|---|
| Multiple R | 0.791216984 |
| R Square | 0.626024317 |
| Adjusted R Square | 0.569927964 |
| Standard Error | 4.653364565 |
| Observations | 24 |

ANOVA - Likert Question 19, Answers 1 through 3

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 724.9565709 | 241.65219 | 11.159804 | 0.000160811 |
| Residual | 20 | 433.0760354 | 21.6538018 | | |
| Total | 23 | 1158.032606 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -0.353125603 | 6.329260089 | -0.0557926 | 0.9560607 | -13.5557308 | 12.8494796 | -13.555731 | 12.8494796 |
| Cost | -1.978347832 | 1.802240346 | -1.0977159 | 0.2853692 | -5.73775532 | 1.78105965 | -5.7377553 | 1.78105965 |
| RoR | 3.338747338 | 1.802240346 | 1.85255388 | 0.0787631 | -0.42066015 | 7.09815482 | -0.4206601 | 7.09815482 |
| Cost*RoR | -0.320540959 | 0.520261975 | -0.6161145 | 0.5447681 | -1.40578842 | 0.7647065 | -1.4057884 | 0.7647065 |

*Figure 16.* Summary Output –Bradley-Terry Pairwise Analysis of Likert-Type Question 15, Answers 4 and 5

Indifference Curve - Likert Question 15, Answers 1 through 3

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 |
|---|---|---|---|---|---|
| 5% | 18.0493 | 1.77752 | 2.71968 | 0.77442 | -1.9229 |
| 4% | 18.6702 | 1.25984 | 1.35817 | -0.0057 | -1.4179 |
| 3% | 1.64653 | 2.38828 | -0.2393 | -1.9312 | -1.3345 |
| 2% | 1.43069 | 0.35363 | -1.0895 | -2.045 | -3.0282 |
| 1% | 0 | -1.1972 | -1.1059 | -3.0177 | -17.919 |

Cost

Indifference Curve - Likert Question 15, Answers 1 through 3 (Trimmed)

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 |
|---|---|---|---|---|---|
| 5% | | 1.77752 | 2.71968 | 0.77442 | -1.9229 |
| 4% | | 1.25984 | 1.35817 | -0.0057 | -1.4179 |
| 3% | 1.64653 | 2.38828 | -0.2393 | -1.9312 | -1.3345 |
| 2% | 1.43069 | 0.35363 | -1.0895 | -2.045 | -3.0282 |
| 1% | 0 | -1.1972 | -1.1059 | -3.0177 | |

Cost

SUMMARY OUTPUT

| *Regression Statistics - Likert Question 15, Answers 1 through 3* | |
|---|---|
| Multiple R | 0.800194104 |
| R Square | 0.640310604 |
| Adjusted R Square | 0.586357194 |
| Standard Error | 4.345169234 |
| Observations | 24 |

ANOVA - Likert Question 15, Answers 1 through 3

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 672.2122864 | 224.070762 | 11.867843 | 0.000110002 |
| Residual | 20 | 377.6099134 | 18.8804957 | | |
| Total | 23 | 1049.8222 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -0.824818626 | 5.910069119 | -0.1395616 | 0.8904022 | -13.1530068 | 11.5033695 | -13.153007 | 11.5033695 |
| Cost | -1.787782179 | 1.682876808 | -1.0623369 | 0.3007427 | -5.29820169 | 1.72263733 | -5.2982017 | 1.72263733 |
| RoR | 3.315495787 | 1.682876808 | 1.97013576 | 0.0628269 | -0.19492372 | 6.82591529 | -0.1949237 | 6.82591529 |
| Cost*RoR | -0.353040051 | 0.485804689 | -0.7267119 | 0.4758229 | -1.36641087 | 0.66033077 | -1.3664109 | 0.66033077 |

*Figure 17.* Summary Output –Bradley-Terry Pairwise Analysis of Likert-Type Question 15, Answers 1 Through 3

Indifference Curve - Likert Question 19, Answers 4 and 5

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 |
|---|---|---|---|---|---|
| 5% | 18.4765 | 3.17671 | 3.2085 | 2.2029 | 0.00288 |
| 4% | 19.1096 | 3.23701 | 1.57109 | 0.55576 | -1.4042 |
| 3% | 2.37821 | 2.55333 | 0.67713 | -0.8755 | -1.6033 |
| 2% | 1.73169 | 0.35078 | -0.8428 | -1.3878 | -2.9805 |
| 1% | 0 | 0.14572 | -2.4518 | -3.5728 | -2.8444 |

Cost

Indifference Curve - Likert Question 19, Answers 4 and 5 (Trimmed)

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 |
|---|---|---|---|---|---|
| 5% | | 3.17671 | 3.2085 | 2.2029 | 0.00288 |
| 4% | | 3.23701 | 1.57109 | 0.55576 | -1.4042 |
| 3% | 2.37821 | 2.55333 | 0.67713 | -0.8755 | -1.6033 |
| 2% | 1.73169 | 0.35078 | -0.8428 | -1.3878 | -2.9805 |
| 1% | 0 | 0.14572 | -2.4518 | -3.5728 | -2.8444 |

Cost

SUMMARY OUTPUT

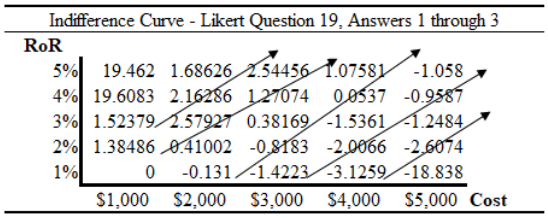
| *Regression Statistics - Likert Question 19, Answers 4 and 5* | |
|---|---|
| Multiple R | 0.84970777 |
| R Square | 0.72200329 |
| Adjusted R Square | 0.68030378 |
| Standard Error | 3.1920764 |
| Observations | 24 |

ANOVA - Likert Question 19, Answers 4 and 5

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 529.268525 | 176.422842 | 17.3144324 | 8.81666E-06 |
| Residual | 20 | 203.7870346 | 10.1893517 | | |
| Total | 23 | 733.0555596 | | | |

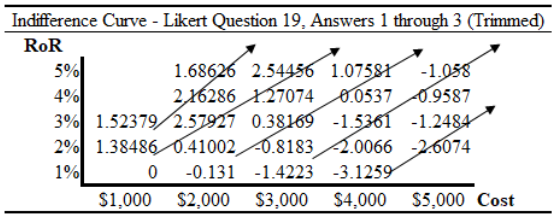
| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -6.7500738 | 4.341693299 | -1.55471 | 0.13569759 | -15.8066873 | 2.30653971 | -15.806687 | 2.30653971 |
| Cost | 0.73881773 | 1.236285873 | 0.59761075 | 0.55680638 | -1.84002942 | 3.31766487 | -1.8400294 | 3.31766487 |
| RoR | 4.96623946 | 1.236285873 | 4.01706399 | 0.00067601 | 2.387392315 | 7.5450866 | 2.38739231 | 7.5450866 |
| Cost*RoR | -0.9765973 | 0.356884991 | -2.7364482 | 0.01271972 | -1.72104634 | -0.2321483 | -1.7210463 | -0.2321483 |

*Figure 18*. Summary Output –Bradley-Terry Pairwise Analysis, Question 19, Answers 4 and 5



Indifference Curve - Likert Question 19, Answers 1 through 3

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 | Cost |
|---|---|---|---|---|---|---|
| 5% | 19.462 | 1.68626 | 2.54456 | 1.07581 | -1.058 | |
| 4% | 19.6083 | 2.16286 | 1.27074 | 0.0537 | -0.9587 | |
| 3% | 1.52379 | 2.57927 | 0.38169 | -1.5361 | -1.2484 | |
| 2% | 1.38486 | 0.41002 | -0.8183 | -2.0066 | -2.6074 | |
| 1% | 0 | -0.131 | -1.4223 | -3.1259 | -18.838 | |



Indifference Curve - Likert Question 19, Answers 1 through 3 (Trimmed)

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 | Cost |
|---|---|---|---|---|---|---|
| 5% | | 1.68626 | 2.54456 | 1.07581 | -1.058 | |
| 4% | | 2.16286 | 1.27074 | 0.0537 | -0.9587 | |
| 3% | 1.52379 | 2.57927 | 0.38169 | -1.5361 | -1.2484 | |
| 2% | 1.38486 | 0.41002 | -0.8183 | -2.0066 | -2.6074 | |
| 1% | 0 | -0.131 | -1.4223 | -3.1259 | | |

SUMMARY OUTPUT

| *Regression Statistics - Likert Question 19, Answers 1 through 3* | |
|---|---|
| Multiple R | 0.791216984 |
| R Square | 0.626024317 |
| Adjusted R Square | 0.569927964 |
| Standard Error | 4.653364565 |
| Observations | 24 |

ANOVA - Likert Question 19, Answers 1 through 3

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 724.9565709 | 241.65219 | 11.159804 | 0.000160811 |
| Residual | 20 | 433.0760354 | 21.6538018 | | |
| Total | 23 | 1158.032606 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -0.353125603 | 6.329260089 | -0.0557926 | 0.9560607 | -13.5557308 | 12.8494796 | -13.555731 | 12.8494796 |
| Cost | -1.978347832 | 1.802240346 | -1.0977159 | 0.2853692 | -5.73775532 | 1.78105965 | -5.7377553 | 1.78105965 |
| RoR | 3.338747338 | 1.802240346 | 1.85255388 | 0.0787631 | -0.42066015 | 7.09815482 | -0.4206601 | 7.09815482 |
| Cost*RoR | -0.320540959 | 0.520261975 | -0.6161145 | 0.5447681 | -1.40578842 | 0.7647065 | -1.4057884 | 0.7647065 |

*Figure 19.* Summary Output –Bradley-Terry Pairwise Analysis of Likert-type Question 19, Answers 1 through 3

An analysis of the data in figures 16 through 19 revealed that the $R^2$ factors associated with each figure of 0.596343474 (Figure 16); 0.640310604 (Figure 17); 0.72200329 (Figure 18); and 0.62602437 (Figure 19), coupled with the low *p*-values of 0.000337992 (Figure 16); 0.000110002 (Figure 17); 8.81666E-06 (Figure 18); and 0.000160811 (Figure 19) indicated the existence of a significant correlation between the decision-making process regarding the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit and the anticipated increase in the retention of students in the sophomore

strategic business unit retention at higher education institutions in North Carolina. based on the statistical analysis of the data, $H2_0$: There is no correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina was rejected.

$RQ_3$: What is the difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina?

$H3_0$: There is no difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

$H3_a$: There is a difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

The low response rate to the survey created a sample that was heavily skewed in favor of the private institutions, with 21 (78%) of the 27 responses provided by senior leaders of private higher education institutions, with the remaining 6 (22%) responses provided by senior leaders of public higher education institutions. The predominance of responses from senior leaders of private higher education institutions resulted in a statistical analysis of the data that was somewhat inconclusive.

An examination of the summary output and indifference curve information for the answers provided by the leaders of private higher education institutions contained in

figure 20 when compared to the summary output and indifference curve information for the answers provided by the leaders of public higher education institutions contained in figure 21, revealed that the responses did not indicate a significant difference in the preferences for the management of funding for the implementation of retention programming for students in the sophomore strategic business unit. As with figures 16 through 19, both the trimmed and the untrimmed indifference curves are presented for comparison.

Indifference Curve - Private Institutions

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 Cost |
|---|---|---|---|---|---|
| 5% | 18.18055 | 1.829683 | 2.538161 | 1.55265 | -0.5452488 |
| 4% | 2.964248 | 2.372822 | 1.297126 | -0.0149187 | -1.180277 |
| 3% | 1.012934 | 2.613906 | 0.6355388 | -1.054971 | -0.7978949 |
| 2% | 1.073749 | 0.5781494 | -1.010189 | -1.540401 | -2.506212 |
| 1% | 0 | 0.4423987 | -1.784107 | -3.013216 | -2.900846 |

Indifference Curve - Private Institutions (Trimmed)

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 Cost |
|---|---|---|---|---|---|
| 5% | | 1.82968 | 2.53816 | 1.55265 | -0.5452 |
| 4% | 2.96425 | 2.37282 | 1.29713 | -0.0149 | -1.1803 |
| 3% | 1.01293 | 2.61391 | 0.63554 | -1.055 | -0.7979 |
| 2% | 1.07375 | 0.57815 | -1.0102 | -1.5404 | -2.5062 |
| 1% | 0 | 0.4424 | -1.7841 | -3.0132 | -2.9008 |

SUMMARY OUTPUT: PRIVATE INSTITUTIONS

| *Regression Statistics - Private Institutions* | |
|---|---|
| Multiple R | 0.802005052 |
| R Square | 0.643212103 |
| Adjusted R Square | 0.583747454 |
| Standard Error | 2.737003105 |
| Observations | 22 |

ANOVA - Private Institutions

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 243.0900481 | 81.03001603 | 10.81671394 | 0.000271957 |
| Residual | 18 | 134.841348 | 7.491185998 | | |
| Total | 21 | 377.9313961 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -6.107164019 | 3.803314865 | -1.605747679 | 0.125729897 | -14.09763205 | 1.883304007 | -14.09763205 | 1.883304007 |
| Cost | 0.858576748 | 1.117438093 | 0.768343905 | 0.452246301 | -1.48907357 | 3.206227065 | -1.48907357 | 3.206227065 |
| RoR | 3.784517235 | 1.129115913 | 3.351752634 | 0.003551138 | 1.412332728 | 6.156701742 | 1.412332728 | 6.156701742 |
| Cost*RoR | -0.805115997 | 0.358009365 | -2.248868534 | 0.037279809 | -1.557265763 | -0.05296623 | -1.557265763 | -0.05296623 |

*Figure 20.* Summary Output – Bradley-Terry Pairwise Analysis of Responses from Leaders of Private Institutions

Indifference Curve - Public Institutions

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 |
|---|---|---|---|---|---|
| 5% | 20.7084 | 2.64852 | 2.2053 | 0.30521 | -2.2749 |
| 4% | 21.5425 | 19.9539 | 1.33876 | 1.11756 | -3.2271 |
| 3% | 0.37936 | 2.43684 | -0.6394 | -2.3544 | -19.084 |
| 2% | 1.88677 | -1.399 | -0.7518 | -2.6398 | -19.985 |
| 1% | 0 | -1.3815 | -0.7029 | -20.907 | -20.604 |

Cost

Indifference Curve - Public Institutons (Trimmed)

| RoR | $1,000 | $2,000 | $3,000 | $4,000 | $5,000 |
|---|---|---|---|---|---|
| 5% | | 2.64852 | 2.2053 | 0.30521 | -2.2749 |
| 4% | | | 1.33876 | 1.11756 | -3.2271 |
| 3% | 0.37936 | 2.43684 | -0.6394 | -2.3544 | |
| 2% | 1.88677 | -1.399 | -0.7518 | -2.6398 | |
| 1% | 0 | -1.3815 | -0.7029 | | |

Cost

SUMMARY OUTPUT: PUBLIC INSTITUTIONS

| *Regression Statistics- Public Institutions* | |
|---|---|
| Multiple R | 0.869825305 |
| R Square | 0.756596061 |
| Adjusted R Square | 0.716028738 |
| Standard Error | 6.313050893 |
| Observations | 22 |

ANOVA - Public Institutions

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 2229.911157 | 743.3037189 | 18.65038171 | 9.33776E-06 |
| Residual | 18 | 717.3830085 | 39.85461158 | | |
| Total | 21 | 2947.294165 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | 4.18969263 | 8.772558665 | 0.477590722 | 0.638689579 | -14.24076922 | 22.62015448 | -14.24076922 | 22.62015448 |
| Cost | -5.340496191 | 2.577433521 | -2.072020926 | 0.052905341 | -10.75548308 | 0.0744907 | -10.75548308 | 0.0744907 |
| RoR | 4.070897712 | 2.604369066 | 1.563103235 | 0.135438469 | -1.40067866 | 9.542474085 | -1.40067866 | 9.542474085 |
| Cost*RoR | -0.172715568 | 0.825768644 | -0.209157334 | 0.836674252 | -1.907591114 | 1.562159977 | -1.907591114 | 1.562159977 |

*Figure 21.* Summary Output - Bradley-Terry Pairwise Analysis of Responses from Leaders of Public Institutions

Upon examination of the results of the interclass correlation coefficient, presented in Figure 22, the results of the Cronbach's Alpha and the data presented on the scatterplot do not reveal a significant difference in the responses submitted by the leaders of private higher education institutions in the State of North Carolina and the responses submitted by the leaders of public institutions in the State of North Carolina. While the Cronbach's Alpha of 0.607 did not quite meet the standard of 0.70 to indicate an acceptable level of internal consistency between the two variances, the small sample size impacted the reliability of the intraclass correlation coefficient. A larger response rate to the survey may have resulted in an acceptable Cronbach's Alpha of 0.70 or better. A Cronbach's

Alpha of less than 0.607 indicated a questionable level of internal consistency, which contributed to the inconclusive nature of the data analysis. The *p*-value was 0.013, which was indicative of a significant correlation between the two variances. In the scatterplot graph depicted in figure 22 was a definite positive correlation trend displayed, also indicative of a positive correlation relationship between the responses received from the senior leaders of private higher education institutions and the responses received from the senior leaders of public higher education institutions in North Carolina.

**Reliability**

| Cronbach's Alpha | N of Items |
|---|---|
| 0.607 | 2 |

**Intraclass Correlation Coefficient**

| | Intraclass Correlation | Interval Lower Bound | Interval Upper Bound | F Test with True Value 0 Value | df1 | df2 | Sig |
|---|---|---|---|---|---|---|---|
| Single Measures | 0.437 | 0.056 | 0.709 | 2.554 | 23 | 24 | 0.013 |
| Average Measures | 0.608 | 0.106 | 0.830 | 2.554 | 23 | 24 | 0.013 |

One-way random effects model where people effects are random.

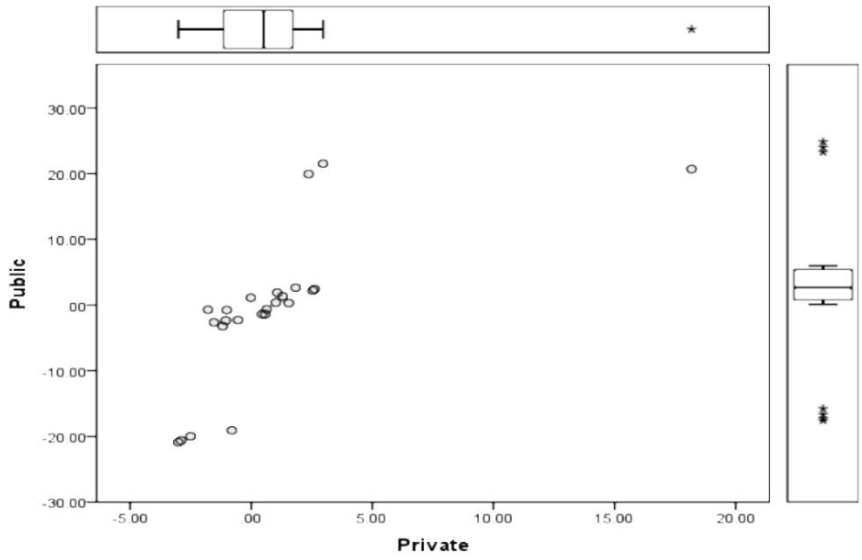



*Figure 22.* Interclass Correlation Coefficient Analysis-Responses from Leaders of Public Versus Private Institutions

Due to this lack of a significant difference in the provided responses, $H3_0$: There is no difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina failed to be rejected.

## Summary

In chapter four, I presented the procedures followed for data collection in both the pilot study and the final study. I also presented and explained the data analysis of the responses received in the final study. While the lower than expected number of usable surveys did have an impact on the results of the survey, a decision was presented for all three research questions.

An analysis of the data associated with the first research question revealed that, according to the responses received, there exists a correlation between the decision to fund a retention program for sophomore students and the costs associated with the implementation of the retention program. Based on this analysis, $H0_1$ was rejected. In a similar fashion, an analysis of the data associated with the second research question revealed that, according to the responses received, there exists a correlation between the decision to fund a retention program for sophomore students and the anticipated increase in the retention of students in the sophomore business unit. based on this analysis, $H0_2$ was rejected. Lastly, the low rate of responses from the senior leaders of public higher education institutions negatively impacted the significance of the responses, which was revealed after an analysis of the data associated with research question three. As a result, $H0_3$ failed to be rejected.

In Chapter five I present the conclusions regarding the data analyses, the additional information that was discovered through the analysis of the results of the final study, and the implication for further study presented. I also explain some additional information that I uncovered regarding the limitations during the administration of the final study. Finally, the possibility of generalization of the findings is presented.

## Chapter 5 - Recommendations and Conclusions

This quantitative study was designed to explore to what extent, if any, there exists a correlation between the decision-making process for the management of institution funds (dependent variable) and the cost of implementing retention programming for students in the sophomore strategic business unit (independent variable) in North Carolina. The population of this study consisted of 49 senior academic officers, most commonly the provost, of the public and private higher education institutions in North Carolina. Another purpose of the study was to determine to what extent, if any, there is a correlation between the decision-making process for the management of institution funds (dependent variable) and the anticipated increase in retention of students in the sophomore strategic business unit (independent variable) at higher education institutions in North Carolina. I also wanted to determine if there is a significant difference in the decision-making process for the management of institution funds between public and private academic higher education institutions in North Carolina regarding the implementation of retention programming for students in the sophomore strategic business unit when the cost and anticipated increase in student retention varies.

In chapter 4, I presented the pilot study, the data collection, and the data analysis as well as an explanation of the limited level of participation in the main study. Regardless of the limited participation, decisions were presented for the three tests of the null hypotheses. The null hypothesis for both $RQ_1$ and $RQ_2$ were rejected, while the null hypothesis for $RQ_3$ failed to be rejected.

In the nature of the study, I attempted to determine if the decision-making process of the senior leaders of public and private higher education institutions in North Carolina differentiate regarding funding for sophomore-level retention programming when the cost and anticipated increase in student retention varies. I used a quantitative design to discover the existence of a correlation between the dependent variable, the decision-making process for funding retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina; and the two independent variables: the cost of program implementation; and the anticipated increase in student retention in the sophomore strategic business unit.

As this was an experimental correlation study, there was no treatment. The study consisted of a single observation of the opinions regarding the management of funds for the implementation of a retention program as different applications of the independent variables were presented in relation to the dependent variable.

## Interpretation of the Findings

The statistical analysis of the data collected as presented in Chapter 4 supported the arguments presented in Chapter 2. The responses of the 49 senior leaders to the Likert-type questions reflected a tendency to express a higher level of risk aversion as the cost of development and implementation of retention programming for students in the sophomore strategic business unit increased. In contrast, the responses to the pairwise analysis indicated that the level of risk adversity was reduced as the anticipated increase in sophomore student retention grew. The difference in the responses may indicate that the senior leaders of higher education institutions may be making decisions while

influenced by a condition known as cognitive dissonance. Salti, et al. (2014) described cognitive dissonance as episodic memory regarding past decision-making choices, which can prevent an individual from remembering how they decided similar prior situations (Salti, El Karoui, Maillet, Naccache, & Daunizeau, 2014). Salti, et al. surmised that individuals with cognitive dissonance might also be influenced by past decisions, regarding past decisions as a set pattern from which no deviation is allowed. The effects of cognitive dissonance on the management decision-making process might be explained further by additional research. The participants responded to the Likert-type questions in a more conservative manner than they responded to the pairwise analysis questions. Support for the presence of an inverse relationship between risk-aversive fund management decisions and increases in both the cost of program development and implementation, and in the anticipated sophomore student retention was evidenced by the Bradley-Terry pairwise analysis and presented graphically by the various indifference curves and the Cronbach's Alpha analysis in Chapter 4.

**Research Question 1**

$RQ_1$: To what extent, if any, is there a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina?

*$H1_0$:* There is no correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming

and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

*$H1_a$:* There is a correlation between the decision-making process for funding the development and implementation of sophomore-level retention programming and the annual implementation cost of retention programming at institutions of higher education in North Carolina.

The results of the regression analysis of the Likert-type questions revealed a maximum inter-item correlation of 0.630, coupled with the low *p*-value of 0.000, which indicated the existence of a significant correlation between the decision-making process for funding retention programming for students in the sophomore strategic business unit at higher education institutions in North Carolina and the costs of retention programming. An examination of the Bradley-Terry pairwise analysis revealed that the $R^2$ value of 0.93 coupled with the low *p*-value of 9.76827E-11, also indicated the existence of a significant correlation between decision-making for funding sophomore-level retention programming at higher education institutions in North Carolina and the costs of retention programming. Based on the results of the data analysis, the null hypothesis $H1_0$ for $RQ_1$ was rejected.

The rejection of the null hypothesis $H1_0$ supported the theory that the variables of cost and risk aversion have a direct relationship. I assumed that as the cost for sophomore-level retention programming for students in the sophomore strategic business unit rises, the funding decisions of senior leaders of higher education institutions in the State of North Carolina become more conservative as the level of risk aversion also rises.

The data analysis presented in Chapter 4 proved that, according to the responses received, the assumption for $RQ_1$ was supported by the data collected in this study.

**Research Question 2**

$RQ_2$: To what extent, if any, is there a correlation between the decision-making process regarding for funding sophomore-level retention programming and the anticipated increase in the retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina?

$H2_0$: There is no correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

$H2_a$: There is a correlation between the decision-making for funding sophomore-level retention programming and the anticipated increase in retention of students in a sophomore strategic business unit at institutions of higher education in North Carolina.

The Likert-type questions were designed to gauge the level of risk aversion expressed by senior leaders of higher education institutions in North Carolina. Questions fifteen and nineteen were designed to address $RQ_2$. The responses to questions 15 and 19 are divided into four separate data analyses. The first analysis presented contained the data from the senior leaders who responded with either a "4" or a "5" for question 15. An analysis of the data presented for question 15 revealed that for the responses of "4" and "5", the $R^2$ factor 0.596343474 coupled with the low *p*-value of 0.000337992 indicated the existence

of a significant correlation between the decision-making process regarding the management of funds for retention programming for students in the sophomore strategic business unit and the anticipated increase in the retention of students in sophomore-level retention at higher education institutions in North Carolina.

The second analysis contained the data from the senior leaders who responded with either "1," "2," or "3" for question 15. An analysis of the data for question 15 revealed that for the responses of "1," "2," and "3," the $R^2$ factor 0.640310604 coupled with the low *p*-value of 0.000110002 indicated the existence of a significant correlation between the decision-making process for funding sophomore-level retention programming and the anticipated increase in the retention of students in the sophomore strategic business unit at higher education institutions in North Carolina.

The third analysis contained the data from the senior leaders who responded with either "4" or "5" for question 19. An analysis of the data presented for question 19 revealed that for the responses of "4" and "5," the $R^2$ factor of 0.72200329 coupled with the low *p*-value of 8.81666E-06 indicated the existence of a significant correlation between the decision-making process for funding sophomore strategic business unit retention programming and the anticipated increase in the retention of students in the sophomore-level retention at higher education institutions in North Carolina.

The fourth analysis presented contained the data from the senior leaders who responded with either "1," "2," or "3" for question 19. An analysis of the data presented for question nineteen revealed that for the responses of "1," "2," and "3, the $R^2$ factor 0.62602437 coupled with the low *p*-value of 0.000160811 indicated the existence of a

significant correlation between decision-making for funding sophomore strategic business unit retention programming and the anticipated increase in the retention of sophomore-level retention at higher education institutions in North Carolina.

Based on the statistical analysis of the data, $H2_0$ was rejected. The rejection of the null hypothesis $H2_0$ supports the theory that the variables of anticipated increases in the retention of students in the sophomore strategic business unit and risk aversion have an inverse relationship. I assumed that as the anticipated increase in the retention of students in the sophomore strategic business unit rose, the funding decisions of senior leaders of higher education institutions in North Carolina become less conservative as the level of risk aversion falls. The data analysis presented in Chapter 4 suggested that, according to the responses received, the assumption for $RQ_2$ was supported by the data collected in this study.

**Research Question 3**

$RQ_3$: What is the difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina?

$H3_0$: There is no difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

$H3_a$: There is a difference in the decision-making process for funding the development and implementation of sophomore-level retention programming between public and private institutions of higher education in North Carolina.

The response rate to the survey created a sample that was skewed in favor of private higher education institutions. A comparison of the responses, which consisted of the summary regression output and indifference curve information revealed that the responses provided by the senior leaders of private higher education institutions did not significantly differ from the responses provided by the senior leaders of public higher education institutions regarding decision-making for funding the development and implementation of retention programming for students in the sophomore strategic business unit. The Cronbach's Alpha value of 0.607 did not meet the minimum standard of 0.70 for an acceptable level of internal consistency between the variance of the responses received from senior leaders of private institutions when compared to the variance of the responses received from senior leaders of public higher education institutions in North Carolina. The low *p*-value of 0.013 and the scatterplot graphic representation were both indicative of a significant positive correlation relationship between responses received from the senior leaders of private higher education institutions and the responses received from the senior leaders of public higher education institutions in North Carolina.

Based on the questionable Cronbach's Alpha of 0.607 and the low *p*-value of 0.013, $H3_0$ failed to be rejected. The failure to reject the null hypothesis $H3_0$ is a result of a failure to prove that when based on the variables of cost of sophomore-level retention programming and anticipated increase in sophomore-level retention, the funding decisions are significantly different between the senior leaders of public and private higher education institutions in North Carolina. I assumed that as the cost of development

and implementation of retention programming for students in the sophomore strategic business unit and as the anticipated increase in the retention of students in the sophomore strategic business unit rises, the fund management decisions of senior leaders of higher education institutions in the State of North Carolina would differ between private and public higher education institutions. This assumption was based on the idea that the income stream of private higher education institutions are largely tuition driven, while the income stream of public higher education institutions are less derived directly from tuition dollars. The data analysis presented in Chapter 4 proved that, according to the responses received, the assumption for $RQ_3$ was not supported by the data collected in this study.

## Limitations of the Study

There were several limitations of the study, some of which had an effect of the results of the final study. The first limitation of the study was having a sample population of senior leaders of higher education institutions in North Carolina, which may limit the ability to apply the results to higher education institutions in other states. A second limitation was that at the time of the study, I was employed by a private institution of higher education in North Carolina. As an employee of a private institution of higher education, I was more familiar with the decision-making processes of private institutions than with the decision-making processes of public institutions. This familiarity did not constitute bias on my part in favor of the decision-making processes of private higher education institutions.

## Recommendations

The need to increase the limited amount of participation is the first recommendation. A larger participation rate may have provided an improved data set regarding the rejection of $H0_3$, which failed to be rejected partially due to the level of responses to the survey. The participation rate may have improved by offering some form of recompense for completion of the survey. Offering compensation to participants was avoided in this study, as Zutlevics (2016), found that the practice of offering recompense for participation in a research project can be viewed as a questionable practice among researchers, especially when the offer of recompense is made specifically to increase the participation rate.

The second recommendation for future researchers is designing a survey that collects more demographic information from the participants. Additional demographic information such as the name of the institution where the participant was employed at the time of the study may have facilitated the communication process between the participants and myself. Such demographic information would have been helpful when attempting to determine which participants should be contacted to request that he or she complete the survey.

A third recommendation is to design a survey that contains instructional information for the participants. Additional instructions designed to provide clarifying information to the participants may have reduced the number of incomplete surveys. Additional instructions may have identified to the participant when he or she completed one section of the survey and entered another section of the survey. More instructional

information at the beginning of the pairwise analysis section, as well as in between each subsection may have reduced participant confusion, thereby increasing the number of usable surveys.

## Implications

This research study was designed to address a gap in the literature about the decision-making process regarding funding for retention programming for students in the sophomore strategic business unit in both private and public higher education institutions in North Carolina. The results of the study indicated that there is a correlation between the dependent variable (decision-making for funding sophomore-level retention programming) and both the independent variables (cost of retention programming and anticipated increase in sophomore-level retention). Further quantitative research into the decision-making process regarding the management of funds for the development and implementation of retention programming for students in the sophomore strategic business unit may show that the results represented in this study are unique to North Carolina, or that the decision-making for sophomore-level retention programming is similar in other states.

The third research question was designed to determine if there was a difference in the decision-making process between public and private higher education institutions in North Carolina regarding funding retention programming for students in the sophomore strategic business unit. The failure to reject $H0_3$ was attributed to the participant response rate. In the future, researchers who wish to replicate the study should conduct a research study using a larger population, which may provide enough data to conclusively

determine the existence of a difference between senior leaders of public and private institutions regarding the decision-making process for funding sophomore-level retention programming.

Qualitative research could explore the underlying factors from the shared experiences of the senior leaders of higher education institutions that drive the decision-making process for funding sophomore-level retention programming to determine if there are factors that affect the process depending upon whether the institution of higher education is a private or a public institution.

The results of this study and any further research based on this study could assist the senior leaders of higher education institutions with the management decision-making process by providing additional insight into how Loomes and Sugden's (1982) regret theory explains the relationship between the cost for sophomore-level retention programming, the anticipated increase in retention of students in the sophomore strategic business unit, and the level of risk aversion experienced by the senior leaders of higher education institutions. The variables examined in this study represent elements that could have a significant effect on the decision-making process as senior leaders of higher education institutions consider the management of institutional funds for student retention programming.

The results of this study, if considered by senior leaders of higher education institutions, could improve the fund management decision-making process. Such an improvement may lead to a positive social change in the form of increased student retention, higher graduation rates, and ultimately, a better-educated society. An increase

in student retention in the sophomore strategic business unit may also lead to positive social change by increasing the number of fiscally independent citizens. This potential increase in fiscally independent citizens, in turn, may create positive social change through a reduction in the default rate on federally funded student loans, and an increase in the amount of tax dollars that flow through the federal government. Both scenarios presented above may allow the United States government to redirect funds to assist citizens in need, without having to find budgetary cuts to provide basic services to all citizens of the United States.

## Summary

This research study was undertaken to address a gap in the literature regarding the decision-making processes for funding sophomore-level retention programming by senior leaders of higher education institutions in North Carolina, based on the interaction of cost and anticipated increases in student retention. The rejection of $H0_1$ as presented in Chapter 4 has led to the conclusion that there is a significant relationship between the decision-making process regarding the management of institution funds (dependent variable) and the cost of retention programming for students in the sophomore strategic business unit (independent variable). The rejection of $H0_2$ as presented in Chapter 4 has led to the conclusion that there is a significant relationship between the decision-making process regarding the management of institution funds (dependent variable) and the anticipated increase in sophomore-level student retention (independent variable) at higher education institutions in North Carolina. The failure to reject $H0_3$ as presented in Chapter 4 has led to the conclusion that a difference in the decision-making for funding

sophomore-level student retention programs between public and private higher education institutions in North Carolina cannot be proven by the data collected in this study.

The results of the data analysis revealed that the answers provided by the participants in the Likert-type question section of the survey indicated a higher level of risk aversion to allocating institutional funds for retention programming for students in the sophomore strategic business unit as the cost of the programming rises, regardless of the rate of anticipated increase in student retention of students in the sophomore strategic business unit. Conversely, the answers provided by the participants in the pairwise analysis question section of the survey indicated a lower level of risk aversion to allocating larger amounts of institutional funds for sophomore-level retention programming for students as the anticipated increases in student retention of students in the sophomore strategic business unit increases. This difference in responses could be a catalyst for further research to determine the reasons behind the variances in response patterns between the two types of questions included in the survey, to include the possibility that senior leaders may be unaware of a difference between how a leader perceives how he or she makes a program funding decision and how a leader actually makes a program funding decision in an environment of increasing complexity and risk.

The results of this study indicated that the senior leaders of private and public higher education institutions in North Carolina are facing the same dilemma that has been noted in the literature of higher education for decades (Raju & Schumacker, 2015). These senior leaders try to balance the provision of institutional support (through retention programming) to students while remaining fiscally responsible with institutional funds.

As senior leaders turn their attention to the retention of students in the sophomore level strategic business unit, the results of this study may assist those senior leaders in understanding the relationship between program cost, the anticipated increase in student retention, and the management of institutional funding for retention programming.

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# Appendix A: Survey Questions

## Likert-type Survey Questions

1. To what extent does my institution consider the implementation of retention programming for sophomore students?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

2. When deciding to fund a retention program, to what extent is the cost of the program the primary concern?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

3. When making a retention program fund allocation decision, to what extent do I consider the retention programming decisions of leaders of institutions of higher education that are similar to my institution?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

4. To what extent do I experience a sense of regret after deciding to allocate funding for one particular retention program rather than another retention program?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

5. To what extent does the likelihood of program implementation decrease proportionately as the projected cost of implementation increases?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

6. To what extent do I generally compare all the possible alternatives before choosing to fund a particular retention program?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

7. To what extent do I start the retention program funding decision process with a clear vision of the program I want?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

8. To what extent do I second guess a retention programming fund allocation decision?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

9. To what extent do I seek out retention program alternatives that fulfill what I have envisioned at the lowest possible cost?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

10. When making fund allocation retention programming decision, to what extent do I believe that the program that leads to the highest anticipated retention rate is the best choice, regardless of cost?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

11. To what extent do I feel it is important to identify retention programs that can be funded through grants?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

12. To what extent do I believe that a balance must exist between the cost to implement a retention program and the tuition dollars gained by the retained students?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

13. To what extent do I make retention fund allocation decisions based solely on the anticipated increase in student retention?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Occasionally | Frequently | Very Frequently |

14. The institution of higher education that I represent can best be described as:
    a. A Public Institution of Higher Education
    b. A Private Institution of Higher Education

The following questions are representative of the pairwise analysis question bank. There are 400 questions in the entire pairwise analysis question bank. Participants will be asked to complete 25 pairwise analysis questions that will be randomly chosen from the bank for each participant.

## Pairwise Evaluation (Two Samples from Each Subsection)

**Subsection 1:**

1. Which funding decision would you most likely support?
    a. Invest $ 1,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 2% increase in sophomore student retention
2. Which funding decision would you most likely support?
    a. Invest $ 1,000 per sophomore student to yield a 3% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 1% increase in sophomore student retention

**Subsection 2:**

1. Which funding decision would you most likely support?
    a. Invest $ 2,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 5,000 per sophomore student to yield a 4% increase in sophomore student retention

2. Which funding decision would you most likely support?
    a. Invest $ 2,000 per sophomore student to yield a 3% increase in sophomore student retention
    b. Invest $ 4,000 per sophomore student to yield a 2% increase in sophomore student retention

**Subsection 3:**

1. Which funding decision would you most likely support?
    a. Invest $ 3,000 per sophomore student to yield a 2% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 5% increase in sophomore student retention
2. Which funding decision would you most likely support?
    a. Invest $ 3,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 2% increase in sophomore student retention

**Subsection 4:**

1. Which funding decision would you most likely support?
    a. Invest $ 4,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 1,000 per sophomore student to yield a 5% increase in sophomore student retention

2. Which funding decision would you most likely support?
    a. Invest $ 4,000 per sophomore student to yield a 5% increase in sophomore student retention
    b. Invest $ 2,000 per sophomore student to yield a 1% increase in sophomore student retention

**Subsection 5:**

1. Which funding decision would you most likely support?
    a. Invest $ 5,000 per sophomore student to yield a 5% increase in sophomore student retention
    b. Invest $ 4,000 per sophomore student to yield a 3% increase in sophomore student retention
2. Which funding decision would you most likely support?
    a. Invest $ 5,000 per sophomore student to yield a 1% increase in sophomore student retention
    b. Invest $ 1,000 per sophomore student to yield a 3% increase in sophomore student retention

## Appendix B: Test for Multicollinearity

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q7 | 0.382 | 2.615 |
| | Q8 | 0.250 | 3.999 |
| | Q9 | 0.362 | 2.765 |
| | Q10 | 0.230 | 4.350 |
| | Q11 | 0.520 | 1.922 |
| | Q12 | 0.518 | 1.932 |
| | Q13 | 0.272 | 3.670 |
| | Q14 | 0.234 | 4.272 |
| | Q15 | 0.539 | 1.855 |
| | Q16 | 0.391 | 2.561 |
| | Q17 | 0.334 | 2.992 |
| | Q18 | 0.464 | 2.156 |
| | Q19 | 0.331 | 3.025 |

a. Dependent Variable: Q6

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q8 | 0.246 | 4.067 |
| | Q9 | 0.411 | 2.431 |
| | Q10 | 0.258 | 3.883 |
| | Q11 | 0.534 | 1.871 |
| | Q12 | 0.490 | 2.039 |
| | Q13 | 0.279 | 3.589 |
| | Q14 | 0.269 | 3.720 |
| | Q15 | 0.576 | 1.737 |
| | Q16 | 0.433 | 2.308 |
| | Q17 | 0.332 | 3.010 |
| | Q18 | 0.464 | 2.154 |
| | Q19 | 0.331 | 3.020 |
| | Q6 | 0.591 | 1.691 |

a. Dependent Variable: Q7

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q9 | 0.372 | 2.688 |
| | Q10 | 0.273 | 3.659 |
| | Q11 | 0.519 | 1.927 |
| | Q12 | 0.557 | 1.795 |
| | Q13 | 0.402 | 2.486 |
| | Q14 | 0.370 | 2.701 |
| | Q15 | 0.538 | 1.859 |
| | Q16 | 0.465 | 2.149 |
| | Q17 | 0.465 | 2.151 |
| | Q18 | 0.464 | 2.153 |
| | Q19 | 0.472 | 2.119 |
| | Q6 | 0.588 | 1.702 |
| | Q7 | 0.373 | 2.678 |

a. Dependent Variable: Q8

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q10 | 0.208 | 4.817 |
| | Q11 | 0.536 | 1.866 |
| | Q12 | 0.488 | 2.049 |
| | Q13 | 0.375 | 2.664 |
| | Q14 | 0.232 | 4.312 |
| | Q15 | 0.552 | 1.812 |
| | Q16 | 0.391 | 2.557 |
| | Q17 | 0.335 | 2.985 |
| | Q18 | 0.457 | 2.189 |
| | Q19 | 0.331 | 3.020 |
| | Q6 | 0.577 | 1.732 |
| | Q7 | 0.424 | 2.356 |
| | Q8 | 0.253 | 3.956 |

a. Dependent Variable: Q9

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q11 | 0.518 | 1.930 |
| | Q12 | 0.567 | 1.765 |
| | Q13 | 0.267 | 3.746 |
| | Q14 | 0.409 | 2.443 |
| | Q15 | 0.588 | 1.701 |
| | Q16 | 0.459 | 2.177 |
| | Q17 | 0.476 | 2.101 |
| | Q18 | 0.446 | 2.242 |
| | Q19 | 0.344 | 2.907 |
| | Q6 | 0.642 | 1.558 |
| | Q7 | 0.465 | 2.151 |
| | Q8 | 0.325 | 3.079 |
| | Q9 | 0.363 | 2.754 |

a. Dependent Variable: Q10

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q12 | 0.510 | 1.959 |
| | Q13 | 0.270 | 3.703 |
| | Q14 | 0.252 | 3.971 |
| | Q15 | 0.545 | 1.836 |
| | Q16 | 0.390 | 2.563 |
| | Q17 | 0.341 | 2.932 |
| | Q18 | 0.457 | 2.189 |
| | Q19 | 0.333 | 3.004 |
| | Q6 | 0.579 | 1.727 |
| | Q7 | 0.385 | 2.600 |
| | Q8 | 0.246 | 4.067 |
| | Q9 | 0.374 | 2.676 |
| | Q10 | 0.207 | 4.841 |

a. Dependent Variable: Q11

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q13 | 0.272 | 3.675 |
| | Q14 | 0.261 | 3.832 |
| | Q15 | 0.533 | 1.877 |
| | Q16 | 0.418 | 2.390 |
| | Q17 | 0.411 | 2.430 |
| | Q18 | 0.449 | 2.227 |
| | Q19 | 0.429 | 2.332 |
| | Q6 | 0.613 | 1.632 |
| | Q7 | 0.375 | 2.665 |
| | Q8 | 0.281 | 3.564 |
| | Q9 | 0.362 | 2.764 |
| | Q10 | 0.240 | 4.165 |
| | Q11 | 0.543 | 1.843 |

a. Dependent Variable: Q12

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q14 | 0.257 | 3.885 |
| | Q15 | 0.551 | 1.815 |
| | Q16 | 0.399 | 2.506 |
| | Q17 | 0.342 | 2.928 |
| | Q18 | 0.449 | 2.228 |
| | Q19 | 0.410 | 2.436 |
| | Q6 | 0.597 | 1.674 |
| | Q7 | 0.395 | 2.533 |
| | Q8 | 0.375 | 2.665 |
| | Q9 | 0.516 | 1.940 |
| | Q10 | 0.210 | 4.771 |
| | Q11 | 0.532 | 1.880 |
| | Q12 | 0.504 | 1.984 |

a. Dependent Variable: Q13

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q15 | 0.601 | 1.664 |
| | Q16 | 0.433 | 2.312 |
| | Q17 | 0.370 | 2.704 |
| | Q18 | 0.484 | 2.067 |
| | Q19 | 0.344 | 2.905 |
| | Q6 | 0.588 | 1.702 |
| | Q7 | 0.436 | 2.292 |
| | Q8 | 0.396 | 2.528 |
| | Q9 | 0.365 | 2.743 |
| | Q10 | 0.368 | 2.718 |
| | Q11 | 0.568 | 1.761 |
| | Q12 | 0.553 | 1.807 |
| | Q13 | 0.295 | 3.393 |

a. Dependent Variable: Q14

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q16 | 0.401 | 2.494 |
| | Q17 | 0.334 | 2.993 |
| | Q18 | 0.467 | 2.142 |
| | Q19 | 0.343 | 2.912 |
| | Q6 | 0.587 | 1.704 |
| | Q7 | 0.405 | 2.467 |
| | Q8 | 0.249 | 4.011 |
| | Q9 | 0.376 | 2.657 |
| | Q10 | 0.229 | 4.362 |
| | Q11 | 0.533 | 1.877 |
| | Q12 | 0.490 | 2.040 |
| | Q13 | 0.274 | 3.654 |
| | Q14 | 0.261 | 3.837 |

a. Dependent Variable: Q15

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q17 | 0.457 | 2.189 |
| | Q18 | 0.465 | 2.152 |
| | Q19 | 0.433 | 2.310 |
| | Q6 | 0.578 | 1.731 |
| | Q7 | 0.414 | 2.413 |
| | Q8 | 0.293 | 3.412 |
| | Q9 | 0.363 | 2.758 |
| | Q10 | 0.243 | 4.109 |
| | Q11 | 0.519 | 1.928 |
| | Q12 | 0.523 | 1.912 |
| | Q13 | 0.269 | 3.713 |
| | Q14 | 0.255 | 3.922 |
| | Q15 | 0.545 | 1.835 |

a. Dependent Variable: Q16

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q18 | 0.451 | 2.215 |
| | Q19 | 0.475 | 2.103 |
| | Q6 | 0.581 | 1.722 |
| | Q7 | 0.373 | 2.679 |
| | Q8 | 0.344 | 2.908 |
| | Q9 | 0.365 | 2.743 |
| | Q10 | 0.296 | 3.376 |
| | Q11 | 0.532 | 1.878 |
| | Q12 | 0.604 | 1.655 |
| | Q13 | 0.271 | 3.693 |
| | Q14 | 0.256 | 3.905 |
| | Q15 | 0.533 | 1.876 |
| | Q16 | 0.536 | 1.864 |

a. Dependent Variable: Q17

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q19 | 0.328 | 3.053 |
| | Q6 | 0.600 | 1.667 |
| | Q7 | 0.388 | 2.576 |
| | Q8 | 0.256 | 3.911 |
| | Q9 | 0.370 | 2.701 |
| | Q10 | 0.207 | 4.839 |
| | Q11 | 0.531 | 1.884 |
| | Q12 | 0.491 | 2.038 |
| | Q13 | 0.265 | 3.775 |
| | Q14 | 0.249 | 4.011 |
| | Q15 | 0.555 | 1.803 |
| | Q16 | 0.406 | 2.461 |
| | Q17 | 0.336 | 2.976 |

a. Dependent Variable: Q18

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Q6 | 0.584 | 1.713 |
| | Q7 | 0.378 | 2.647 |
| | Q8 | 0.355 | 2.820 |
| | Q9 | 0.366 | 2.732 |
| | Q10 | 0.217 | 4.598 |
| | Q11 | 0.528 | 1.894 |
| | Q12 | 0.640 | 1.563 |
| | Q13 | 0.331 | 3.025 |
| | Q14 | 0.242 | 4.131 |
| | Q15 | 0.557 | 1.796 |
| | Q16 | 0.516 | 1.936 |
| | Q17 | 0.483 | 2.070 |
| | Q18 | 0.447 | 2.237 |

a. Dependent Variable: Q19

## Appendix C: Sample Pairwise Comparison Data

| P | C | 11 | 12 | 13 | 14 | 15 | 21 | 22 | 23 | 24 | 25 | 31 | 32 | 33 | 34 | 35 | 41 | 42 | 43 | 44 | 45 | 51 | 52 | 53 | 54 | 55 | Q # | Rev. Q # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 106 |
| 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 110 |
| 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 114 |
| 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 118 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 207 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 211 |
| 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 215 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 219 |
| 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 308 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 312 |
| 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 316 |
| 1 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 64 | 320 |
| 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 81 | 409 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 82 | 413 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 83 | 417 |
| 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 84 | 421 |

# Appendix D: Summary Output: Regression Analysis

SUMMARY OUTPUT: ALL RESPONSES

| *Regression Statistics* | |
|---|---|
| Multiple R | 0.835563669 |
| R Square | 0.698166645 |
| Adjusted R Square | 0.647861086 |
| Standard Error | 3.651513014 |
| Observations | 22 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 555.1496569 | 185.0498856 | 13.87851871 | 6.25215E-05 |
| Residual | 18 | 240.0038513 | 13.33354729 | | |
| Total | 21 | 795.1535082 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -8.367189709 | 5.074109599 | -1.648996646 | 0.11649101 | -19.0274984 | 2.293118982 | -19.0274984 | 2.293118982 |
| Cost | 1.465307606 | 1.490805667 | 0.982896456 | 0.338686262 | -1.666758876 | 4.597374089 | -1.666758876 | 4.597374089 |
| RoR | 5.779440599 | 1.506385375 | 3.836628192 | 0.001208598 | 2.614642363 | 8.944238835 | 2.614642363 | 8.944238835 |
| Cost*RoR | -1.370659252 | 0.477630389 | -2.869706963 | 0.010190041 | -2.374123463 | -0.367195042 | -2.374123463 | -0.367195042 |

SUMMARY OUTPUT: PRIVATE INSTITUTIONS

| *Regression Statistics - Private Institutions* | |
|---|---|
| Multiple R | 0.802005052 |
| R Square | 0.643212103 |
| Adjusted R Square | 0.583747454 |
| Standard Error | 2.737003105 |
| Observations | 22 |

ANOVA - Private Institutions

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 243.0900481 | 81.03001603 | 10.81671394 | 0.000271957 |
| Residual | 18 | 134.841348 | 7.491185998 | | |
| Total | 21 | 377.9313961 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -6.107164019 | 3.803314865 | -1.605747679 | 0.125729897 | -14.09763205 | 1.883304007 | -14.09763205 | 1.883304007 |
| Cost | 0.858576748 | 1.117438093 | 0.768343905 | 0.452246301 | -1.48907357 | 3.206227065 | -1.48907357 | 3.206227065 |
| RoR | 3.784517235 | 1.129115913 | 3.351752634 | 0.003551138 | 1.412332728 | 6.156701742 | 1.412332728 | 6.156701742 |
| Cost*RoR | -0.805115997 | 0.358009365 | -2.248868534 | 0.037279809 | -1.557265763 | -0.05296623 | -1.557265763 | -0.05296623 |

SUMMARY OUTPUT: PUBLIC INSTITUTIONS

| *Regression Statistics- Public Institutions* | |
|---|---|
| Multiple R | 0.869825305 |
| R Square | 0.756596061 |
| Adjusted R Square | 0.716028738 |
| Standard Error | 6.313050893 |
| Observations | 22 |

ANOVA - Public Institutions

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 3 | 2229.911157 | 743.3037189 | 18.65038171 | 9.33776E-06 |
| Residual | 18 | 717.3830085 | 39.85461158 | | |
| Total | 21 | 2947.294165 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | 4.18969263 | 8.772558665 | 0.477590722 | 0.638689579 | -14.24076922 | 22.62015448 | -14.24076922 | 22.62015448 |
| Cost | -5.340496191 | 2.577433521 | -2.072020926 | 0.052905341 | -10.75548308 | 0.0744907 | -10.75548308 | 0.0744907 |
| RoR | 4.070897712 | 2.604369066 | 1.563103235 | 0.135438469 | -1.40067866 | 9.542474085 | -1.40067866 | 9.542474085 |
| Cost*RoR | -0.172715568 | 0.825768644 | -0.209157334 | 0.836674252 | -1.907591114 | 1.562159977 | -1.907591114 | 1.562159977 |