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Administrative Structural Variables: Towards greater Retention and Efficiencies

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Administrative structural variables: towards greater retention and efficiencies

by

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ABSTRACT

Combining institutional data and measures with predictive analyses is a viable means by which to determine where and how to allocate all too limited institutional resources and programming. There are not many among us who would argue against the richness of data and depth of understanding of a phenomenon that are gained through focus groups and interviews and other qualitative research methods. However, these techniques are both time-consuming and expensive. Furthermore, it has been my experience that these types of research methods make for great research publications but rarely lead to timely, substantive, or continually evolving structural change within the academy. I propose that we be probabilistic, using our data to tell us where we will get the most bang for our retention and matriculation efforts. Using the knowledge of what has happened to establish both causal links between outcomes for departments, programs, and discount rates based on valid and reliable measures of success allows us to quickly and efficiently explore what is working as well as providing valuable information about the areas that we need to improve upon.

The research presented within explores the effects of departmental, programmatic, and financial aid leveraging strategies employed by institutions of higher education and the effect that they have on retention and or graduation. Utilizing secondary data reflective of a Research One University, a private not-for-profit liberal arts college and four-year public and private not-for-profit baccalaureate degree or higher-granting IPEDS institutions we explore the effects of structural manipulations on success outcomes. The author hopes that this work will add to the corpus of research on retention as well as provide new insights into how institutions can most effectively maximize retention and graduation efforts.

CHAPTER 1

INTRODUCTION

Retention has been theorized about for over a generation. Most research on student persistence and retention focuses on the experiences of undergraduate students representing a large body of research that explores social and organization factors which impact student retention in higher education (Astin, 1984; Bean, 1981; Pascarella & Terenzini, 1991; Tinto, 1975, 1993) The bulk of retention research has focused on social and academic integration, holding the aforementioned two aspects as key to student retention. Though the integration model espoused by Tinto is probably the most commonly employed model in student retention literature, it is not without its critics (Draper, 2003; McCubbin, 2003). Early criticism of Tinto's model was that some important external factors, i.e., finances, were not considered—a concern he directly addresses in his more recent work (Tinto & Pusser, 2006).

The impact of structural factors on student persistence remains a critical issue for many colleges and universities in the United States. This issue exists because attrition or dropout rates remain at unacceptable levels—for students, families, elected representatives, the media, employers, and institutions of higher learning. Scholars such as Bean have found that structural factors influence student persistence and rates of attrition and retention. I attempt to add to the literature by exploring the feasibility of using institutional specific and secondary data, proposing that aggregate measures of departmental usage, program membership or discount rates are valid and reliable structural variables.

Graduation and retention are two of a select few measures of success that are used to compare across institutions to measure student and institutional progress. Because of their prominence as measures of success, researchers have for decades sought to explore what elements encourage retention.

These two measures are reported in mandated federal reporting about an institution and are currently being discussed in state legislative committees about higher education funding. Thus far, 12 states have enacted "Performance Funding for Higher Education" legislation, which ties funding to completed courses and degree attainment in lieu of its predecessor, the full-time equivalent model, which awarded funding based on enrollment. Four states are in the process of the transition and 19 state legislatures are holding serious discussions on the matter. Only 15 states and the District of Columbia are not having at least a formal discussion on the matter (NCSL, 2013).

This document will explore three different structural variable scenarios. In Chapter 2, we will examine the role that Dining Services plays in engaging and retaining students while seeking avenues by which they can simultaneously increase market capitalization at research one university in the Midwest. The contributions made by dining services at times go both unheralded and underappreciated by the academy, although there is plenty of data that speak to the pivotal role of community builder or engagement facilitator that dining services plays within the institution (Brown, 2008; Harley & Morhew, 2008; Kennedy, 2001; Lawn, 2008). Therefore, this evaluation will focus on means by which MWUDS can increase their market share/profitability without interrupting engagement facilitation.

In Chapter three, we examine the programmatic effects on retention and graduation at a private not-for-profit liberal arts college in the Midwest. This offers a means by which institutional data—secondary data—such as grade point average, admission rankings, funding, program membership, etc.—can be used in conjunction with predictive modeling to implement programming and allocate resources to positively impact retention and/or graduation. That is, by using institutional data about which student belonged or participated in which program we can

estimate predictive models that estimate said membership effect on retention and or graduation. Allowing us to forego a deep understanding of why the program works and focus on the more immediate task of replication in order to positively affect retention and or graduation rates.

Lastly, Chapter 4 will explore the effects of financial aid leveraging strategies employed by institutions utilizing secondary data reflective of four-year public and private not-for-profit baccalaureate degree or higher-granting IPEDS institutions. Exploring the impact of financial aid on retention from the perspective of the student effectively ignores the institutional decision of how much net tuition revenue per student to generate. To my knowledge the research exploring the impact of financial aid on retention disregards the reality that academic institutions are operated like businesses. By doing so, the prior research overlooks the institutions' natural disposition to protect their bottom lines, which means keeping discount rates low and net tuition revenue per student high. This practice is part of a larger concept within enrollment management known as financial aid leveraging. Additionally, no research exploring the impact of financial aid dollars employs the use of a global (Integrated Postsecondary Education Data System [IPEDS] universe) dataset.

Attrition continues to challenge educational systems. Over time, the percentage of students who drop out of traditional higher education institutions[1] has been relatively constant, ranging between 40-45% for the past 100 years (Tinto, 1982). The shear gravity of the body of research on retention, and the vastness of the theoretical frameworks and models that have been put forth to explain, describe, or predict student persistence, illuminates the fact that retention has no simple explanation or parsimonious solution that will help students complete their

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[1] Traditional higher education institutions are defined as those with physical or brick and mortar locations.

academic programs or fulfill their goals (Gilbert, 2000). The problem relating to a student's lack of persistence is complex and multidimensional.

It is the hope of the author that this work will add to the corpus of research on retention as well as provide new insights into why structural variables continue to be significant predictors of retention and graduation. The following pages present brief reviews of the prominent literature on retention, descriptions of the data and methods of analysis including both descriptive and predictive data on retention at Midwest University, Midwest College, and the IPEDS universe including suggestions for intervention strategies.

Statement of Problem

Retention continues to baffle researchers. We think that we know what retention is comprised of. Because of our "certainty" where the topic of retention and or graduation is concerned facts like that overtime the percentage of students who drop out of traditional higher education institutions has been relatively constant, ranging between 40-45% for the past 100 years (Tinto, 1982) are of great concern to us. If we really knew what the elements of retention were then one would think that manipulating the persistence rate would relatively simple. This is where the problem arises. Most scholars are on board with the idea that retention is comprised of two components, academic and social integration. However just because most of us agree that the combination of these two elements cause engagement and therefore persistence, does not mean that we agree on the mixture rate, i.e., two parts academic integration to one part social integration. Furthermore, throughout this document the concepts of engagement and integration will be used synonymously to address the outcome of their affects known as retention or persistence.

In addition to disagreement about the mixture rate, we continue to disagree as to how and where the intervention should come from. That is, the camp of which I profess membership to, would hold that elements of integration can and perhaps more importantly are structural and best manipulated administratively. However, though I believe that there are things the institution can do to positively affect retention, every institution is unique. Therefore simultaneously explaining the scholarly disagreement about the mixture rate and elaborates the problem faced by institutions of higher education. This document proposes throughout that administrative structural variables are the key to addressing the time tested problem of persistence and the fact that every institution is different.

By manipulating administrative structural variables I posit that institutions have levers that they can pull to address issues of persistence within their institutions. By using these variables to determine which levers to pull, an institution is better equipped to determine what the success recipe is within its own halls.

Research Questions

Though the research questions presented within vary slightly throughout the chapters, common to them all is the focus of how to manipulate retention and or graduation via administrative structural variables. Also common amongst the research questions presented within the chapters is the concern for the bottom line. Personally, I find this to be a historically overlooked issue within higher education, one whose time I believe has come.

Chapter two will address the role of dining service within the academy. This chapter proposes three research questions:

R$_1$: Does regular dining in the cafeteria lead to higher levels of student engagement—a proxy measure for retention?

R_2: Are there differences among demographic groups to the extent which MWUDS experiences low market capitalization?

R_3: Will increasing market capitalization within certain demographic groups positively affect MWUDS' community building role or their ability to effect engagement?

Chapter three will address the role of programmatic effects within the academy. This chapter addresses two research questions:

R_1: Are institutional data—secondary data—effective variables for predicting success defined as retention and or graduation?

R_2: Do these variables provide increased efficiencies in programming that will lead to increases in retention and or graduation?

Chapter three is based on what is already known about the effect of financial aid dollars. This chapter is limited to research questions directly answerable from the available data. When the aforementioned is combined with the general goals and strategies pursued by institutions, the following two questions are addressed:

R_1: Do institutions with higher tuition and fee discount rates have lower attrition rates (higher levels of retention)?

R_2: Do institutions with higher total cost of attendance discount rates have higher rates of retention (lower levels of attrition).

The research questions delineated within this section represent the theme and tone of this dissertation. Taken in sum the questions that will be addressed throughout the corpus of this document address the larger concept of structural variables that can manipulated

administratively, but not the sum of administrative structural variables that can be manipulated. Next, I will discuss why I took the three chapter dissertation approach.

In chapter two, I address the role of community building played by dining services and how that function effect engagement. Chapter three will examine how efficiencies can be gained by using aggregate variables in conjunction with predictive modeling in both retention and or graduation as was as cost savings in the form of program replication. Chapter four will address how financial aid leveraging can be positively used to both increase revenues while increasing retention. Chapter five will draw conclusions learned from the various analyses as well as attempt to move beyond the data offering suggestions to institutions for improving their success measures.

The Three Article Approach

When contemplating the topic of student success in higher education, I was struck by the reality that though student success could be defined in a multitude of ways, it was systematically measured in a select few. Furthermore, when examining the select few ways that student success is systematically measured, most additional measures, i.e., percent to graduate school, are dependent upon if a student is retained and or graduate. Upon further examination, these two measures comprise the corpus of cross-institutional student success measures that are used by organizations like IPEDS for institutional comparison. Additionally, and perhaps more importantly, these are the two most logical and desired outcomes of a fully integrated or engaged student.

As I ruminated on how to approach the subject of retention, I was struck the vastness of approaches taken by scholars before me. Tinto's theory of student integration is all but accepted doctrine where persistence is concerned. Scholars like Bean have elaborated on Tinto's basic

theory to capture structural variables. In my desire to go further, I have caveated structural variables to those that can be administratively manipulated. This left me with a dilemma. Namely, that traditional predictive models though capable of handling multiple levels of data such as student, departmental, and institutional level observations, would be too reductive and not allow for the nuance to be explored that existed within each level of observation. Thus, the three chapter dissertation was born.

I found the three chapter version of the dissertation allowed for increased flexibility in where theory integration, statistical analyses, research methods, and story-telling were concerned. Furthermore, the three chapter approach provided greater data leverage and economic and temporal efficiencies. This version of the dissertation allowed for greater economic and temporal efficiencies in the sense that it allowed me the freedom to use secondary data (normally free or at little cost) in comparison to primary data, which depending on the type of data being collected can be very expensive. The temporal efficiencies gained took the form of not having to design, distribute, and collect primary data.

Chapter two will address the role of community building played by dining services and how that function effect engagement. Chapter three examines how efficiencies can be gained by using aggregate variables in conjunction with predictive modeling in both retention and or graduation as was as cost savings in the form of program replication. Chapter four will address how financial aid leveraging can be positively used to both increase revenues while increasing retention. Chapter five will draw conclusions learned from the various analyses as well as attempt to move beyond the data offering suggestions to institutions for improving their success measures.

CHAPTER 2

FOSTERING COMMUNITY AND INCREASING MARKET CAP: DINING SERVICES IN

HIGHER EDUCATION

The intent of this project to explore the role that Dining Services plays in engaging and retaining students while seeking avenues by which they can simultaneously increase market capitalization at research one university in the Midwest. Midwest West University Dining Services (MWUDS) are tasked to be both self-sufficient and profitable by the institution. The contributions made by dining services at times go both unheralded and underappreciated by the academy, although there is plenty of data that speak to the pivotal role of community builder or engagement facilitator that dining services plays within the institution (Brown, 2008; Harley & Morhew, 2008; Kennedy, 2001; Lawn, 2008). Therefore, this evaluation will focus on means by which MWUDS can increase their market share/profitability without interrupting engagement facilitation.

As a former hospitality industry manager, the role dining services plays within an institution is intriguing to me. As a child of blue collar parents and first-generation everything the impact of self-supporting auxiliaries on engagement and retention fascinate me. While exploring one of the data sources used within this study I couldn't help but notice a trend of more and more students opting out of meal plans. My pondering of why this trend existed led me to the fundamental questions that I attempt to answer within. Primary amongst them is how can MWUDS increase their market capitalization without disturbing, and, if possible, further facilitating, their engagement facilitator role?

Close to half of MWUDS's operating budget is spent on employee salaries, and, if you include benefits and retirement payments, over two-thirds of the budget is accounted for. It is

extraordinary to think that supplies and services (food and equipment), account for less than a third of the total operating budget. When I was a young restaurant manager, I had a boss who taught me a rule of thumb that served me well throughout my management career. Briefly, the rule holds that whatever the cost of the food that you put on a plate is multiply it by a minimum of three if you want to be profitable. Multiplying by three is merely a guideline, and it generally holds that about 10% of each dollar at this multiple will be profit. This is not to confuse profit margins with operating budgets. What is meant to be highlighted by this digression is that dining services either sells a product, or goes home.

Data collected by organizations both external and internal to the university, including the National Organization of College & University Food Services and Midwest University Dining Services, underwent a secondary analysis. This analysis identified trends in dining services that can be capitalized upon (pun intended), while not disturbing, and, if possible, further actualizing, their critical role as engagement facilitator. The finished evaluation takes the form of this brief report that will highlight trends found in the data particular to demographic groups where MWUDS experiences high engagement and low market capitalization.

Literature Review

The National Association of College & University Food Services (NACUFS), founded in 1958, boasts a membership of 656 institutions serving over 7.3 million students and a total purchasing power of 1.7 billion dollars annually (Annis, Kraner, & Meyer, 2008). NACUFS hosts both annual regional and national conferences and offers its members support on everything from menu to dining hall design. It is a strong, vibrant, and active national organization consisting of approximately 550 institutions of higher education and nearly 500

industry members hosting both regional and national conferences with the next national conference scheduled for July 10-13, 2013, in Dallas NACUFS provides many additional services to its members, a great many of which address the issue of community development.

What I noticed in the plethora of articles that were read as research for this project is that dining service managers take the dollars and centd side of what they do seriously. The caveat is that they take their role as community builders equally, if not more, seriously. This is highlighted repeatedly in the literature. Will Smith, Director of Food Services at Jackson State University (JSU), stated that they "wanted to create an atmosphere of openness and community … for those people who haven't been here a long time we wanted to be able to just say welcome home" (New Union Eateries, 2008). To be able to say "welcome home," JSU'snew union features a 12,000-square-foot bookstore, an Internet Café, a game room, a 700-seat dining hall, a convenience store, a takeout location, and a 250-seat movie theatre, as well as a few other amenities not mentioned. The total price tag for this construction at JSU, $24.5 million, is more than the dining services' at MWU fiscal budget. Jackson State is an 8,000-student campus, whereas MWU enrolls approximately 28,000!

Jackson State is not alone in this trend. More and more institutions of higher education are investing large amounts of capital into making dining halls more welcoming. This trend seems to hold true across institutions. St. Olaf College recently spent $26 million on a 175,000-square-foot student center (Kennedy, 2001). The University of Michigan spent $21 million on a 35,-000-square-foot dining hall that consolidated four other residence dining halls. According to Mike Lee, director of dining services at Michigan, they decided to "consolidate the dining halls … to create a sense of neighborhood" (Brown, 2008; Kennedy, 2001). Not only do dining services play a crucial role in facilitating communal interactions among an institution's customer

base, but they also represent a means for an institution to generate additional income. At Brigham Young University, catering alone accounts for $4.3 million in annual revenue and employs over 255 students (Reputation Building, 2008).

The literature repeatedly emphasized that dining services provided an integral service to a university's customer base. Dining services provides sustenance as well as the equally important—I would argue more important—substantive support to the student. In the strictest sense (or in a hospitality sense), dining services is tasked with providing customer satisfaction. Customer satisfaction is a predictor of the "likelihood of customers returning" (Kim, Ng, & Kim, 2008; Oh, 2000; Yuksel & Yuksel, 2002). When we place this in the context of student engagement theory, we find that "for college students, food can often be related to the general cultural patterns of their specific cultural group" (Gramling et al., 2005, p. 16). Furthermore, *On-campus Hospitality* (2003) reports that the spending power of college students is more than $90 billion annually. This market is driving the expansion of university food services (Kim, Ng, & Kim, 2008).

When Almanza et al. (1994) identified the attributes that affected customer satisfaction in the academy's food service operation, quality of food, convenient location, price, and service were found to be important attributes. These attributes also have been determined to be top predictors of the customer satisfaction of non-university restaurants (Lee, 2004; Pettijonhn, 1997; Qu, 1997). To further demonstrate the relationship that exists between university food services and customer satisfaction, Kim, Ng, and Kim (2008, p. 14) found that "food quality, service quality, price and value, atmosphere and convenience" explained 65% of the variation in customer satisfaction.

Couple the findings with Hartley and Morphew's 2008 work, the relationship and the theory that this paper operates from begins to become clear. Hartley and Morphew examined Viewbooks, which are the glossy brochures that campuses distribute to prospective students by the "tens of thousands" (p. 671). The purpose of the study was to determine if there were common themes that colleges and universities decided to advertise, or what I refer to as sell. What they found was that there were six common themes that appeared in these view books: dining services appeared as the third most common theme.

Tying these literatures together are studies that have shown that living on-campus, as opposed to commuting to college, is positively related to engagement (Chickering, 1975; Terenzini et al., 1996). What this suggests is that students who perceive a personal concern for them among the universities varied communities are more likely to remain at the university (Patti, 1993). Additionally, Tinto (1987) stresses the importance of both academic and social integration (participation in college life) in predicting retention in a university setting. Pike and Kuh (2005), in their extensive literature review of engagement theory, routinely pointed out that "institutional policies and practices influence levels of engagement on-campus" (p. 186).

Theory

The theory that I posit is straightforward in its two-pronged approach, as it draws directly on the literature reviewed for this project and previous research conducted in the area. The previous research on retention, when discussing engagement, regularly refers to the sense of connection students hold toward their institution as well as toward their peers. Therefore, this paper theorizes that community building, the role that dining service managers see themselves as facilitating, is a function of engagement. I posit that it is possible to have engagement without community. A group can be brought together and be engaged at a lecture or rally, but the

engagement is with the speaker, not the people around them. But when you have community the engagement is with the people and the institutions that comprise the community. If we thought about this like a funnel of causality (Campbell et al., 1960), community precedes engagement.

This is not to say that whether the quality of food is good or bad has an effect on the extent to which students feel engaged with their institution. Rather, this is to say that students who eat in the cafeteria regularly will experience higher levels of belonging and a greater sense of community in general. This feeling of community then serves as a facilitator of engagement. The flank of the theory holds that dining services can actively increase their market share without disrupting, and, in fact, quite possibly increasing, their ability to create community, therefore facilitating engagement for more of its customers—Midwest University students.

Hypothesis

Based on what is already known about the role of dining service, the limitations of time and resources, and the nature of this analysis, this article is limited to four hypotheses directly answerable from the available data. When the aforementioned is combined with the general goals and strategies of MWUDS, the following three hypotheses are offered:

H_1: Regular dining in the cafeteria is associated with a higher level of student engagement.

H_2: There are differences among demographic groups in the extent to which MWUDS experiences low market capitalization.

H_3: Increasing market capitalization within certain demographic groups will positively affect MWUDS' community building role.

For the first three of the four hypotheses secondary data will be analyzed. These data take the form of MWUDS' Department of Residence Dining Services Feedback Survey, published reports, and an open-ended questionnaire. For the latter of the four questions, I will rely on previously written literature and approaches taken by MWUDS's comparison institutions.

Methodology, Data Collection, and Measurement

One of the two data sources used in for this document was the Department of Residence (DOR) Housing and Dining Services Feedback Survey conducted in the Fall of 2001. The survey was distributed by residence hall staff. A random sample of 2,129 residence hall students was selected to take part in the survey. Optical scan sheets were used with the survey and an envelope was used to allow confidentiality. The DOR considered responses usable if the student supplied his or her University ID and if the responses were mostly complete (aside from an occasional missing response). The return rate for the survey was 67%.

The DOR requested student identification numbers, to align students with demographic data provided from the Registrar's information file. All such identifiers have been removed from the dataset and a generic set of identification numbers has been assigned to respondents. As I used the data in their secondary form and because I possessed neither the key to the generic identification system nor the respondent's personal identification information, I did not need IRB approval to conduct this analysis. Since the survey was originally designed to evaluate Resident Assistants, House Cabinet, and the general atmosphere of the Residence Halls, an explanation of how the dependent variable was constructed as well as information on the independent variables of interest are required.

The dependent variable is a summated rating scale (or index) that is the mean of a respondent's answers to four correlated questions. A histogram of the dependent variable

demonstrates the assumption of normality has not been violated. The questions that combine to create the measure of engagement are[2]:

- I know most of the people in my house
- There is a strong feeling of respect for one another's individuality and beliefs in my house
- I am satisfied with the relationship I have with my roommate(s)
- I interact informally with house members

A test of reliability resulted in a Cronbach's Alpha of .59. An alpha less than .5 is considered a unacceptable as measure of internal consistency, and though the alpha presented above is considered low, it does break the acceptable threshold Furthermore, because the dependent variable is computed based on the means, the resulting scale ranging from one through five[3] has enough breadth to support the use of Ordinary Least Squares (OLS) regression.

The independent variables of interest used in the regression analysis are a combination of questions and demographic information asked within the survey. The following questions are on a five-point scale ranging from very dissatisfied to very satisfied, coded so that 1 is very dissatisfied, 3 represents neutrality, and 5 is very satisfied. The following questions are used as independent variables in the regression model:

- Overall appearance and décor of the dining centers
- Courteousness and helpfulness of the dining center managers and full-time staff

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[2] All questions are on the same five-point scale ranging from strongly agree to strongly disagree.

[3] Normally a scale of 1 to 5 should call for a logit, or an ordered probit, form of regression. However, because the computation is based on means there are enough observations at 1.25, 1.5, 1.66, 1.75, and so on as to effectively use OLS for this pilot study.

- Courteousness and helpfulness of the dining center student employees

- Amount of food you get for your money

- Overall variety of food

- Overall quality of food

- How many semesters have you had a meal plan[4]

Upon a review of evaluation models and examples, I chose a mixed evaluation model to meet the needs of MWUDS. The model includes elements of the Utilization-Focused Evaluation (UFE) and Consumer-Oriented Approach to program evaluation. The combination of the two approaches requires that the evaluator provide both useful information/recommendations to management—the UFE approach—while mandating that the evaluator base the evaluation on "standards set forth and guided by consumers' needs" (Russ-Eft & Preskill, 2009, p. 53; Scriven, 1974).

Constraints on time and resources mandated that this be a cross-sectional study using secondary data. The data also consisted of a variety of reports conducted by both MWUDS and groups external to the institution (for a complete list of reports, see Appendix A. These reports were written based on both local and national surveys. Some, like the NACUFS report, are national surveys that provide disaggregated data to allow for comparisons of MWUDS with other select institutions and with the industry in general. The disaggregated NACUFS data (NACUFS, 2010) provided an MWU-specific N of 741 extracted from a national survey of 100 institutions with a total N of 129,764. Equipped with a roadmap provided by the reports analyzed for this project, (Insights, 2009; NACUFS, 2010, 20088; I. D. Services, 2009; T. I. Services, 2009) the data were further refined to an N of 485 students, with 166 representing the off-

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[4] Measured from 1 to 6 with 1) 1-2; 2) 3-4; 3) 5-6; 4) 7-8; 5) 9-10; 6) 11 or more semesters.

campus students polled in the NACUFS survey. The NACUFS survey, besides ascertaining demographic data, also put forth two open-ended questions. These questions were numericized for ease of analysis (see Appendix A). Although these data are nominal, they provide a wealth of descriptive information. and are used to answer H_1 and H_2

According to the Office of Institutional Research at Midwest University, the institution has 10 peer institutions (http://www.ir.mwu.edu/peers.html). The websites of these 10 institutions were surveyed, specifically focusing on the types of meal plans that they offered and whether they offered meal plans targeted to off-campus students. This information was then compared to the information garnered from MWUDS's website on their meal plans and whether they targeted specific demographic groups via their meal plan options.

Results

Table 1 reports the results of a multiple regression model estimating the effects of perceptions about dining services on student engagement[5]. The estimated effect of décor, courteousness, gender and year in school are positive and statistically significant. The coefficient suggests that a one-unit increase in the perceived satisfaction of the courteousness and helpfulness of a dining center's student employees will lead to a 0.085 mean increase in the level of engagement. Number of semesters with an ISU meal plan is the only variable with both a negative and significant impact on the mean level of engagement. As the number of semesters that a student has a meal plan increases, we expect on average a .061 unit decrease in the mean level of engagement (see Table 1). To restate, as the number of semesters that a student has had a meal plan increases, the effect of dining service on engagement decreases. This result was both expected and makes intuitive sense.

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[5] Reported in table 1 are only the models significant variables. Variables not reported are: Amount of food for the money; Overall variety of food; Overall quality of food; and Ethnicity. All variables not significant (p. < .1)

The reason for this drop in dining services impact on a student engagement can be found in the literature. The role of the institution in fostering engagement is critical in the first year, but not as important afterwards. By the third semester the student has friends outside of the dining groups and connections to the broader community.

However, the value of adjusted R^2 is low, and as it stands this model explains less than five percent of the variation in the dependent variable. Though this is a problem, it does not represent a catastrophic failure for the proposed study. Regardless of issues with the dataset, which include but are not limited to the fact that the survey was not designed for the theoretical framework utilized within this paper, the substantive result of the analysis indicates that although I may not have found fire, I have definitely found smoke.

The data revealed that there were 485 students at Midwest University who had completed the NACUFS survey. Of the 485 students who completed the survey, 268 (55%) were female and the remaining 45%, or 217 respondents, were male. Of the 268 female respondents, 183 (68%) lived on-campus and 85 (32%) lived off-campus; 63%, or 136, of the 217 male respondents lived on-campus, with the remaining 37%, or 81, living off-campus. Fully 66%, or 319, of all student respondents lived on-campus, with the remaining 166 (34%) living off-campus (Table 2). The student classification breakdown is highlighted in Table 3; 36%, or 174, of the students surveyed were freshmen; 22%, or 109, were sophomores; 86 (18%) were juniors; and 16%, or 76, were seniors. The vast majority (92%) of those surveyed self-identified as undergraduates. Of the remainder, 35 (7%) were graduate students and five (1%) identified themselves as "other" on the student classification.

Table 4 provides us with a breakdown of the living arrangements of the students surveyed. As we noted earlier 174 (36%) of our sample were freshmen and 164 (94%) lived on-

campus. Of the 109 sophomores, 70% or 76 lived on-campus with the remaining 33 (30%) living off-campus. For juniors only 48% or 41 of the 86 surveyed lived on-campus. The remaining 45 (52%) lived off-campus. The trend continues with the seniors, with fully 53%, 40 of the 76 senior's surveyed living off-campus and the remaining 47% or 36 living on-campus. The graduate students overwhelmingly lived off-campus. Of the graduate students surveyed, 97% (34 out of 35) lived off-campus. Also, of the students that identified as other 80%, four out of the five that identified as other lived off-campus.

Tables 5 and 6 provide descriptive data about the two open ended questions that students were asked to respond to. The two questions; "if you could make one change to any aspect of the dining services at this college/university, what would it be," and "is there anything else concerning campus dining that you wish to share" response rates are analyzed fully in table 5. The first thing that should be noticed is that of the 485 respondents, 443 or 91% answered the first of the two open ended questions and 333 or 69% of all respondents answered the second of the two. Combined there is a total of 776 open ended responses. A full accounting of how of the answers as they were coded are provided in Table 5, however a few key findings are illuminated within this text. 36% or 276 of all 776 responses to these two questions were focused on service. Furthermore, the vast majority of these were complaints about the speed, seating and quality of service. 186 (24%) of responses spoke to the desire for more menu options, and 13% or 99 of the responses spoke to the respondents desire to have lower prices.

Looking at the same three responses in Table 6, we begin to see who said what based on living arrangement and gender. What is noticeable in this frequency distribution is that male/female differences in opinion about improving dining services are for the most part relatively close in their occurrence. On the other hand, the on-campus/off-campus opinions' on

where/how to improve dining services seems to be more greatly disconnected. For example of the 276 open ended comments that spoke to the quality of service only 91 (33%) of them came from students living off-campus. Furthermore, of the 186 students that spoke to the need for increased menu options, 62% or 116 were on-campus residents. However, this trend is reversed when we examine the student breakdown of those who complained about price. 63 out of 96 (66%) of all responses complaining about price came from off-campus students.

Tables 7 and 8 present the results of the χ^2 analyses preformed using the dichotomous variable that measured whether a student lived on or off-campus and dummy variables for the open ended questions. What I found was quite interesting. In Table 6 there are 3 statistically significant results, all with a p-value of < .01. The dummy variables "more meal plan options" and "food quality" the on-campus students mentioned these items as an area of improvement eight and five percent of the time in comparison the off-campus students mentioning these items .65 and zero percent of the time, respectively. However, where the dummy variable measuring mentions about the need for lower prices is concerned, this area of improvement is broached 31% of the time by off-campus students compared to the eight percent of the time that it is mentioned by on-campus students. Also, worthy of note is the variable that measured the number of time that our respondents mentioned service. The analysis of this variable produced a p-value of .053 and with fully 40% of on-campus students focusing on service as the one area of change most needed. However, unlike variables addressing prices, meal plan options, and food quality, the difference in on-campus/off-campus students does not hold when the responses to the question "is there anything else you would change" is analyzed.

Discussion

In moving beyond the data we can begin to see how and more specifically via which mechanisms dining services effects student engagement on institutions of higher learning. By examining the results of the OLS regression we see can instantly see that both the décor of dining services and the courteousness of the dining services professional staff are both achieve traditional levels of significance. What I believe is going on here is as follows. I would posit that the décor of a dining hall when warm, homely and welcoming puts students at ease[6]. This allows them to relax and partake in the community that dining services is trying to build. This, I would hypothesize, is similar to the effects students feel when they bring familiar items such as blankets and other trinkets from their home to their dorm room.

Thus, the first step in creating the community that is sought by those who manage foodservice departments within academia is achieved by creating a décor that welcomes and encourages the repeated use of dining services by students. What the result of the analysis tells us that at least at Iowa State University…this end has been achieved. When I first looked at the regression results, I thought to myself why aren't the two courteousness indicator variables closer in their levels of significance. As thought about this I concluded that the reason for this was because on a daily basis, the student going to the dining room for lunch is going to have more personal interaction with the professional staff than with the student staff.

Relying on my years of restaurant management experience, I put myself in the role of a dining services manager. By doing this, I was able to conclude that in a food service system that was asked to feed upwards of 20,000 students per day, where would I get the most bang for my

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[6] This is my intuition on the subject. I have only personally witnessed a few dining halls in my academic career. However, for all those that I have bore witness to creating a warm and welcoming environment was obviously the look and feel that they were going for.

buck. That is, where to do I place my key player and my role players. Based on experience alone, I concluded that on the front line, serving and interacting with my customer base is where I would place my key players or my professional staff in this scenario. This would leave my role players in support roles within the cogs of the machinery. So it makes sense that the perceptions of the courteousness of dining hall professional staff by the students surveyed within this analysis have a higher degree of impact on regression results than the perceptions of the courteousness of the dining hall student staff.

At first glance, it would seem that the number of semesters with a meal plan -.061 and class classification .066 are juxtaposed in their interpretation and that something may be wrong the model that was specified. But when we explore the two independent variables further we realize that just because one is a senior at Iowa State University does not mean that they have had a meal plan for 8 semesters. What holds sway among these two variables is the number of semesters with a meal plan. What this means is quite simple. The longer a student has a meal plan, the less effect that dining services has on that student's engagement. That is to say, that as a student progresses in age, and familiarity with the campus, its surrounding areas the reliant that student becomes on dining services to provide them with a sense of community as well as a place to eat.

The positive and close to traditional level of significance variable class classification highlights the above effect. Just because dining services is becomes less and less relied on to provide the student with a senses of community, does not mean that as a student progresses in their college career that they become less engaged. It simply means that by the time that they are ready to matriculate from the institution they have created their own community, social network and have thus become less reliant on the community created by dining services. What I find in

the analysis of this data I believe at best speaks to academia at large, but certainly to four year, public PhD granting, land grant institutions.

I believe what the data is telling us first and foremost is that dining services plays significant role in the retention of an institution's students. It does so by building community which in turn leads to increased levels of engagement. This in turns leads to increased levels of retention and matriculation. Secondly, the data supports the numerous claims made by a plethora of dining service directors that their job is to be community builders. Third, I think the data highlights that a university's structure plays a significant role in the levels of engagement experienced by an institutions students. All of which I believe speak to and highlight this final point: when deciding on capital expenditures, dining services is a safe and profitable place to invest that provides an institution with many residual returns.

The first hypothesis (H_1) assumes that there are demographic groups where Midwest University Dining Services experiences low market capitalization. To answer to this I rely on the several reports that all demonstrated the trend of off-campus students not having meal plans(Insights, 2009; NACUFS, 2010). According to the Midwest University Fact Book in the fall of 2009 the undergraduate head count was 22, 521 with only about 10,000 living on-campus. The fall enrollment for 2010 was higher than 2009 though the official headcount has not been released, one thing is for sure…the amount of on-campus students does not increase unless new facilities are built to house them. Thus, even though MWU experienced record enrollment for fall 2010 (www.MWU.edu), MWUDS in all probability did not experience the same increase (if any) in the number of meal plans purchased by students.

Midwest University Dining Service's can increase their market penetration dramatically by targeting off-campus students. Because of the reports that identified off-campus students as

dining services largest expansion market, the data presented above examined the trend specific to what Midwest University students had to say about dining services to attempt to answer the remainder of the hypotheses posited within this note and to get a better understanding in general of why off-campus students do not use meal plans. To accurately do this the data analyzed within the corpus of this text honed in on the differences between on-campus and off-campus students. Though the dataset analyzed above did not include a variable that asked if a student had a meal plan or not, the fact that on-campus residents have to have a meal plan, and off-campus students do not led me to believe that interpreting the results as a comparison of two groups as one with high market penetration and the other with low market penetration, was a safe assumption. Additionally, the fact that in responses to open ended questions only one of the 166 off-campus students commented about meal plan options provided me with even greater confidence in the validity of the side by side comparison of the two demographic groups and their ability to serve as proxy measures of what a group with high market capitalization and a group with low market capitalization view as key issues.

What we found is interesting. Our statistical analysis revealed three consistent differences amongst our two groups. These differences are consistent because they are present in both the responses to the primary and secondary open ended prompts. Also, in all occasions where the statistically significant differences occur we can be at least 95% certain that the difference between the two groups did not occur by chance. Of the three statistically significant differences, only one can be attributed to the demographic group where MWUDS currently experiences low market capitalization. In a nutshell, off-campus students aren't happy with the prices they are asked to pay! Being a non-traditional student myself, I can relate to this. Off-campus students already pay for parking and a myriad of other expenses not experienced by on-campus students,

but at Midwest University, these students experience no price break on the meal plans that they are offered.

Fully one third of all the off-campus student's surveyed mentioned price as the one thing they would change if they could. This is only equaled by the number of time that off-campus students mentioned service. These are some typical comments that off-campus students made in regard to the prices:

> Cheaper food; Cost of food that is not that great, is way too high; Lower prices on many of the items across campus; More affordable food options, besides the vending machine; More affordability for students, the school is already making money, why nickel and dime the students to poverty for a latte; Lower costs of meals at dining centers.

This is not to allude to or indicate that the off-campus students were harsher in their comments about price, because they weren't. For that matter, when price was the mentioned by the students surveyed the comments above are typical of all price comments. What is meant to be highlighted is that where MWUDS experiences their lowest market penetration, the over-riding reason for the low market capitalization is price.

A secondary reason contributing to the low market capitalization among off-campus students I believe can be attributed to service. Though, the statistical difference between the groups in the rate of observation is only close to traditional levels of significance in Table 6 and non-existent in Table 7, the fact that service was mentioned at such a high rate by both groups leads me to believe that it is a contributing factor in the rate at which off-campus students procure meal plans. Typical comments about service took the following form:

More seating areas; I know the space is small but I wish there was more seating; More people working, because at times the lines are too long and it takes a while; To decrease the service time during the dinner rush; Employees are there to work not socialize, pay them for the time they work so we don't have to pay them for socializing...Bring costs down.

The vast majority of all service related comments addressed seating and time spent in line, but it was not unusual to see a negative comment about employees in general.

Further interpretation of the results leads me to believe that not only is there a demographic group where MWUDS experiences low market capitalization, but that increasing market capitalization within this demographic group is not only possible, but probable (H$_2$). This is evidenced by the fact that with the exception of Purdue and UC Davis, all of our peer institutions offer meal plans specifically labeled or overtly designed with the needs of the commuter student in mind. That is not to say that all plans are created equal, but schools like North Carolina State University whose "8 meal per week plan" comes in at about $6.80 per meal compared to the cost per meal of their largest limited weekly meal plan (NC State has an unlimited plan) of 5.33. Texas A & M University who allows all students regardless of residency to purchase any of their meal plans at the same price that a student living on-campus would pay for that meal plan…are on the right road.

Additionally, I believe that increasing market capitalization within this demographic will positively affect MWUDS community building role (H$_3$). Though, I do not have data that speaks to this directly, it would seem counter intuitive to me that meeting the needs of more of MWU's student population would negatively impact the engagement felt/experienced by the student

population. However, the limitations of the data are experienced fully when I attempt to answer the third hypothesis. The in ability to perform causal analysis leaves me with nothing more than an opinion on what I think would happen based on previous research. That stated this is an area of suggested future research and a remedy that I offer in the suggestion/conclusion section of this paper.

Students today are savvy consumers, and savvy consumers price check. What I found when comparing MWUDS to its peer institutions was that MWU's price per meal was difficult to calculate from the information provided on the website. Given that customers want transparency to be included as part of their experience, it would be wise to offer a price per meal breakdown and the number of meals per week, semester and year for each meal plan offered and the cost affiliated with all options.

Conclusion

As I read to write this paper I continually ran into articles highlighting the role in community building that dinning services plays. Community building takes many forms within the institution. The community building efforts of dining services can be operationalized and measured in order to better assess the impact that this has on levels of engagement. Community is not the only operational form that engagement can take. However, when it comes to the role that dining services plays within the academy, community building seems to be its most notable auxiliary function. The focus of this paper is to propose a pilot study that explores dining services in order to better understand the role that dining services plays in retention and matriculation. Furthermore because of what we know about view books, dining services might even play a role in enrollment.

Due to a low R2, it is difficult to draw hard conclusions about the effect dining services has on engagement. But some things are clear. It is clear that dining services via their community building mission positively impacts engagement in institutions of higher education. It was also clear that this impact is most forcefully felt at the earlier stages of a student's collegiate career, which is where it is most important to engage students. In future research I would like to develop a measurement instrument that more accurately captures both engagement and perceptions of dining services.

Chapter three examines how efficiencies can be gained by using aggregate variables in conjunction with predictive modeling in both retention and or graduation as was as cost savings in the form of program replication. Chapter four will address how financial aid leveraging can be positively used to both increase revenues while increasing retention. Chapter five will draw conclusions learned from the various analyses as well as attempt to move beyond the data offering suggestions to institutions for improving their success measures.

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Table 1: Multiple Regression Effects of satisfaction with Dining Services on Engagement, Controlling for Gender, Ethnicity & Year in School

Predictor Variables	Level of Engagement	
	B	SE
Décor of Dining Centers	.041*	0.052
Courteousness of Dining Center Staff	.047*	0.063
Courteousness of Dining Center Student Staff	.085**	0.108
Number of Semesters with MWU Meal Plan	-.061**	-0.066
Gender	.101**	0.065
Class Classification	.066**	0.067
Adjusted R^2 = .042		

N = 1441; * = p < .05 ** = p < .01

Table 2: Frequency Distribution by Gender and Student Living Arrangement

Gender	Student Living Arrangement		Total
	On-campus	Off-campus	
Female	183	85	268
Male	136	81	217
Total	319	166	485

Table 3: Frequency Distribution by Gender and Student Educational Level

Year in School	Gender		Total
	Female	Male	
Freshmen	106	68	174
Sophomore	54	55	109
Junior	51	35	86
Senior	38	38	76
Graduate	14	21	35
Other	5	0	5
Total	268	217	485

Table 4: Frequency Distribution by Student Educational Level and Student Living Arrangements

Year in School	Student Living Arrangements		Total
	On-campus	Off-campus	
Freshmen	164	10	174
Sophomore	76	33	109
Junior	41	45	86
Senior	36	40	76
Graduate	1	34	35
Other	1	4	5
Total	319	166	485

Table 5: Frequency Distribution of Responses to "If you could make one change" and "Is there anything else

	If you could make one change to any aspect of the dining services at this college/university, what would it be?	Is there anything else concerning campus dining that you wish to share?	Total
Lower Prices	71	28	99
More Menu Options	116	70	186
More Healthy Choices	36	7	43
Service	164	112	276
Nothing	12	79	91
Location	1	0	1
Meal Plan Options	25	12	37
Conservation	2	2	4
Food Quality	14	22	36
Cafeteria Style Dining	2	1	3
Total	443	333	776

Table 6: Frequency Distribution by Student Living Arrangements and Responses to "If you could make one change" and "Is there anything else"

	If you could make one change to any aspect of the dining services at this college/university, what would it be?					Is there anything else concerning campus dining that you wish to share?				
	Female		Male		Total	Female		Male		Total
	On-campus	Off-campus	On-campus	Off-campus		On-campus	Off-campus	On-campus	Off-campus	
Lower Prices	14	23	9	25	71	6	9	7	6	28
More Menu Options	39	15	36	26	116	27	9	14	20	70
More Healthy Choices	20	10	4	2	36	2	1	3	1	7
Service	65	27	51	21	164	36	24	33	19	112
Nothing	5	0	4	3	12	31	13	24	11	79
Location	0	1	0	0	1	0	0	0	0	0
Meal Plan Options	15	1	9	0	25	7	0	5	0	12
Conservation	1	1	0	0	2			2	0	2
Food Quality	6	0	8	0	14	7	1	12	2	22
Cafeteria Style Dining	2	0	0	0	2	1	0	0	0	1
Total	167	78	121	77	443	117	57	100	59	333

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Table 7: Differences in On-campus vs. Off-campus Responses to "If you could make one change"

Variable	Present (N =443)	On-Campus (n = 288)	Off-Campus (n =155)	Chi –Square
Lower Prices	71 (16%)	23 (8%)	48 (31%)	39.54**
More Menu Options	116 (26%)	75 (26%)	41 (26%)	0.01
More Healthy Choices	36 (8%)	24 (8%)	12 (8%)	0.05
Service	164 (37%)	116 (40%)	48 (31%)	3.75^
Nothing	12 (3%)	9 (3%)	3 (2%)	0.46
Location	1 (.23%)	0 (0%)	1 (.65%)	1.83
More Meal Plan Options	25 (6%)	24 (8%)	1 (.65%)	11.19**
Conservation	2 (.45%)	1 (.35%)	1 (.65%)	0.20
Food Quality	14 (3%)	14 (5%)	0 (0%)	7.78**
Cafeteria Style Dining	2 (.45%)	2 (.69%)	0 (0%)	1.08

^ < .1 * < .05 ** < .01

Table 8: Differences in On-campus vs. Off-campus Responses to "Is there anything else you would change"

Variable	Present (N =333)	On-Campus (n =217)	Off-Campus (n =116)	Chi –Square
Lower Prices	28 (8%)	13 (6%)	15 (13%)	4.73*
More Menu Options	70 (21%)	41 (19%)	29 (25%)	1.70
More Healthy Choices	7 (2%)	5 (2%)	2 (2%)	0.12
Service	112 (34%)	69 (32%)	43 (37%)	0.94
Nothing	79 (24%)	55 (25%)	24 (21%)	0.91
More Meal Plan Options	12 (4%)	12 (6%)	0 (0%)	6.65*
Conservation	2 (.60%)	2 (.92%)	0 (0%)	1.08
Food Quality	22 (7%)	19 (9%)	3 (3%)	4.66*
Cafeteria Style Dining	1 (.30%)	1 (.46%)	0 (0%)	0.54

^ < .1 * < .05 ** < .01

Appendix A: Codebook

Variable Name	Description of Variable	Variable Coding
Resptype	Type of respondent	1=Student
Respclass	Class Level of respondent	1=First Year; 2=Sophomore; 3=Junior; 4=Senior; 5=Graduate; 6=Other
Respgender	Gender of respondent	1=Female; 2=Male
Respliving	Residential status of respondent	1=On-Campus; 2=Off-Campus
Onechange	If you could make one change to any aspect of the dining services at this college/university, what would it be?	1=Food Expense; 2=More Menu Variety; 3=More Healthy Options; 4=Service; 5=Nothing; 6=Location; 7=More Meal Plan Options; 8=Conservation; 9=Food Quality; 10=More Cafeteria Style Dining
Else	Is there anything else about concerning campus dining that you wish to share?	1=Food Expense; 2=More Menu Variety; 3=More Healthy Options; 4=Service; 5=Nothing; 6=Location; 7=More Meal Plan Options; 8=Conservation; 9=Food Quality; 10=More Cafeteria Style Dining

CHAPTER 3

PREDICTIVE STATISTICS: USING AGGREGATE ANALYSES TO LEVERAGE
RESOURCES AND PROGRAMMING

Retention and graduation are two measures of success used across institutions. These two measures are reported in mandated federal reporting about an institution and are currently being discussed in state legislative committees about higher education funding. Thus far, 12 states have enacted "Performance Funding for Higher Education" legislation, which ties funding to completed courses and degree attainment in lieu of its predecessor, the full-time equivalent model, which awarded funding based on enrollment. Four states are in the process of the transition and 19 state legislatures are holding serious discussions on the matter. Only 15 states and the District of Columbia are not having at least a formal discussion on the matter (NCSL, 2013).

Graduation and retention are two of a select few measures of success that are used to compare across institutions to measure student and institutional progress. Because of their prominence as measures of success, researchers have for decades sought to explore what elements encourage retention. Therefore this study seeks to build upon the existing body of literature by offering means by which institutional data—secondary data—such as grade point average, admission rankings, funding, etc.—can be used in conjunction with predictive modeling to implement programming and allocate resources to positively impact retention and/or graduation.

The following pages present a brief review of the prominent literature on retention, a description of the data and method of analysis including both descriptive and predictive data on retention at Midwest College, and suggestions for intervention strategies.

Literature Review

A number of theories have attempted to explain student achievement. Student effort and student engagement levels are two terms that are often used when discussing factors that affect student success. Studies focusing on measuring the quality of undergraduate education based upon the students' experiences and self-analysis of their own effort level have found that strong correlations exist between effort level and the quality of education received (Astin, 1993; Pace, 1981). An examination of current research focusing on the effort level that college students demonstrate during their academic experiences supports the theory that active involvement in the learning process is a key indicator of academic achievement (Astin, 1984; Kuh, Pace, & Vesper, 1987; Pace, 1981, 1990; Pascarella, 1997; Pascarella & Terenzini, 1991; Tinto & Russo, 1994).

The student engagement theory resulted from the works of Astin (1984, 1985), Chickering and Gamson (1987), Pace (1981, 1984, 1986), Kuh and his colleagues (Kuh et al., 1981, 1989), and Tinto and Russo (1994), and is supported by the findings of the American Council on Education (2002) and the National Survey of Student Engagement (NSSE; 2006). Pace (1984), Tinto (1993), and Astin (1984) each have developed theories focusing on the investment of the student as it relates to time and energy spent on the college experience. Each one of their theories will be discussed and their findings reviewed.

Astin (1984) proposed his student involvement theory based upon 20 years of research on student development. Astin's (1984) theory is based upon the amount of energy the student devotes to the academic experience. The primary focus is on linking the frequency of student–faculty interactions to students' satisfaction with their college experience. The theory of student involvement connects behavior to student motivation. It seems logical to assume that high student involvement in the learning process would correlate positively with student success and

persistence. This theory contends that educators should focus more on motivating students to devote more time and energy to the learning process.

Pace's (1981, 1984, 1986, 1990) studies using the College Student Experiences questionnaire focused on measuring the quality of undergraduate education based upon students' experiences and self-analysis of the level of their college engagement. Pace (1981, 1984, 1986, 1990) found a strong positive correlation between effort level and the quality of education students perceive they have received. Pace (1981, 1984, 1986, 1990) contended that the scope of the effort can be used to judge the quality of the educational experience. The results from the 1979 and 1980 data sets found that, overall, small schools scored higher than did larger schools in quality effort. In general, higher scores were found in young female students, residential students, students with a B+ or higher GPA, and students spending 40 or more hours per week on academic activities. Pace's (1981) research was conducted at 34 colleges and universities. Some of the student characteristics that were found by Pace (1981, 1984, 1986, 1990) to predict a high-quality educational experience are in alignment with liberal arts' college student attributes.

Tinto's (1993) student integration model divides students' experiences into academic integration and social integration. For this model, academic integration is measured by grades or other indications of academic achievement. Social integration is measured by such factors as interaction with faculty and participation in extracurricular activities. Tinto contended that both academic and social integration should be developed within an institution for the comprehensive college experience. The concepts of academic and social integration are difficult to both define and measure. Tinto's research indicates a positive correlation of academic and social integration with persistence for 4-year college students. Residential, full-time students certainly have a

greater opportunity to become involved socially with college events and activities. Balancing external commitments and distractions against academic pursuits is highly challenging.

Bragg (2001) explained that integration techniques may include experiential hands-on learning; service learning; and cooperative arrangements as part of the academic experience. Incorporating academic and social integration activities into the learning process strengthens students' commitments to both their institution and personal goals (Pascarella & Terenzini, 2005). Tinto holds that there are five conditions for student success: Institutional Commitment, Institutional Expectations, Support, Feedback, and Involvement or Engagement (Tinto & Pusser, 2006). According to Tinto, the institutional commitment condition is fairly straightforward. He holds that it is the willingness of an institution to invest resources and to provide incentives and rewards that enhance student success. An institution's expectations are also a condition of success. Moreover, it is high expectations that are important. On the same note, holding differing expectations, which are often expressed in the labels used to describe different groups (i.e., remedial, first-generation, low income, etc., or more subtly in the way faculty treat students of different genders or ethnicities), can be felt negatively by the groups targeted by those labels. "However expressed, the research is clear that students quickly pick up expectations and are influenced by the degree to which those expectations validate their presence on campus" (Tinto & Pusser, 2006).

The social integration component of Tinto's (1993) theory is the most difficult to relate to student success. Bragg's (2001) study indicates that the social environment may not have as much impact on community college students as on 4-year students. Rendón (1994) found that if a concentrated effort is made to integrate minority students into the social and academic life of

college, an increase in academic success occurs. Rendón described minority students as underprepared and lacking in self-confidence.

Students are more likely to succeed in environments that provide faculty, staff, and students frequent feedback about their performance. Here Tinto and Pusser are referring to more than entry assessments of learning skills and early warning systems that alert institutions to students who need assistance. They are talking about classroom assessment techniques such as those described by Angelo and Cross (1993) and those that involve the use of learning portfolios. These techniques are not to be confused with testing. They are forms of assessment, such as the well-known "one-minute" paper that provides both students and faculty information on what is, or is not, being learned in the classroom (Tinto & Pusser, 2006). This feedback/monitoring loop, which Tinto identifies as one of the conditions for student success, also fits within and supports our push to build a culture of assessment at Midwest.

What is frequently described as engagement, or academic and social integration, is a condition for student success. The more students are involved both academically and socially, the more likely they are to persist and graduate, especially during their first year of study. This is the case because during the first year of study a student's sense of membership is tenuous, yet that membership is critical to subsequent learning and persistence (2001). First-year involvement serves as the bedrock upon which subsequent connections, both academically and socially, are built.

Theoretical Framework

These previous studies have examined the phenomena of retention and/or graduation by focusing primarily on the student experience. In this article, the focus of the research results presented will not differ. However, the majority of the previous research on retention utilizes

primary data or data collected via questionnaires or in-depth studies with students, rarely taking advantage of the wealth of data stored within the institution's memory banks or available through secondary analysis of datasets.

The existing research points to three types of support that promote success: academic, social, and financial. Academic Support includes developmental education courses, tutoring, study groups, and academic support programs such as supplemental instruction. Social Support is composed of counseling, mentoring, LGBTQ , and ethnic student centers. Support, both academic and social, needs to be connected to the campus environment, i.e., supplemental instruction would provide academic support that is directly attached to a specific class or group's needs.

Although the literature on retention is vast, there is very little that speaks directly to an institution such as Midwest College, whose freshmen to sophomore retention percentage was 95% for the 2011 cohort, compared to the national average for all four-year private non-profit institutions of 79.1% (NCHEMS); such institutions have not often been the beneficiaries of retention studies that speak directly to the experiences of students at their institutions. That said, the limited research that has focused on retention at selective, private non-profit liberal arts institutions has not only referenced the work of Tinto, but has spoken to his "five major theoretical perspectives on attrition: psychological, economic, societal, organizational, and interactional" (Hermanowicz, 2007).

My theoretical perspective is straightforward, holding that for two types of support that promote success (academic and financial) secondary data—at a national, selective, private, not-for-profit liberal arts college such as Midwest—are not only viable proxies for the types of

support that promote success, but also the only reliable measures. Furthermore, these types of aggregate analyses are a viable means of determining how to best allocate resources and where to implement additional programming.

Data and Methods

Midwest College provided the researcher with a dataset containing demographic information on 4,852 first-time full-time students who were fall enrollees at Midwest College from 2000 to 2011. The dataset included a variety of demographic information. This type of information ranged from information specific to the individual (gender, ethnicity, and nationality) to institution-specific information (Midwest College learning community participation, whether the student visited campus or not, and several admission measures). The dataset included information about each student's financial need, major(s), region, and other institutions the student had included in the FAFSA application. The dataset also included whether or not the student had taken a personal or medical leave, or had an academic and conduct suspension, while enrolled at Midwest College.

Because the focus of this research is on retention, all analyses employed a cohort-based approach measuring retention for first-time full-time degree-seeking students as the proportion of those freshman who returned for their sophomore year (first-year retention) and as the proportion of freshman who returned for their junior year (second-year retention). That is to say, the denominator is held constant and is always the size of the entering cohort. For example, first-year retention for the class of 2002 was measured as the percentage (92%) of freshman who re-enrolled the fall of their sophomore year.

For analysis of first-year retention, all 12 entering cohorts were used (fall 2000 through fall 2011). At the time of the analysis the entering cohort of fall 2011 could not be used for the analysis of second-year returners due to the fact that they had not had the opportunity to return for a second year. For calculating graduation rates, only cohorts within the dataset that had the opportunity to complete five years were used. Five years was chosen both to maximize sample size and to reflect the fact that Midwest College is a four-year residential liberal arts college where students are expected to graduate in four years. Though Midwest College reports a 150% time to degree, in comparison to other institutions this measure is not the norm.

Whether a student was retained or not was operationalized by restructuring the data. Simply stated, retention was determined by assessing whether the student was enrolled at the time of certified enrollment for the second (and third) fall semesters. Students who were not enrolled in their second or third fall semester but were on some sort of leave or suspended were determined to have been retained *if* they were enrolled in the first possible semester following their leave or suspension.

Retention and graduation are all dichotomous variables with binary coding structures where zero equals not retained or non-graduated and one equals retained or graduated. Predictive analyses took the form of logistic regression. A logistic model predicts the logit of Y from a variety of predictor $X's$, where the logit is the natural logarithm (ln) of the odds of Y occurring compared to not occurring. Since odds ratios are the probabilities (π) of Y happening (i.e., a student being retained or graduating) then $1 - \pi$ is equal to the probability of Y not happening. The logistic regression equation is expressed as follows: $logit\ (Y) = ln\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_1 X_1 +$

$\beta_2 X_2 + \beta_i X_i + e$. The constant ($\alpha$) is the Y intercept and β is the regression coefficient for each variable (X) and e is the error term (Cabrera, 1994; Peng, Lee, & Ingersoll, 2002).

Results

A total of 4,852 first-time full-time students enrolled at Midwest College during the fall semesters of 2000 through 2011. The average entering cohort at Midwest College was about 400 students. Over the course of the 12-year window, the average first year retention was 93% and the average second-year retention was 89% (see Table 1). Graph 1 plots first- and second-year retention rates over time.

Midwest College's academic, ethnic, international, and need profile has remained relatively consistent over time. A close descriptive examination of the percentages of students of color, Caucasian students, academic qualifications and need compositions revealed that there were no differences on these variables amongst the 12 cohorts. Furthermore, this stability is reflected in Midwest College's first- and second-year retention rates. This finding provides evidence for treating the individual cohorts as components of a single common population, thus providing statistical confidence and statistical power when interpreting the results. The populations' stability provided me with confidence that I was not committing a Type II error by reporting variables whose significance level were less than .1 but greater .05 as significant findings within this research.

Table 2 illustrates the results of three logistic regressions estimating the effect that a variety of measures have on retention (first- and second-year) and graduation. For the sake of space in this format, non-significant independent variables were not included in Table 2. All of the models used the same independent variables. Each estimate included dichotomous variables

representing the following ethnicities: Asian, African American, Latino/a, Native American, Multi-ethnic, and International students. In addition to ethnic group variables, independent variables representing gender, whether a student was from a contiguous state, first-generation, or in a STEM major, or if the student participated in a learning community unique to Midwest College, were included as controls in the estimates. Additionally, controls for "quality of student" represented by Midwest College's three admission measures, in the form of Midwest College GPA and the level of the student's financial need, were included in the models.

Table 2 presents only the significant findings from the three estimated models. The non-significant independent variables not included in the table include the three admission measures that denote the "quality of the student," and the dummy variables denoting gender, whether or not the student came from a border state, was first generation, was suspended for conduct reasons, visited the institution, or was African American, Native American, Multi-ethnic, or International.

First-Year Retention

The dummy variables representing medical and personal leaves, along with level of need, GPA, and learning community, were all significant predictors of whether a student was retained for the sophomore year. Both medical and personal leaves were negative predictors of first-year retention. Students who took medical or personal leaves had estimated beta coefficients (odds ratios) of -2.85 and -2.03, respectively. Both variables were significant ($p < .01$). This means that students who take a medical leave are about 42% less likely to be retained for a second year and that students who take a personal leave experience about a 96% decrease in the odds of being retained for a second year (Exp (B) = .58 and .13, respectively). Where need is concerned we

found the variable to be significant ($p < .1$) and with Exp (B) = 1.03 indicating that for every one thousand dollar increase in need a student has a 3% increase in the odds of being retained to year two.

GPA was a significant predictor of first-year retention. The estimated beta coefficient for GPA was 2.26 ($p <.01$). For every unit increase in GPA, we found that students experienced a several hundred percent increase in the odds of being retained (Exp (B) = 9.55) from their freshman year to their sophomore year. Students who participated in Midwest College's specialized learning community also experienced an increase in the odds of being retained for their second year. The learning community variable was significant ($p <.1$), with an estimated beta coefficient of 1.160 and Exp (B) = 3.19, meaning that learning community participants had a greater than 200% increase in the odds of being retained than did those who had not participated in a learning community.

Second-Year Retention

The same variables that were significant for first-year retention were also significant predictors of second-year retention, or those who retained for the start of their third year, save for the variable measuring the effect of Midwest College's learning community (see Table 2 for Beta coefficients and odds ratios). In addition, three additional variables were significant predictors of second-year retention: whether a student was a STEM major, Asian, or Latino/a. The STEM dummy variable was significant ($p < .1$) and had an odds ratio of Exp (B) = 2.71, indicating that STEM majors have a more than 150% increase in the odds of being retained for a third year compared to those who were not STEM majors. On the other hand, both Asian and Latino/a students experienced a decrease in the odds of being retained. The Asian and Latino/a student

dummy variables had estimated beta coefficients of -1.43 and -1.30, respectively, and both were significant ($p < .01$). The odds ratios for Asian and Latino/a students were Exp (B) = .24 and .27, respectively. This indicates that both groups experienced greater than a 70% decrease in the odds of being retained to their third year compared to other students.

Graduation

The same variables that were significant for predicting first-year retention were also significant predictors of graduating, except for the variable measuring the effect of Midwest College's learning community (see Table 2 for Beta coefficients and odds ratios). In addition, the dichotomous variable that denoted whether a student had been placed on academic suspension also was a significant predictor of graduation. This variable was significant ($p < .05$) with an estimated beta coefficient of -3.69 and an odds ratio of Exp (B) = .03, indicating that students who were suspended for academic reasons experienced a 97% decrease in the odds of graduating compared to those who were not suspended for academic reasons.

<div align="center">

Discussion

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The results of the logistic regression analyses provide great insight as to where to begin to focus our efforts. Midwest College's unique learning community proved effective in increasing the likelihood of students being retained for their second year. The program has existed at Midwest College for some years now and serves as a template to be replicated in and amongst other groups of students where the institution is experiencing difficulties retaining students. Midwest GPA was also a significant predictor of both first- and second-year retention as well as graduation. We find, as others have, that GPA is a positive predictor of engagement (Brint, Cantwell, & Hanneman, 2008; Kuh, Cruce, Shoup, & Kinzie, 2008). The problem with

this is that at Midwest, attrition is approximately equal across GPA quartiles. Thus, as a stop-gap measure, the institution should reach out to students who are struggling academically but not in danger of being suspended for academic reasons.

Medical and personal leaves both have negative effects on retention and graduation. A viable means by which Midwest College could combat these effects is by having faculty, advisors, and administrators remain in contact with students who are on these types of leaves. The effort required to implement this strategy would be minimal on the part of the institution but illustrates to students that the institution cares about their recovery and/or their personal situation. Where need is concerned the findings suggest that whatever Midwest College currently does is working for students with lower expected family contribution levels.

Where second-year retention is concerned we see the addition of three demographic groups to the significant variables affecting retention. Those students with STEM majors are more likely to be retained to their third (junior) year. It is possible that this result reflects a de facto learning community or peer connection effect. STEM majors at Midwest College are on a fairly linear course trajectory. STEM majors typically are in the same course levels at the same points in their academic careers. Thus, it is possible that STEM majors build sub-cohorts or develop stronger peer connections like those that are developed amongst students who eat together in an institution's dining halls and the sense of community that evolves from that experience (Harley & Morhew, 2008; Kennedy, 2001; Lawn, 2008). No claims are made regarding Midwest College's intentionality, but a similar effect might be seen in non-STEM fields if a similar structure were adopted.

At Midwest College, Asian and Latino/a students are more than 70% less likely to be retained for their third year. However, this is the only time that these groups of students are less likely to be retained. One possible explanation for this phenomenon is that the vast majority of Midwest College's Asian and Latino/a population are from the East and West Coasts and may incur cases of homesickness or prefer to leave for other reasons after a couple of years at Midwest College.

In addition to the variables affecting first-year retention, graduation is affected by a student being placed on academic suspension. Students who are placed on academic suspension are 97% less likely to graduate than those who are not suspended for this reason. This is a multifaceted problem. When placed on suspension, students cannot live on campus, are not communicated with after the suspension letter is sent, and have to take a full load upon successful petition to return. Furthermore, some students are asked to prove their ability to do college work while on suspension and regardless of credit hours taken, can only transfer nine credits into Midwest College. Thus, students who are placed on academic suspension are completely removed from Midwest College. They experience a complete disconnect with both the institution and the community and are left to fend for themselves. Furthermore, some students are told to prove that they are capable of handling college-level work before they can return to Midwest College while some attend other institutions on their own. So, not only are all ties with Midwest College effectively severed upon the suspension but they are forced to create, either by condition of suspension or desire to continue their education, an academic community within the halls of another institution. Furthermore, the fact that they struggle is not acknowledged by Midwest College because of the requirement to take a full academic load upon return.

Conclusion

The data suggest that Midwest College could increase its retention and graduation rates via a combination of three approaches. First, Midwest College's learning community is working. It is the suggestion of the researcher that they replicate this program in other targeted fields of study. Second, the linear course structure of the STEM classes at Midwest seems to create smaller, more tightknit communities. Though linearity of courses is difficult to achieve in the humanities and social sciences, if a similar structure in those fields could be reasonably closely replicated the evidence suggests that the net change in retention will be positive.

Third, existing work focusing on racial and ethnic groups within higher education leads us to believe that an institution's personnel must continue to work towards understanding how these students' college experiences impact persistence. The hope is that through continued work the institution's personnel will develop better understandings of how to meet the needs of these students personally, culturally, socially, and academically (Benitez, 2011; Pascarella & Terenzini, 1991, 2005; Rendón et al., 2000; Watson, Terrell, Wright, & Associates, 2002). Therefore, although Midwest College's Asian and Latino/a populations are disproportionately from the East and West Coasts, the institution's personnel must continue to search for ways to engage these groups personally, culturally, socially, and academically or risk their continued attrition.

Fourth, Midwest College should undertake efforts to communicate regularly with students who have been suspended for academic reasons. It would be useful for advisors, faculty members, and key administrators to reach out and make contact with these students so they know that they are still part of the Midwest College community. Fifth, a reduction in the required first-

year course load for students returning from academic suspension will also assist in their continued process toward completion. The combination of communicating regularly with academically suspended students and a reduction in the course load requirement may positively impact graduation rates at Midwest College.

Finally, although the quantitative analysis provides us with a global view of the problems with retention at Midwest College, this approach only informs us as to what groups to pay attention to and provides less information about what is working. Quantitative analysis does not provide us with information regarding why something is working. Therefore, future research in this area should adopt the approach employed by many qualitative researchers. That is, while Midwest College is replicating existing programs like the learning community and the linear structure of STEM courses, the institution also should conduct interviews and focus groups with students who currently are members of the learning community and STEM majors to gain insight into what aspects of the learning community and course structure is working and not working. By following this process, Midwest College will be able to continually evolve and grow to meet the needs of its students.

Chapter four will address how financial aid leveraging can be positively used to both increase revenues while increasing retention. Chapter five will draw conclusions learned from the various analyses as well as attempt to move beyond the data offering suggestions to institutions for improving their success measures.

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Table 9: First- and Second-Year Retention

Fall Semester	1st Year Retention %	2nd Year Retention %
2000	92%	90%
2001	92%	88%
2002	92%	88%
2003	93%	87%
2004	92%	87%
2005	92%	89%
2006	94%	92%
2007	94%	88%
2008	95%	91%
2009	92%	90%
2010	93%	87%
2011	95%	N/A%

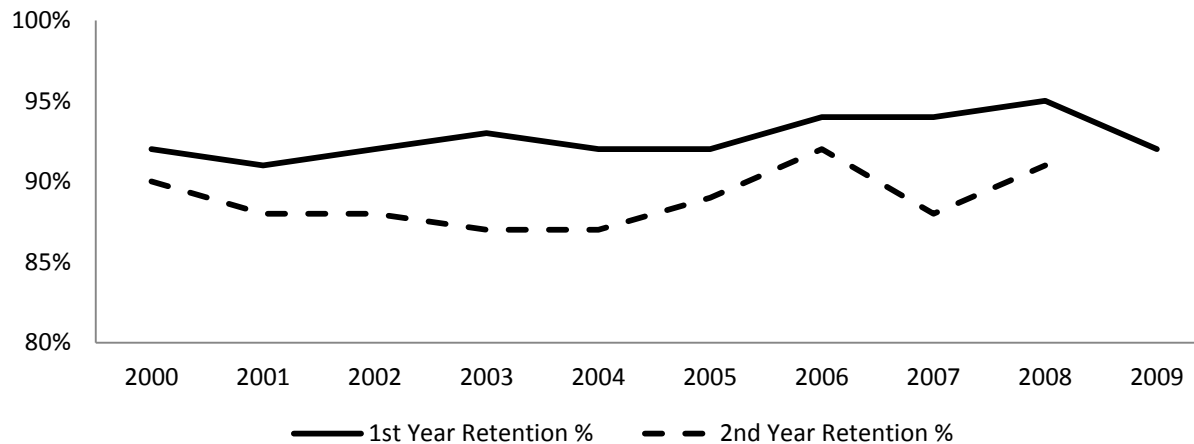**Graph 1 : Midwest Retention over Time**

Table 10: Logistic Regression Analysis of Retention and Graduation

	Dependent Variables					
	1st Year Retention Cohorts 2002 - 2011		2nd Year Retention Cohorts 2002 – 2010		Graduation Cohorts 2000 – 2006	
Predictor Variables	B	e^{β} (odds ratio)	B	e^{β} (odds ratio)	B	e^{β} (odds ratio)
Medical Leave	-2.850***	.58	-1.88***	.152	-4.30**	.014
Personal Leave	-2.029***	.132	-1.60**	.272	-1.99*	.137
Need	.34*	1.03	.29*	1.03	..09**	1.10
GPA	2.256***	9.548	2.489***	12.055	4.19**	65.74
Learning Community	1.160*	3.191	---	---	---	---
STEM	---	---	.99*	2.71	---	---
Asian	---	---	-1.43**	.24	---	---
Latino/a	---	---	-1.30**	.27	---	---
Academic Suspension	---	---	---	---	-3.69**	.03
Nagelkerke R^2	.533		.487		.724	

Note: 1st year retention N = 3989; 2nd year retention N = 3611; Graduation N = 2316
*p <.1. **p <.05. ***p <.01.

CHAPTER 4

FINANCIAL AID LEVERAGING: INCREASING REVENUES VS. RETENTION

Retention has been theorized about for over a generation. Most research on student

persistence and retention focuses on the experiences of undergraduate students. There is a large

body of research that explores social and organization factors that impact student retention in

higher education (Astin, 1984; Bean, 1981; Pascarella & Terenzini, 1991; Tinto, 1975, 1993)

The bulk of retention research has focused on social and academic integration, holding these two

aspects of integration as key to student retention. Though the integration model espoused by

Tinto is probably the most commonly employed model in student retention literature, it is not

without its critics (Draper, 2003; McCubbin, 2003). Early criticism of Tinto's model was that

some important external factors, i.e., finances, were not considered—a concern he directly

addresses in his more recent work (Tinto & Pusser, 2006).

The impact of financial factors on student persistence remains a critical issue for many

colleges and universities in the United States. This issue exists because attrition or dropout rates

remain at unacceptable levels—for students, families, elected representatives, the media,

employers, and institutions of higher learning. Studies have found that financial factors have a

significant influence on students' persistence and rates of attrition and retention (Adelman, 1999;

Braunstein, McGrath, & Pescatrice, 2001; Cabrera, Nora, & Castaneda, 1992a; Perna, 1998). All

of this research explores the impact of financial aid on retention in the context of the dollar

amount received by the student.

Exploring the impact of financial aid on retention from the perspective of the student

effectively ignores the institutional decision of how much net tuition revenue per student to

generate. To my knowledge the research exploring the impact of financial aid on retention

disregards the reality that academic institutions are operated like businesses. By doing so, the

prior research overlooks the institutions' natural disposition to protect their bottom lines, which means keeping discount rates low and net tuition revenue per student high. This practice is part of a larger concept within enrollment management known as financial aid leveraging. Additionally, no research exploring the impact of financial aid dollars employs the use of a global (Integrated Postsecondary Education Data System [IPEDS] universe) dataset.

Attrition continues to challenge educational systems. Over time, the percentage of students who drop out of traditional higher education institutions[7] has been relatively constant, ranging between 40-45% for the past 100 years (Tinto, 1982). The shear gravity of the body of research on retention, and the vastness of the theoretical frameworks and models that have been put forth to explain, describe, or predict student persistence, illuminates the fact that retention has no simple explanation or parsimonious solution that will help students complete their academic programs or fulfill their goals (Gilbert, 2000). The problem relating to a student's lack of persistence is complex and multidimensional.

The research presented within this text will explore the effects of financial aid leveraging strategies employed by institutions utilizing secondary data reflective of four-year public and private not-for-profit baccalaureate degree or higher-granting IPEDS institutions. As such, it is the hope of the author that this work will add to the corpus of research on retention as well as provide new insights into why financial aid dollars continue to be significant predictors of retention. Casting the institution in a commercial light may expose the use of aid dollars as an enrollment tool whose purpose is to entice an institution's most qualified applicants to enroll and less to retain students. Viewing aid dollars as such makes an institution's discount rate the product of the student enrollment process and for the most part controllable by the institution. Therefore, the discount rate, represented by net tuition revenue, will be used as a proxy measure

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[7] Traditional higher education institutions are defined as those with physical or brick and mortar locations.

of financial aid leveraging throughout this research. By doing so, it is my position that outside of a few targeted groups or those students with extremely low expected family contributions the impact of financial aid dollars on retention and graduation are by-products of financial aid leveraging[8].

Literature Review

Defining Retention

Defining "retention" is complex and problematic. This is reflected in the large body of research that presents inconclusive and often contradictory results. Retention studies typically address degree completion versus non-completion (IRP, 2003). However, retention in terms of program completion is only relevant for some groups of students. For others, learning success is most pertinent to achieving *their* objectives of participation (Kerka, 1988). The definition of retention is further complicated by different measures adopted by respective organizations. For the purpose of this research, we will adopt working definitions of retention, attrition, and persistence as presented below:

> Retention is continued student participation in an institution of higher education of first-year first-time degree-seeking students from year one to year two
>
> Attrition therefore is the number (percentage) of those students not retained from year one to year two
>
> Persistence is the result of first-time first-year degree-seeking students continuing their participation in an institution of higher learning through degree completion within a four-, five-, or six-year time span.

For *policymakers and administrators*, understanding factors or conditions that influence student performance helps ensure institutional effectiveness in lowering attrition. For *faculty and staff*, understanding factors or conditions that influence student performance and decisions to drop- or

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[8] Currently 46 institutions are need blind in admissions and commit to meeting full demonstrated need. They represent ~3 % of the institutions analyzed within this study.

stop-out helps promote interactions that will likely yield positive impacts on student decisions. For *students*, understanding these factors or conditions helps them to develop strategies in meeting challenges, creates positive learning experiences, and maximizes the potential for reaching their learning goals.

Recent Research

In 2004, the National Center for Education Statistics published a lengthy report analyzing longitudinal changes in undergraduate student aid and postsecondary education costs. The study highlighted the rapid increase of tuition at postsecondary institutions as well as enhancements to the financial benefits that resulted from the 1992 Reauthorization of the Higher Education Act. Financial aid became more available, especially in the form of loans and state or institutional grants. Decreases in Expected Family Contribution (EFC) benefited students with lower socioeconomic status. As tuition continued to rise, however, it was soon evident that students were expected to confront the financial burden of increased costs by taking on subsidized and unsubsidized federal loans, leading sometimes to large amounts of debt (Wei, Li, Berkner, & Carroll, 2004). Concerns about debt and meeting financial needs have prospective students calculating college costs as a factor in determining preferred schools (Adelman, 2006; Presley & Clery, 2001).

The effect of financial aid on persistence has become a focus of concern in national discussions. Recently, the Advisory Committee on Student Financial Assistance (2006) presented a report to Congress highlighting the concern of financial barriers for low- to moderate-income families. It was estimated that low- to middle-income students will fail to complete up to 2.4 million degrees due to financial barriers. The drastic increase of merit-based awards in the past decade fails to alleviate all problems, as many needy students do not qualify

for merit aid. Finally, students' heavy reliance on loans prompted officials to encourage policymakers to expand need-based aid programs. The report suggested several implications for changes in student aid policies to counter the financial barriers associated with degree attainment. Of the documents recommendations, two bore direct weight on the work presented within. Namely, to restrain increase in the price of colleges and offset necessary increases with need-based aid, moderate the trend—at all levels—toward merit-based aid.

The relationship between financial need and persistence is not always easily understood in simple terms. Generally, receiving work-study, grants, and academic-based aid has been found to be positively related to persistence and degree attainment (Adelman, 2006; Perna, 1998). Students may not always capitalize on these or other types of aid available to them, however. Although a wealth of information about financial aid has been made public, there is a wide gap in financial aid awareness and understanding among students and parents (Perna, 2006; see also www.luminafoundation.org/access). The lack of complete and accurate information can hinder academic progress of the student and can be especially perilous to low-income students if their financial needs are not adequately prepared for and met.

This project was initiated by DePaul University's Office of Financial Affairs to investigate the degree to which student financial difficulties hinder students' academic progress. The goal of the project was to provide support for possible discussions about interventions, techniques, and programs to reduce instances of student drop-out due to financial burdens. Specifically, while the investigation looked at financial blockages in general, the major concern was senior-level students in good academic standing who were close to graduation but had failed to re-enroll after receiving a financial blockage from the University. For students close to

graduation, a financial blockage due to financial difficulties may limit or prevent degree attainment; therefore intervention or supplemental aid programs may be appropriate.

Discount Rate

The focus of this research, like retention, is multi-faceted. Though multi-faceted, this research will focus primarily on two phenomena: retention (persistence and attrition) and the discount rate—the proxy measure for financial aid leveraging. These two phenomena provide the empirical leverage necessary to speak to the larger purpose of this study. The purpose of the study is to demonstrate how institutional characteristics can and do affect the behavior of their students. Inasmuch, this research will build upon the work of scholars such as Porter & Stephens, 2010) by paying particular attention to the effects that discount rates have on retention, persistence, and attrition. This research will explore the effects of institutional decisions on student behavior. Furthermore, by controlling for a myriad of institutional characteristics, such as endowment, selectivity, and admission policies, I will be able to isolate the effects of discount rate.

Research to date has focused on the relationship between retention and financial aid from the perspective of the student. This research generally falls into one of two categories, either how many dollars and what type of dollars the student received, or the value that the student placed on the education given other opportunities present within the environment, i.e., the economy or, more specifically, the job market. Inasmuch as the research has held that increasing aid dollars leads to increased retention and persistence, I present no dissent. Furthermore, these studies have found that financial aid dollars positively impact retention. However, what has been missing in the research exploring the impact of financial aid dollars on retention and persistence has been the intentionality of institutional decisions. Even among researchers who have explored the

effects of institutional characteristics on student behaviors, an explicit exploration of institutional decisions, specifically financial aid leveraging, has been missing.

Financial Aid Leveraging

Financial aid leveraging, sometimes referred to as "price discrimination" or "tuition discounting," is used by most colleges and universities to achieve goals related to student enrollment. Most institutions agree that care should be taken not to award unsustainable amounts of institutional resources in an effort to replace what families would otherwise be charged. However, according to Noel-Levitz (2009a), a surprisingly low number of academic institutions (~20%) admit to having an enrollment plan that includes the strategic award of institutional aid. Though only about 20% admit to having an actual enrollment plan that strategically awards institutional aid, coupling the fact that the majority of institutions take care to award only *sustainable* amounts of institutional aid speaks to the academies' attempt to maximize net tuition revenues. More importantly, this highlights the *control* that an institution has in the kind and size of aid package a student receives.

The financial aid literature is replete with observations and predictions of the effect of financial aid on commonly-defined success measures like retention and graduation. To my knowledge all of the research on financial aid focuses on the student. Making claims such as, on average, those students receiving *x* were retained at *xx*% places no responsibility on the institution, completely ignoring its ability to control its price point in general and its net tuition revenue specifically. Among private colleges nationally, the average tuition discount rate was 36% according to a study conducted by Noel Levitz (2010a). Local conditions of colleges and universities make it difficult to generalize about an optimum level of tuition discounting for individual institutions. However, using predictive modeling, we hope to be able to answer the

question of the ideal discount rate an institution should aim for to maximize retention and graduation, controlling for endowment among other variables.

Currently some institutions effectively balance financial aid awards and tuition discounting at a level sufficient to inspire enrollment decisions without unnecessary compromise to the level of revenue required for their operational expenditures. Colleges and universities depend upon high yield (the percentage of students offered admission who enroll) and strong retention rates (students who return for a second year of attendance) to meet enrollment targets that are essential to generate revenue critical for operations and to retain good standing in national rankings that are influenced by these metrics. As tuition continues to rise, students are expected to confront the financial burden of increased costs by taking on subsidized and unsubsidized federal loans, leading sometimes to large amounts of debt (Wei, Li, Berkner, & Carroll, 2004). Concerns about debt and meeting financial needs have prospective students calculating college costs as a factor in determining preferred schools (Adelman, 2006; Presley & Clery, 2001).

In 2004, the National Center for Education Statistics published a report analyzing longitudinal changes in undergraduate student aid and postsecondary education costs. The study highlighted the rapid increase of tuition at postsecondary institutions (see Figure 1) as well as enhancements to the financial benefits that resulted from the 1992 Reauthorization of the Higher Education Act. Financial aid became more available, especially in the form of loans and state or institutional grants, and decreases in Expected Family Contribution (EFC) amounts benefited students within lower socioeconomic status groups. What's missed in this conversation is that a student is merely reacting to market conditions. Institutions are actively trying to maximize

tuition revenue (Davis, 2003) and in an effort to maximize revenues students taking loans to finance college is a better option than the institution making a little less income.

Theoretical Framework

The structural theoretical framework presented in this article borrow from scholars such as Bean (1981). Structurally, students are the academy's equivalent of customers. By employing an organizational view that looks at the institution like any other company attempting to sell goods to maximize its profit, the logic of financial aid leveraging is easier to see.

Today's parents and students have a plethora of choices as the number of institutions has grown over the years. Coupled with a boom in information and access to higher education while disposable incomes have precipitously dropped, it is no wonder that institutions actively try to control their discount rate. This active attempt to control the discount rate is known as financial aid leveraging. The act of financial aid leveraging is the institution's attempt to maximize its revenues from tuition and fees. This wouldn't be problematic except for the fact that we know from previous work in the retention arena that the greater the financial aid students receive the more likely they are to be retained.

Therefore the theory presented within this article holds that the financial aid leveraging is counter-productive to increasing retention. The theory holds that an institution's attempt to leverage its financial aid dollars is reflected within by the resulting discount rate, asserting that the higher the discount rate the higher retention will be. What must be understood here is that to an institution a high(er) discount rate is a failure of the attempt to control it, or in other words a failure of its attempts to leverage its financial aid dollars.

Hypotheses

Based on what is already known about the effect of financial aid dollars, the limitations of time and resources, and the nature of this analysis, this article is limited to two hypotheses directly answerable from the available data. When the aforementioned is combined with the general goals and strategies pursued by institutions, the following three hypotheses are offered:

H_1: Institutions with higher tuition and fee discount rates will have lower attrition rates (higher levels of retention) .

H_2: Institutions with higher total cost of attendance discount rates will have higher rates of retention (lower levels of attrition).

Bothhypotheses one and two will be addressed using inferential statistics with additional support for hypothesis two taking the form of correlation statistics.

Data and Methods

Secondary data were used for this analysis. The data were downloaded from the Integrated Post-Secondary Education Data System (IPEDS). In total, data on 1,449 institutions of higher learning from 2008 to 2011 were selected using the following criteria. The 1,449 institutions were all public or private not-for-profit 4-year or above U.S. institutions with degree-granting status of primarily baccalaureate or above. About a third (537) of the institutions represented within the dataset were public four-year or above, with the remaining 912 being private not-for-profit four-year or above institutions. They all had basic 2010 Carnegie Classifications of Baccalaureate/Associate's Colleges; Baccalaureate Colleges--Diverse Fields; Baccalaureate Colleges--Arts & Sciences; Master's Colleges and Universities (smaller programs); Master's Colleges and Universities (medium programs); Master's Colleges and

Universities (larger programs); Doctoral/Research Universities; Research Universities (high research activity); and Research Universities (very high research activity).

IPEDS holds data on the independent and dependent variable(s) of interest going back four years. The dependent variable of interest is first-year retention. First-year retention is defined as the percentage of first-time full-time students who enter in one fall and return the next fall, and was operationalized as the four-year average.

Twelve independent variables used as predictors of retention. The percentage of students admitted and the percentage of full-time students yielded were both used as controls within the ordinary least squares (OLS) model. The percentage of admitted students represents the selectivity of an institution and the percentage of students yielded represents the desirability of the applicant pool to attend said institution. Each variable was operationalized as four-year averages. Also controlled for within the model was the size of the institution, by including a variable within the model reflecting the average fall full-time enrollment measured in thousands of students.

Three variables representing the type of funding a student received were also included as controls within the model. The four-year average percentage of undergraduates receiving Pell Grants, other federal grant aid, and institutional grant aid were also included within the model. Since our primary interests are with retention, the model also controlled for the average percentage of students transferring out of an institution.

The arguments made within the text are structural, holding that institutions have a choice in how to package students and that this choice is represented in the discount rate, which is reflective of the financial aid leveraging practice. To control for an institution's wealth, the four-

year average endowment assets per student FTE was estimated as a control within the OLS model.

To control further for institutional wealth, the four-year average percentage of core revenues accounted for by tuition and fees was also included in the model. The average cost of attendance was derived by averaging the in-district, in-state, and out-of-state cost of attendance and dividing that cost by 1000. The variables selected from IPEDS allowed me to know both the average cost of attendance per institution and the average cost of tuition and fees per institution. This information provided the derived measure of average tuition and fee discount rate. This was operationalized as the average tuition and fee revenues generated per student divided by the average dollar amount of tuition and fees.

The final independent variable included within the model is the one of most concern. The average cost of attendance discount rate in thousands of dollars was operationalized as the average dollar amount of tuition and fees received by the institution divided by the average dollar cost of attendance. The cost of attendance discount rate is treated as the result of an institution's attempt to leverage its financial aid dollars to maximize its revenue generated from tuition dollars.

Analysis of the data took two forms: descriptive and inferential. Descriptive statistics are provided for all institutions by sector, which used by IPEDS to differentiates public and private institutions as well the institutional degree focus, i.e., public four year and above and private not-for-profit four and above and Carnegie classification. Some institutions did not report on some of the key variables aforementioned. Because of this two sets of descriptive tables are presented. One set highlights the averages for all institutions within a sector or Carnegie classification and the second set presents these same numbers for only those institutions that reported. The

inferential statistics take the form of OLS regression using four-year average retention as the dependent variable and the 12 independent variables mentioned above as predictors. The OLS models were estimated only for those institutions for which complete information is available.

Results

Descriptive Statistics

Data analyses presented are based on 1,449 institutions. Of the 1,449 institutions, we were able to derive dependent and independent variables of interest on 1,368, or 94%, of those that fit the IPEDS selection criteria. Of these, 877, or 64%, were from the private not-for-profit, four-year or above sector. The remaining 37%, or 491 institutions, analyzed within were from the public four-year or above sector. Master's colleges and universities with larger programs accounted for the largest proportion (25%) of the 1,368 institutions analyzed. Baccalaureate colleges with a focus on the arts and sciences were the second most prevalent type of institution, accounting for 20% of the 1,368 sampled (see Table 1).

For public institutions the average admission rate was 67%. On average, public institutions yielded 41% of their admitted students. In comparison, private not-for-profit institutions had an average admission rate of 60% and an average yield rate of 35%. Additionally, public institutions reported an average transfer out rate of 23%, compared to 19% for private not-for-profit institutions. These rates varied across Carnegie classification. For instance, the admission rate for public research universities with very high research activity was 63% but for private not-for-profit similar institutions the admission rate was 26%. The yield rate for this classification of institution was also different for the two sectors of institutions. For public research universities with very high research activity the yield was 38%, and for private not-for profit institutions this rate was 15%. The largest contrast, however, was found in the

comparison of transfer out rates. The transfer out rate for the public research universities with very high research activity was 15%, in comparison to 6% for privates (see Table 2).

The differences and similarities between the public and private institutions continued to materialize as the descriptive analysis progressed. For instance, the percentage of core revenues derived from tuition and fees were dramatically higher for private not-for-profit institutions (except for research universities with very high research activity), averaging 59% in comparison to 31% for public institutions. However, the average tuition and fee discount rate was very similar across the two sectors of institutions analyzed within this paper. For public institutions this rate was 58% compared to 56% for private institutions. That said, where the discount rate is concerned the two sectors diverge sharply again. Private institutions on average provide a 37% discount rate compared to a 26% discount rate for public institutions (see Table 3).

Public and private institutions were very similar in the percentage of students receiving federal grant aid—36 and 35%, respectively. This similarity continued for the percentage of Pell grant recipients; 35% of the students at public institutions received Pell grants compared to 33% of the students at private institutions. The difference is stark when comparing the percentage of students receiving institutional grant aid. Institutional grant aid is provided to about 37% of students at public institutions but 80% of students at private ones (see Table 4).

Inferential Statistics

Using SPSS version 20 correlation an estimate on 1368 institutions was estimated. Additionally, an OLS regression model was estimated on the 626 institutions, 308 public and 318 private not-for-profit institutions, for which complete data were available. A significant positive correlation was found between average the total cost of attendance discount rate in thousands of dollars and retention $r(1368) = .41$, $p < .001$. Twelve independent variables were used to

estimate the effect of institutional traits on first-year retention. The results of the regression indicated that nine of the 12 institutional measures significantly predicted the institution retention rate (R^2 of .68, $F (12,613) = 113.18$, $p < .001$). The estimated model produced an adjusted R^2 of .68. Thus the model explained roughly 68% of the variance in retention.

Table 5 illustrates the coefficients and level of significance for the partial slopes estimated within the model. It was found that the four-year average admission percentage significantly predicted retention ($\beta = -.116$, $p < .001$), as did four-year average yield percentage ($\beta = -.044$, $p < .05$). Additionally, the average four-year headcount was a significant predictor of retention ($\beta = .386$, $p < .001$) as was the transfer out rate ($\beta = -.189$, $p < .001$). Though the four-year average percentage of students receiving federal grant aid was close to being significantly significant ($\beta = -.127$, $p > .05$), it was among the three variables that were not significant in the estimated model.

The four-year average percentage of students receiving Pell grants was a significant predictor of retention ($\beta = -.148$, $p < .05$), but the average percentage of students receiving institutional grant aid was not a significant predictor ($\beta = -.016$, $p > .1$). Also, amongst the institutional financial strength indicators that were not significant was endowment ($\beta = -.001$, $p > .1$). The four-year average of the percentage of core revenues was a significant predictor of retention ($\beta = -.088$, $p < .001$), as was the average cost of attendance ($\beta = .223$, $p < .001$). Additionally, average tuition and fees and the cost of attendance discount rates were both significant predictors of retention ($\beta = 11.91$, $p < .01$, and $\beta = 20.78$, $p < .01$, respectively).

Discussion

The results indicate that institutional measures in general are effective predictors of retention. More importantly, the measures used within the estimated model that were specific to

the institution's attempt to control the cost of attendance have a significant impact on retention. The results presented lead us to reject the null hypothesis for hypothesis one and fail to reject the null hypothesis for hypothesis two. Figure 1 clearly demonstrates a relationship between the cost of attendance discount rate and retention that is presented in the results as a correlation estimate. More importantly, Table 5 highlights the effect both types of discount rate while controlling for the effects of an institution's endowment. The collective weight of the data leads us to believe that institutions, in an effort to maximize tuition and fee revenues, unwittingly negatively affected their retention rates. It is also important to note that this effect is present across institution type. That is, financial aid leveraging has a negative effect for both public and private not-for-profit institutions.

The signs of the coefficients explain it all! For every thousand dollars in cost of attendance discount rate an institution provides there is a correlating 20% percentage point increase in retention. What's interesting here is that an institution can increase the cost of attendance by a thousand dollars and still produce an increase in retention. Additionally the data indicate that discounting tuition and fees alone has a negative impact on retention. However, the negative affect of discounting tuition and fees is still overridden by the positive effects of discounting the cost of attendance. When all financial variables are considered there is still roughly a 10% percentage point gain to be had by a thousand dollar increase in tuition and fees because what is really driving retention is the cost of attendance discount rate. Or to put it another way, a 3% increase in tuition and fees accompanied by a 2% increase in the cost of attendance discount rate will produce both increased revenues and higher retention. This is important because it indicates that an institution can increase the revenues generated—the purpose of financial aid leveraging—and increase retention.

Revenues are important! Institutions of higher education operate in increasingly competitive markets. The level of support that government agencies are providing continues to decrease, and in a tough economic climate more and more Americans are returning to college. Many institutions are not in the position to walk away from charging tuition and fees. They operate in environments where they rely increasingly on the revenues generated from tuition and fees.

The largest claim made within this document is that discount rate is the result of the act of financial aid leveraging and therefor can be used as a proxy for the practice. I believe that, when the evidence is considered in total, this claim is supported. The regression analysis provides clear concise evidence that increasing total cost of attendance while simultaneously increasing the discount rate will produce higher levels of retention. What is important here is that the discount rate increase does not have to match the increase in the total cost of attendance. Thus the purposeful institution could use this information to demonstrate compassion and increase its retention rate while increasing all-too-precious revenue streams.

Chapter five will draw conclusions learned from the various analyses as well as attempt to move beyond the data offering suggestions to institutions for improving their success measures.

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Table 11. Carnegie Classification Institution Sector

	Sector of institution						Total	
	N Public	% w/in Public	Public % of Total	N Private not-for-profit	% w/in Private	Private % of Total	Carnegie % of Total	Carnegie N
Research Universities--Very high research activity	72	15%	5%	34	4%	2%	8%	106
Research Universities--High research activity	72	15%	5%	23	3%	2%	7%	95
Doctoral/Research Universities	28	6%	2%	39	4%	3%	5%	67
Master's Colleges & Universities--Larger programs	158	32%	12%	188	21%	14%	25%	346
Master's Colleges & Universities--Medium programs	56	11%	4%	90	10%	7%	11%	146
Master's Colleges & Universities--Smaller programs	33	7%	2%	49	6%	4%	6%	82
Baccalaureate Colleges--Diverse fields	26	5%	2%	219	25%	16%	18%	245
Baccalaureate Colleges--Arts and Science	45	9%	3%	231	26%	17%	20%	276
Baccalaureate/Associate's Colleges	1	0%	0%	4	0%	0%	0%	5
Total	491		36%	877		64%	100%	1368

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Table 12. Carnegie Classification by Measures of Selectivity and Transfers

	Sector of institution					
	Public			Private		
	4 year Avg. Admit %	4 year Avg. Yield %	4 year transfer out %	4 year Avg. Admit %	4 year Avg. Yield %	4 year transfer out %
Research Universities--Very high research activity	63%	38%	15%	26%	41%	6%
Research Universities--High research activity	71%	38%	22%	58%	27%	15%
Doctoral/Research Universities	68%	42%	22%	64%	28%	20%
Master's Colleges & Universities--Larger programs	66%	41%	23%	68%	30%	25%
Master's Colleges & Universities--Medium programs	68%	43%	24%	68%	34%	25%
Master's Colleges & Universities--Smaller programs	70%	37%	24%	68%	34%	22%
Baccalaureate Colleges--Diverse fields	60%	44%	27%	59%	31%	18%
Baccalaureate Colleges--Arts and Science	69%	48%	25%	65%	37%	25%
Baccalaureate/Associate's Colleges	N/A	N/A	N/A	65%	50%	15%

Table 13. Carnegie Classification by Measures of Revenues and Costs

	Sector of institution							
	Public				Private			
	% of Core Revenues form Tuition & Fees	Average Tuition & Fees discount rate	Average cost of attendance discount rate	Average cost of attendance in thousands	% of Core Revenues form Tuition & Fees	Average Tuition & Fees discount rate	Average cost of attendance discount rate	Average cost of attendance in thousands
Research Universities-- Very high research activity	25%	67%	33%	$27	25%	57%	41%	$54
Research Universities-- High research activity	31%	67%	31%	$24	55%	61%	41%	$46
Doctoral/Research Universities	30%	59%	26%	$22	74%	61%	41%	$42
Master's Colleges & Universities--Larger programs	33%	58%	25%	$21	78%	57%	37%	$38
Master's Colleges & Universities--Medium programs	28%	53%	23%	$21	74%	56%	37%	$35
Master's Colleges & Universities--Smaller programs	27%	52%	23%	$20	70%	57%	37%	$35
Baccalaureate Colleges-- Diverse fields	25%	56%	24%	$19	53%	56%	39%	$41
Baccalaureate Colleges-- Arts and Science	28%	54%	24%	$19	63%	56%	35%	$31
Baccalaureate/Associate's Colleges	54%	53%	22%	$25	41%	44%	24%	$24

Table 14. Carnegie Classification by Measures of Student Need and Resource Distribution

	Sector of institution							
	Public				Private			
	4 year Avg. % Receiving Federal Grant Aid	4 year Avg. Receiving Pell Grant	4 year Avg. Receiving Institutional Gran	4 year Avg. Endowment in hundreds of thousands	4 year Avg. % Receiving Federal Grant Aid	4 year Avg. Receiving Pell Grant	4 year Avg. Receiving Institutional Gran	4 year Avg. Endowment in hundreds of thousands
Research Universities--Very high research activity	24%	23%	47%	7671	16%	13%	58%	51099
Research Universities--High research activity	30%	30%	47%	1444	21%	20%	79%	5612
Doctoral/Research Universities	44%	42%	35%	397	32%	30%	85%	1766
Master's Colleges & Universities--Larger programs	37%	36%	34%	283	35%	33%	89%	635
Master's Colleges & Universities--Medium programs	40%	39%	37%	168	36%	34%	88%	495
Master's Colleges & Universities--Smaller programs	41%	40%	34%	96	41%	39%	88%	307
Baccalaureate Colleges--Diverse fields	35%	33%	40%	212	29%	27%	81%	2094
Baccalaureate Colleges--Arts and Science	43%	42%	42%	59	45%	43%	85%	247
Baccalaureate/Associate's Colleges	32%	32%	22%	26	58%	55%	66%	75

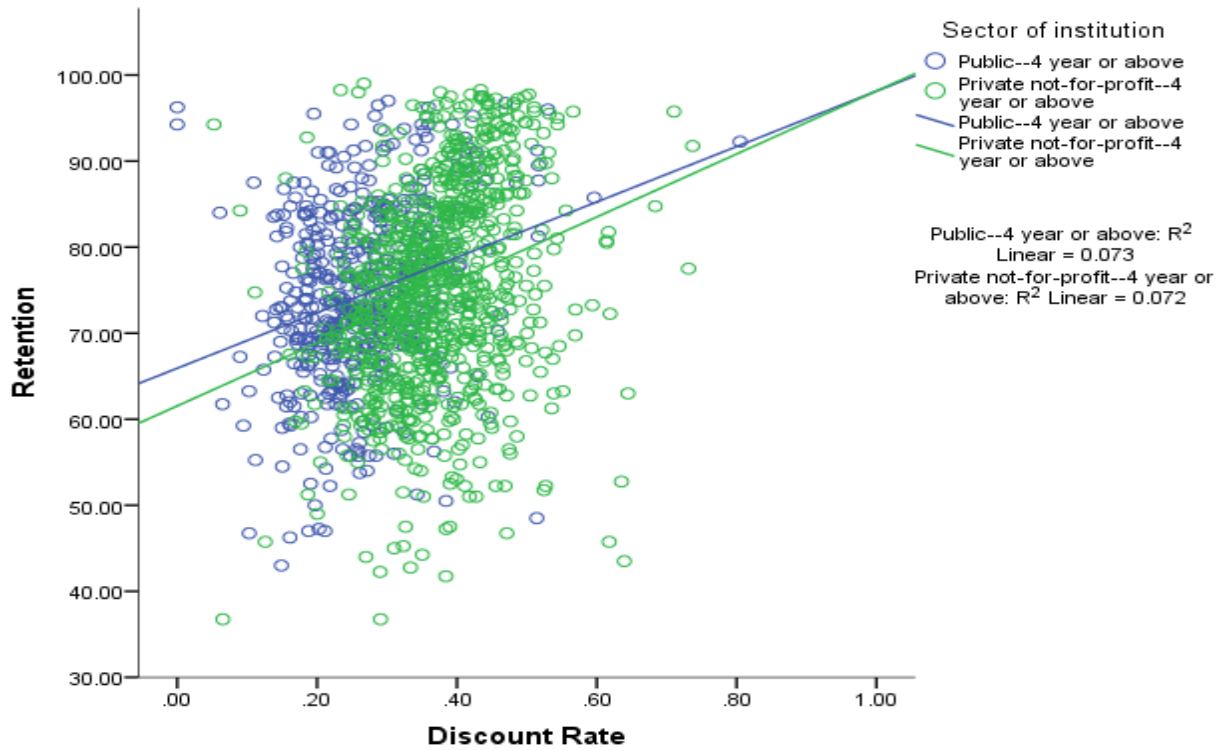Figure 1. Relationship between Discount Rate and Retention by Institution Type

Table 15. Summer of OLS Regression for Variables Predicting Retention (N = 626)

	Institution Retention Model			
	B	*SE. B*	*β*	
4 year Avg. Admit %	-0.12	0.02	-0.18	***
4 year Avg. Yield %	-0.04	0.02	-0.06	*
Headcount in thousands	0.39	0.04	0.28	***
4 year transfer out %	-0.19	0.02	-0.22	***
4 year Avg. % Receiving Federal Grant Aid	-0.13	0.07	-0.18	
4 year Avg. Receiving Pell Grant	-0.15	0.07	-0.21	*
4 year Avg. Receiving Institutional Grant	-0.02	0.01	-0.05	
Endowment	-0.01	0.00	-0.04	
% of Core Revenues form Tuition & Fees	-0.09	0.02	-0.20	***
Average cost of attendance in thousands of dollars	0.22	0.05	0.22	***
Average Tuition & Fees discount rate	-11.91	3.79	-0.16	**
Average cost of attendance discount rate	20.80	6.77	0.20	**
Adjusted R^2	0.68			
Constant	93.98	2.64		

Notes: Dependent Variable = 4 Year Average First Year Retention

***$p < .001$. ** $p < .01$, * $p < .05$

CHAPTER 5

CONCLUSION

To conclude I will summarize the findings presented in Chapters two through four and provide an additional insight or two. Additionally, I will provide a brief discussion of what I think this all means when the collective weight of the evidence is taken in its totality. As I read to write this paper I continually ran into articles highlighting the role in community building that dinning services plays. Community building takes many forms within the institution. The community building efforts of dining services can be operationalized and measured in order to better assess the impact that this has on levels of engagement. Community is not the only operational form that engagement can take. However, when it comes to the role that dining services plays within the academy, community building seems to be its most notable auxiliary function. The focus of this chapter was to propose a pilot study that explores dining services in order to better understand the role that dining services plays in retention and matriculation. Furthermore because of what we know about view books, dining services might even play a role in enrollment.

The R^2 was low in the model estimated within this chapter which makes it difficult to draw hard conclusions about the effect dining services has on engagement. But some things are clear. It is clear that dining services via their community building mission positively impacts engagement in institutions of higher education. It is also clear that this impact is most forcefully felt at the earlier stages of a student's collegiate career, which is where it is most important to engage students. In future research I would like to develop a measurement instrument that more accurately captures both engagement and perceptions of dining services.

The data in Chapter 3 provides evidence that Midwest College could increase its retention and graduation rates via a combination of approaches. Midwest College's learning community is working. It is the suggestion of the researcher that they replicate this program in other targeted fields of study. Secondly, the linear course structure of the STEM classes at Midwest seems to create smaller, more tightknit communities. Though linearity of courses is difficult to achieve in the humanities and social sciences, if a similar structure in those fields could be reasonably closely replicated the evidence suggests that the net change in retention will be positive.

Third, existing work focusing on racial and ethnic groups within higher education leads us to believe that an institution's personnel must continue to work towards understanding how these students' college experiences impact persistence. The hope is that through continued work the institution's personnel will develop better understandings of how to meet the needs of these students personally, culturally, socially, and academically (Benitez, 2011; Pascarella & Terenzini, 1991, 2005; Rendón et al., 2000; Watson, Terrell, Wright, & Associates, 2002). Therefore, although Midwest College's Asian and Latino/a populations are disproportionately from the East and West Coasts, the institution's personnel must continue to search for ways to engage these groups personally, culturally, socially, and academically or risk their continued attrition.

Fourth, Midwest College should undertake efforts to communicate regularly with students who have been suspended for academic reasons. It would be useful for advisors, faculty members, and key administrators to reach out and make contact with these students so they know that they are still part of the Midwest College community. Finally, a reduction in the required first-year course load for students returning from academic suspension will also assist in their

continued process toward completion. The combination of communicating regularly with academically suspended students and a reduction in the course load requirement may positively impact graduation rates at Midwest College. By following these processes, Midwest College will be able to continually evolve and grow to meet the needs of its students.

The results in Chapter four indicate that institutional measures in general are effective predictors of retention. More importantly, the measures used within the estimated model that were specific to the institution's attempt to control the cost of attendance have a significant impact on retention. Figure 1 clearly demonstrates a relationship between the cost of attendance discount rate and retention that is presented in the results as a correlation estimate. More importantly, Table 5 highlights the effect both types of discount rate while controlling for the effects of an institution's endowment. The collective weight of the data leads us to believe that institutions, in an effort to maximize tuition and fee revenues, unwittingly negatively affected their retention rates. It is also important to note that this effect is present across institution type. That is, financial aid leveraging has a negative effect for both public and private not-for-profit institutions.

Discussion

Revenues are important! Institutions of higher education operate in increasingly competitive markets. The level of support that government agencies are providing continues to decrease, and in a tough economic climate more and more Americans are returning to college. Many institutions are not in the position to walk away from charging tuition and fees more and more are operating in environments where they rely increasingly on the revenues generated from tuition and fees. However, we know from previous research that the higher the economic burden on students, the more likely they will be to attrit. The question then becomes, how do we (as in

institutions of higher education) increase revenue streams while increasing persistence. I posit that we do this be increasing our efficiencies in order to maximize our economies of scale.

Midwest University Dining Services offers a prime example of how institutions can both maximize their economies of scale through increased efficiencies, leads to greater profitability that have a positive impact on persistence. MWUDS had to compete against several national and commercial kitchen operations. They won a competitive bidding process which led to MWUDS's dining services remaining in house. That is, dining services at MWU is not out sourced. I have heard enough tales through the years of how students have been angered by the approaches taken by commercial kitchen operations when they replace the institutions in house dining services staff and services rendered. I caution institutions seeking to decrease its operating budgets from offering dining services as a sacrificial lamb. Engaging and retaining students is an institutional effort. As evidenced by the out pouring of love at my own graduation for the "little old lady" who swiped student ID's at the cafeteria whose line of new graduates waiting to say goodbye to her during our recessional march was nearly twice as long as most professors.

Midwest College offers another example of how an institution can maximize it economies of scale by increasing its efficiencies while again positively effecting retention. By using aggregate measures of group or program membership we are able to predict the impact said group or program will have on our desired outcome. What we sacrifice is a information regarding why something is working. However, all things being equal, I would rather know that something is working, save the cost both monetary and temporal of understanding why and replicate for the predicted positive impact. At minimum, you save the cost of recruited student which at Midwest College is roughly five thousand per. Furthermore, the cost of replication is where both program replication and course structure are concerned exist in the cost of

repurposing employees who used to recruit, making the cost savings from not having to recruit the student who departed without completing pure profit.

Institutions should embrace the idea of financial aid leveraging. They should design and implement goals and strategies based on the concept and aggressively pursue their targets. The signs of the regression coefficients explain it all! On average every thousand dollars in cost of attendance discount rate an institution provides there is a correlating 20 point increase in retention. Financial aid leveraging is a multi-faceted and fickle beast. It is as much art as it is science. That said, we found that an institution can increase the cost of attendance and still produce an increase in retention. Additionally the data indicate that discounting tuition and fees alone has a negative impact on retention. My suggestion is that we depart from discussing the discount rate in terms of tuition and fees alone and move the conversation to what the data indicates is truly driving decisions…the cost of attendance discount rate. By using this as our reference point, we gain elasticity in tuition and fee price setting, more accurately address the driving force behind decisions to stay or dart, gain the potential to significantly impact retention, and increase our revenues.

In summation, the collective weight of the evidence leads me to believe that instittuions of higher education would be best served if they adopted some of the strategies discussed within the corpus of this dissertation. I have long believed that though our cause is noble, our retail practices interfere with our ability to truly realize our honorable goals. When I have spoken about higher education in market or retail terms in the past, I have been met with what varied from mild irritation to outright disdain. However, the dissertation process has left me more convinced than ever that the academy is like any other retailer: it sales a product, has many competitors and must have both brand recognition and repeat customers if it is to survive long

term. Therefore, I urge institutions to embrace their economic realities and seek ways that will maximize retention and minimize the bottom line without compromising the level of service provided to the customer. This is no easy route to take, but one in which I believe this dissertation provides a roadmap for.