

CAMPUS RECREATION AND RETENTION IN HIGHER EDUCATION: A PREDICTIVE
CORRELATIONAL STUDY

by

Christopher John Misiano

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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APPROVED BY:

Michael Shenkle, Ed.D., Committee Chair

Kurt Michael, Ph.D., Committee Member

ABSTRACT

Campus recreation facilities and programs provide various environments and opportunities outside of the classroom for students to socialize, participate in sports, improve their physical fitness, and learn new skills. Existing research has explored the relationship between participation in campus recreation and the social, academic, and physical impacts it has on the lives of students. The purpose of this quantitative correlational study was to determine if participation in various types of campus recreation held predictive significance regarding year-over-year retention of first year college students at a large, private university. The predictor variables were participation in club sports, intramural sports, outdoor recreation, student activities events, and usage of the on-campus fitness center. Archival data drawn from the university's database of records provided a sample of 2,857 students for the 2017-2018 academic year, 2,780 students for the 2018-2019 academic year, and 2,742 students for the 2019-2020 academic year. Logistic regressions were conducted at the 95% confidence interval which produced results indicating statistical significance for the full model for all three years. Of the predictor variables, student activities participation displayed significance all three years, intramural sports participation was significant twice, and fitness center usage was significant once. Odds ratios for the predictor variables revealed that four out of five were positively associated with retention for each academic year. The results from this study add to the existing body of literature that explores the relationship between various types of campus recreation and year-over-year retention. Additionally, these results demonstrate a link between social events and year-over-year retention.

Keywords: retention, campus recreation, freshmen, higher education budgets

Dedication

This dissertation is dedicated to my wife and children. My wife has sacrificed her time and energy over the past several years in order to assist me in my educational pursuits. She has been a faithful source of encouragement and support while I took classes, completed homework assignments, conducted research, and typed for hours upon hours. She impresses me daily with her charm, her wit, and her selflessness. I am thankful for her, and I love her more and more with the passing years.

I also dedicate this to my children, who are still small enough that it seems to them that Dad has always been “in school”. The Psalmist wrote that “children are a heritage from the LORD” and I have been blessed enough to see that in my own life. Each of my children fill me with joy in their own unique way, and it is my prayer that they will look back on this period of their lives with fondness. They have provided me with the inspiration necessary to complete this dissertation.

To my family, in the words of Marilynne Robinson, who wrote: “I’m writing this in part to tell you that if you ever wonder what you’ve done in your life, and everyone does wonder sooner or later, you have been God’s grace to me, a miracle, something more than a miracle.”

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The soundtrack for this manuscript was the music of both Mr. Max Richter and Mr. Ludovico Einaudi. Their albums were ever present during the research and writing process. I am grateful for artists such as them.

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List of Abbreviations

American Psychological Association (APA)

Grade Point Average (GPA)

Institutional Review Board (IRB)

Analytics and Decision Support (ADS)

Information Technology (IT)

National Intramural-Recreation Sports Association (NIRSA)

National Collegiate Athletic Association (NCAA)

CHAPTER ONE: INTRODUCTION

Overview

In the increasingly competitive field of higher education, administrators at colleges and universities look for strategies to help boost their recruitment efforts and meet their retention goals. This chapter provides an overview of the historical and theoretical background related to campus recreation and retention in higher education. Then, this chapter presents a problem statement as well as a purpose statement which lead to a discussion of the significance of studying data related to students participating in recreation. Finally, the chapter provides the research questions along with definitions of terms that will be used throughout the study.

Background

Recreational facilities and programs factor in to the lives of students on the campuses of colleges and universities across the country. These various recreational opportunities give students the chance to play sports, socialize with their peers, and keep themselves physically fit. While not directly linked with their academic experience, many students do find benefits from participation in campus recreation (Henchy, 2013; Mayers et al., 2017; Phipps et al., 2015; Vasold & Pivarnik, 2019). Additionally, Forrester (2015) reported that close to 75% of students participate in some form of campus recreation. Despite these benefits and reported usage, some view the financial investment in campus recreation as frivolous or unnecessary (Koch, 2018). One way to better understand the role of campus recreation is to explore how it relates to student retention.

Since the conclusion of World War II, the average cost for one year of college has risen annually, outpacing the rate of inflation (Archibald & Feldman, 2018; Martin, 2002). This phenomenon has led researchers to investigate the underlying causes in an attempt to create

models or theories that can help explain why the average cost for one year of college has risen (Kimball, 2014). These rising costs can prove challenging for students and their families as they struggle to pay for their education. Some decide to take out loans in order to finance their schooling, thus plunging many of these students into massive debt (Popescu, 2018). In the United States, the nationwide graduation rate is 60% (National Center for Education Statistics, 2019). Faced with this reality, institutions of higher education face pressure to retain their student population year after year. To better understand how to be successful in the area of retention, administrators study the characteristics of those who do retain, including their participation in campus recreation. Several studies exist to help provide data and research regarding specific campus recreation programs, such as intramural sports (McElveen & Ibele, 2019) or club sports (Weaver et al., 2017). Given the diversity of campus recreation programs, services, and facilities at different colleges and universities across the country, additional research can give additional data points and context regarding this issue.

Historical Overview

An early examination of student retention in the United States was conducted by John H. McNeely who in 1937, drafted a report for the Department of the Interior. This report referred to the lack of persistence as “student mortality” and examined several of the underlying and root causes of student mortality. McNeely (1937) reported data from 25 different institutions that represented 15,535 students which accounted for just over 6% of all freshmen in 1931-1932. This study discussed several factors that were barriers to retaining, including financial issues, sickness, a lack of interest, and other reasons. A decade following this report, colleges and universities across the United States began to experience a surge in enrollment from servicemen returning from World War II. This time period, labeled “Dealing with expansion” by Berger et

al. (2012), set the stage for the remaining decades of the 20th century. These years saw student retention develop as a distinct topic that researchers studied and analyzed as several theories and models came into existence (Aljohani, 2016).

During this expansionist era enrollment surged at many institutions, thanks in part to the National Defense Education Act of 1958. Also, during this time there was an increase in participation for recreation programs, primarily intramural sports. By the end of the nineteenth century, intramural sports became popular on campuses as a place for students who did not play varsity sports (Stewart, 1992). These programs grew slowly during the early twentieth century, and then grew at a faster pace as intramural directors were added to the staff of various colleges and universities. In 1950, intramural directors from various Historically Black Colleges & Universities gathered at Dillard University. This gathering led to the founding of the National Intramural Association (NIA), an organization that later evolved into the National Intramural-Recreational Sports Association (NIRSA [NIRSA, n.d.]). The growth and formal organization of these recreational programs coincided with the development of several student retention models and theories.

Throughout the 1960s, the focus on retention primarily dealt with students in regards to their individual circumstances (Aljohani, 2016; Berger et al., 2012). According to this view, the demographic background of a student (such as their race, gender, and other factors) should be the focus when discussing whether or not they persist at their institution (Burke, 2019). This era, known as “Preventing Dropouts” (Berger et al., 2012) also used psychology in an attempt to better understand what would cause a student to retain or not retain. He believed that these developments must be seen in the wider historical context of the Civil Rights Movement, the Vietnam War, and the protest movement on many campuses across the country. Against this

historical backdrop, researchers “focused primarily on demographic and psychological characteristics” but “there was little emphasis placed on the interaction of student and campus characteristics” (Berger et al., 2012, p. 25). However, this focus would change with the emergence of various theories starting in the 1970s.

Over the next two decades researchers developed several theories specifically tailored to the topic of student retention. They took a holistic approach to better understand the factors that influence, guide, and shape a student as they navigate the difficult decisions regarding whether they can stay enrolled. Several notable theorists include Spady (1971), Tinto (1975), and Astin (1977). These important theorists and their theories began an era that used a systematic approach when discussing the topic of student retention and persistence (Berger et al., 2012). Their theories show a contrast to earlier methods, since they look not just at the characteristics of the students themselves, but at the relationship between the student and their institution, and the variables affecting this relationship (Burke, 2019).

With several theories and models firmly in place, researchers could look at the relationship between campus recreation and student retention. This coincided with a period of expansion in the field of campus recreation during the 1980s and 1990s (Barcelona & Ross, 2002). Originally, campus recreation was mostly understood to be intramural sports. From the late nineteenth century through the early twentieth century any sports that were not varsity, or played against other schools fit into the intramural category. Professor A.S. Whitney put together 2 Latin words (“intra” and “muralis”) to create the word intramural (Stewart, 1992) in order to provide a category for those participating this way. However, the expansion of campus recreation included growth in participation, facility quality, and overall scope. No longer was this area only known for intramural sports- it expanded to include areas such as aquatics, fitness, outdoor

recreation, events, and other programming options. Due to the expansion and growing popularity of campus recreation, some institutions decided to shift these departments from reporting to the physical education or athletics departments, and instead reporting through the division of student affairs (Milton et al., 2011).

Theoretical Overview

Several important theories help to guide the discussion related to student retention and persistence at the college and university level. Tinto (1975) uses a theory of suicide to discuss how and why students might choose to remove themselves from their academic community (similar to how someone who commits suicide removes themselves from their entire community). He then moves on to create a schema that helps diagram what might lead to a student dropping out from school. By understanding the background of the students, and then looking at their commitments, this schema then considers how these interact within the academic system and the social system present at the school. Campus recreation can be a part of the social system as understood and developed in this theory. It has been noted that “college dropouts perceive themselves as having less social interaction than do college persisters” (Tinto, 1975, p. 107). Tinto’s work is seen as an expansion of Spady’s (1971) model that explored students dropping out based on both intrinsic and extrinsic factors (Berger et al., 2012). In a later study, Tinto (2007) continued to focus on the relationship between the student and their environment (their campus or institution), not just on their individual characteristics. He also pointed to the importance of students being involved during their first year of school in order to increase their rate of retention.

In a similar vein, Astin (1975) considered the impact that involvement has on retention. Many administrators were drawn to this work since “The simplicity of this model made it easily

used” (Berger et al., 2012, p. 26). Later, this became known as Astin’s (1999) theory of student involvement and it defines “involvement” as the way students spend their time or energy. Since students have a finite amount of time, energy, and attention, how they decide to spend them will impact their overall experience. According to Astin (1999), those who chose to involve themselves on-campus, with their institution, and with their peers will be more plugged in to the overall collegiate experience and therefore more likely to persist.

Additional development in this field was completed by Bean (1980), who developed a student attrition model that was based employee turnover. In this model, students who leave their school are seen as analogous to employees who leave their place of employment. This comparison departs from Tinto’s (1975) analogy of dropping out and suicide. Bean (1980) points out a lack of evidence for using suicide as a theoretical basis for considering the subject of attrition. The student attrition model takes a causal approach, and includes several variables including background, organizational determinants, and intervening variables (including satisfaction and institutional commitment). Burke (2019) points out Bean’s (1980) quantitative approach as different from Tinto’s (1975) sociological and philosophical approach. The development of these unique theories allowed for an expansion of thought regarding student persistence and retention into the 1980s and 1990s (Berger et al., 2012).

Problem Statement

The current financial state of higher education indicates that there are concerns regarding the rising cost of tuition (Kimball, 2014). The drivers of this increased cost include expensive payroll (due to employees with a high degree of education), rising overall costs, and the financial implications of trying to stay current with technological trends (Archibald & Feldman, 2018). As costs increase, committing funding towards campus recreation could be seen as unwise or

unnecessary. Due to these increased costs, many students take out student loans in order to finance their education. However, increased student debt could be an unsustainable proposition for these individuals, and the overall economy, moving forward (Popescu, 2017). These increased financial pressures mean that institutions need to evaluate the ways that they spend their budget in order to ensure it is done in the most effective fashion, and in a way that helps to retain students and ultimately produce graduates. All stakeholders could benefit from understanding how spending money on amenities such as campus recreation result in positive outcomes such as improved student retention.

Colleges and universities need to not only attract new students, but retain their current students at a reasonable rate in order to remain financially stable. Santini et al. (2017) found that campus life is a factor related to student satisfaction. At many institutions, one of the important parts of campus life can be the recreation department. Campus recreation can encompass various facilities and programs depending on the size and budget for the school. Burke (2019) points out that students involved in intramural or club sports retain at a higher rate than non-participants. Similar results regarding intramural sports participants and student employees were also found by Forrester et al. (2018). Regarding outdoor recreation, Andre et al. (2017) found various benefits such as employability and transferable skills developed by students. These are helpful studies when looking at campus recreation programming, and Zizzi et al. (2004) look also at facility usage at a recreation center to try to determine how it affects students. They found a relationship between usage of a recreation center and patters of physical activity among students. However, these results were not tied to retention. While there are documented benefits of participation in campus recreation programming such as intramural sports (Webb & Forrester, 2015), more research is necessary in order to document and quantify the ties to retention. To

fully understand how each of the various types of campus recreation impact student retention rates, further research is needed that breaks participation and usage down by category. Danbert et al. (2014) suggest further research that connects recreational facility usage with retention as well as academic success. Additionally, Forrester et al. (2018) suggest future research using logistic regression that involves “trackable individual frequency of participation” (p. 71). The problem is that more research is needed on how the various forms of campus recreation, both facilities and programming, impact student retention (McElveen & Rossow, 2014).

Purpose Statement

The purpose of this quantitative, correlational study was to determine whether participation in club sports, intramural sports, outdoor recreation, student activities events, or usage of the fitness facility held predictive significance for year after year retention of first year residential students at a large, private university. The criterion variable is year after year retention for first year college students who are enrolled from one fall semester to another (from 2017 to 2018, 2018 to 2019, and 2019 to 2020). The first predictor variable is membership in club sports which is defined as students made the roster of any of the club sports teams offered at this institution. The second predictor variable is participation in intramural sports which is defined as students who not only signed up, but also checked-in to play any of the several sports offered at the university. The third predictor variable is participation in outdoor recreation which is defined as students who visited the outdoor recreation facility to check and checked out equipment or those who signed up and attended a trip offered by the outdoor recreation department. The fourth predictor variable is attendance at student activities events which is defined as any student who came to any of the events offered by the department (including movie nights, concerts, open mic nights, art expos, or other events). The fifth predictor variable

is usage of the fitness facility which is measured by students swiping their student identification card when entering the facility. The population for this study is residential undergraduate students attending a private, religious, liberal arts university who participated in some form of campus recreation during the 2017-2018, 2018-2019, or 2019-2020 school year. This population used their student identification card to check in or swipe in at various campus recreation facilities or programs (monitored by campus recreation staff members) during this specified time period.

Significance of the Study

Given the rise in student debt (Popescu, 2017) as well as the need for institutions to identify proactive retention strategies (Manyanga et al., 2017), stakeholders will benefit from this study by having a better understanding of factors that could lead to students continuing their education. Qualitative research has examined the ways that campus recreation can contribute to a sense of community on college campuses (Hall, 2006). By participating and being involved in campus recreation, students can contribute to this sense of community. This sense of community can help students feel connected to one another, to their professors, to the staff, and to the institution as a whole. The institution should desire to have students who have a greater sense of community as opposed to students who have a poor sense of community.

In order to help obtain this sense of community, students can find ways to be involved on their campus. Astin (1999) asserts that involvement can be measured both quantitatively and qualitatively. Some quantitative research exists that discusses a certain aspect of campus recreation and the way it relates to retention, such as intramural sports (McElveen & Rossow, 2014) or club sports (Weaver et al., 2017) or fitness facilities (Danbert et al., 2014; Kampf et al., 2018). However, research is needed that looks at these types of variables all together, and not

just as separate occurrences. This is especially true since many colleges and universities offer varying types of recreational opportunities to their student body. By analyzing participation patterns of individual students across various types of campus recreation and then their subsequent retention rates, this study is significant in that it will add to the existing body of knowledge as well as help to expand it.

Research Questions

The research questions for this study are:

RQ1: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2017-2018 academic school year?

RQ2: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2018-2019 academic school year?

RQ3: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2019-2020 academic school year?

Definitions

1. *Participation*- The decision of a student to take part in programming options or to make use of a facility. This requires the choice of a student to spend their time and energy in a particular way, thus placing themselves in the category of those who are involved (Astin, 1999; Forrester et al., 2018).
2. *Retention*- The act of a student enrolling to their college or university from year to year (Burke, 2019).

3. *Campus recreation*- The programs, services, and facilities offered by a college or university (usually through a division of auxiliary services or student affairs) that provide social and physical interaction for students (NIRSA, 2008).
4. *Persistence*- The progress of a student who stays in their academic program, ultimately allowing them to graduate (Manyanga et al., 2017).

CHAPTER TWO: LITERATURE REVIEW

Overview

A review of the literature was completed in order to understand the effects of campus recreation programs and facilities on undergraduate students. This chapter reviews the current literature related to this issue. First, the theoretical framework is addressed which includes Astin's (1999) theory of student involvement as well as Tinto's (1975) theory of student persistence. This will set a foundation for discussing how recreational opportunities allow students to become involved, and what role this might have in their persistence (or their avoidance of dropping out). The next section includes a synthesis of recent literature discussing the various benefits of campus recreation, encompassing both facilities and programs. It will discuss the connection between participation and retention as well as academic, social, and health related benefits. Finally, other ancillary benefits will be presented. This literature review will reveal a gap, thus showing that further study is necessary. The gap is centered on the differences in campus recreation since the existing literature does not compare the various types of participation and usage to see if they have different outcomes.

Theoretical Framework

Theory of Student Involvement

Those students who chose to take part in campus recreation should be distinguished from those who do not take part. This distinction could be understood as involvement versus non-involvement. Astin's (1999) theory of student involvement discusses "involvement" as the way students spend their time or energy. This type of involvement impacts the social lives of students as they decide to make use of a student recreation center or participate in programming options offered by the campus recreation department. The theory of student involvement is contrasted

with traditional pedagogical theories, including the subject-matter theory, the resources theory, and the individualized (or eclectic) theory (Astin, 1999).

After citing Astin's theory, Miller (2011) describes various positive outcomes associated with using a recreational facility including meeting new people, building self-confidence, becoming a leader, being happy, and learning to manage time. This can also be understood in terms of their emotional connection to one another (Gathman, Grabowski, Carr, and Todd, 2017). Students have a finite amount of time, energy, and attention, and how they decide to spend these resources will impact their overall experience. For college and university administrators, the focus should be on finding ways for students to involve themselves in campus life, even in areas that are not explicitly academic in nature.

According to Astin (1999) those who chose to involve themselves on-campus, with their institution, and with their peers will be more plugged in to the overall collegiate experience and therefore more likely to stay with it over the course of their academic career. Participation in campus recreation is not the only way that students pursue an "involved" lifestyle. They could also find this through other pursuits, such as clubs, the marching band, student government, or other activities. This is contrasted with students who are not involved. These students would be less likely to participate in campus recreation or other forms of campus activities. They would be disconnected from their peers as well as the faculty and staff working on campus. For Astin (1999), understanding where students are involved is a better metric than trying to understand whether or not the student is motivated. The theory of student involvement is more concerned with processes related to student development than it is with the outcomes that were the focus of earlier developmental theories in education. In light of this, Astin recommends that "all institutional policies and practices... can be evaluated in terms of the degree to which they

increase or reduce student involvement” (Astin, 1999, p. 529). To this end, this theory helps campus recreation staff understand their place in the structure of a college or university as they provide co-curricular programming and options for the student body.

Theory of Student Persistence

College and university administrators should understand the factors that help students persist at their institution as well as the factors that might be a hindrance to staying in school and ultimately lead to students dropping out. Tinto (1975) uses a theory of suicide to discuss how and why students might choose to remove themselves from their academic community (similar to how someone who commits suicide removes themselves from their entire community). Students are a part of the social fabric of a campus community, so when they drop out, they are voluntarily removing themselves from this community. Tinto then moves on to create a schema that helps diagram what might lead to a student dropping out from school. By understanding the background of the students, and then looking at their commitments (both goal commitment and institutional commitment), the schema then considers how these interact within the academic system and the social system present at the school.

Whether or not the student is integrated academically and socially will in turn impact their commitment to their goals. Because of this, “either low goal commitment or low institutional commitment can lead to dropout” (Tinto, 1975, p. 96). This longitudinal model can explain certain root causes for students dropping out, but Tinto also moves on to consider how external influences can also lead to students dropping out from school. Avoiding dropout requires a multidimensional approach that considers the student holistically and looks at each area of campus as a potential opportunity to increase student engagement. According to Aljohani (2016), Tinto’s model holds up to scrutiny based on studies from a variety of schools. Further

work by Tinto (2016) explains that while institutions seek retention, the student comes from the perspective of persistence. For students, their perception of their own persistence will be seen in terms of self-efficacy, their sense of belonging, and their perceived value of the curriculum (Tinto, 2016).

Campus recreation can be a part of the social system as understood and developed in this theory. This is important because “college dropouts perceive themselves as having less social interaction than do college persisters” (Tinto, 1975, p. 107). The social interaction and integration mentioned in this theory can involve both informal, formal, and semi-formal environments where students meet with and get to know one another. Tinto also points out that the social system of an institution consists of more than peer-to-peer interactions- it also involves the interactions and social connections between students and the faculty and staff at the school. Each college or university will have a set of social circles, subcultures, and opportunities for social integration. The link between student persistence and their involvement in social environments such as sport related activities or campus recreation offerings has been explored (Leppel, 2005, Huesman et al., 2009).

Tinto’s work is seen as an expansion of Spady’s (1971) model that explored students dropping out based on both intrinsic and extrinsic factors (Berger et al., 2012). Tinto’s (1975) theory of student persistence should be understood alongside Astin’s (1999) theory of student involvement to help paint a picture of a student who is engaged, thriving, and succeeding in their collegiate experience. Considering these theories together, a student who is engaged in the life of their campus, and spending their time associated with their campus, then they will be less likely to drop out and leave, as opposed to those who are not able to persist in their studies.

Related Literature

Retention in Higher Education

Various factors or explanations could play a part in better understanding retention trends in higher education. In order to do this effectively, a multifaceted approach that understands several models might prove helpful. Burke, (2019) discusses three main theoretical models related to retention. This includes the undergraduate dropout process model, the institutional departure model, and the student attrition model. These models coalesce around the idea of giving students a sense of belonging with their university. Burke (2019) defines retention as “the continued enrollment of a student from the first year to the second year” (p. 13). This could be accomplished through various programs, services, or residence life options that are offered by a college or university. Various studies have connected campus recreation to retention. In fact, Lindsey and Sessoms (2006) found that over 37% of the students who participated in their survey cited recreational sports as important or very important in their decision to retain at their college. In this study, juniors and seniors emphasized the availability of campus recreation amenities (both facilities and programs) as important in their decision to stay at their institution. In a study conducted at Ohio State University, the researcher found that 75% of the males who completed a survey indicated that campus recreation facilities and programs were either somewhat important, important, or very important (using a 4-point Likert scale) in their decision to continue at the institution (Haines, 2001). In the same study, 62% of females indicated the same level of importance for recreation in their retention decision.

Forming deep and meaningful connections can help students with their persistence. While “honors programs, intrusive advising, and living-learning communities within residence halls have higher retention rates and higher overall GPAs than their campus peers who do not” (Burke,

2019, p. 18), the role of campus recreation can be examined in greater detail as well. For instance, Kampf and Teske (2013) reported that students who participated in club sports retained at a rate 2.22 times greater than their peers who did not participate. These researchers also examined the retention rates of those who entered the recreation center on campus. Several logistic regression models of retention were created to analyze various characteristics, including recreation facility entries. These models found that “Each one-unit increase in student recreation center entry counts increased the odds of enrolling the following year by 1.44 times” (Kampf & Teske, 2013, p. 92). Additionally, the same study found that students who worked in the campus recreation department all retained (100%) when comparing Fall-to-Fall semesters. Each of these interactions with campus recreation (participating in club sports, entering the recreation facility, and being employed by the recreation department) helped to increase the chances of retaining at the institution.

Campus recreation programming opportunities such as intramural sports have been found to increase retention among specific student populations. McElveen and Rossow (2014) studied first time in college (FTIC) students who participated in intramural sports at a private college. These researchers found that those who participated in intramural sports retained at a rate of 79.8% fall to fall semesters, compared to a rate of 73.9% for those who did not participate in intramural sports (a difference of 5.9%). Among the groups studied by McElveen and Ibele (2019), those who participated in intramural sports reported the highest retention rate. At the conclusion of their study, they call for more research to determine “how recreation programs can help former and current student-athletes further integrate into the campus community” (McElveen & Ibele, 2019, p. 9). When considering the role of facilities, Miller (2011) focused on a recreation center as a location where community is formed and place bonding occurs. This

study found several emotional responses related to a recreation center on campus, including overall happiness, satisfaction, and sense of belonging. These factors are closely tied to the retention of students who might be considering leaving their school. By considering the place of campus recreation in retention strategies, colleges and universities can be proactive instead of reactive in their approach, as recommended by Manyanga et al. (2017).

Relationship to Campus Recreation

As colleges and universities work to recruit new students and keep the ones that they have, then they should consider the ways that campus recreation facilities and programs can assist in this effort. Forrester et al. (2018) found an association between campus recreation and retention. They looked various ways students could be involved, including intramural sports and students who work for the recreation department. Regardless of the type of involvement the student had with campus recreation (they could have been an employee, official, or a participant) they retained at a higher rate than their peers who were not involved. Similarly, Milton et al. (2020) found a positive relationship between students who used the on-campus recreation center and overall student retention at a public university in the Midwest. They tracked 11,515 students who made at least one visit to the on-campus recreation center during the spring semester, and found that 8,961 (78%) of these students were enrolled in the following fall semester. This retention rate was then compared to students who did not visit the recreation center ($n = 9,626$). Data analysis was conducted using the χ^2 test of homogeneity and they concluded that usage of the recreation center indicated that students were significantly more like to return to their school from the spring to the fall semester.

Leppel (2005) studied freshmen students to determine how their participation in different activities (both sport and non-sport activities) in order to determine if there was a relationship to

their persistence. After studying the data, the researcher concluded that “For both men and women, the more likely a student was to be involved in sports, the more likely he/she was to continue to attend the same institution for the first year of college to the second” (Leppel, 2005, p. 183). Sporting activities, such as intramural sports and club sports teams, would squarely fit into this category of participation that could be related to persistence in freshmen students.

Association with Recruitment

Administrators at colleges and universities face a competitive marketplace for the recruitment of new students. Given the concerns surrounding the rising cost of education (Kimball, 2014), those working in campus recreation could be asked to provide a justification for their department. Kampf, Haines, and Gambino (2018) looked at the campus recreation facilities at three different schools. They measured whether or not a recreation facility plays into the decision-making process of a prospective student and found that it resulted in “Some Level of Importance” for 84.5% of first-year students at one school, and for 91.7% at another. At the other school in this study, they reported a 3-5% increase in applications for the years following a \$14 million-dollar renovation project on the student recreation center. Lindsey and Sessoms (2006) report that 31% of the students in their survey cited recreational sports as either important or very important in their decision to attend the college of their choice. These researchers conclude that “when campus decision makers at an institution are considering ways to increase recruitment, retention, GPA, and other areas, they should look into the benefits that can be obtained from a renovated or newly-constructed facility” (Kampf, Haines, & Gambino, 2018, p. 30).

In a similar vein, Andre et al. (2017) listed recruitment as one of the positive benefits for colleges and universities that is associated with outdoor recreation (alongside retention, student satisfaction, and supporting academic programs). Recreational opportunities can assist with

attracting certain student populations. Weaver et al. (2017) reported a theme related to the recruitment of male students who were interested in club sports or recreational sports. Potential students who might not be able to compete at the NCAA level, but would like to engage in sports can find a point of connection within campus recreation. This will benefit any institution that is struggling to recruit male students. For students considering where to go to school, and how to spend their money, these options can factor into their decision making and thus affect where they ultimately choose to attend.

Effects of Facilities

While some students might participate only in the programming options offered by campus recreation, each department still manages various facilities where this programming takes place. Campus recreation departments can oversee a wide variety of facilities on campus, including traditional spaces such as fitness centers, aquatics centers, and outdoor recreation areas, but also non-traditional spaces such as game rooms, equestrian centers, and rock walls. Students may make use of these facilities (and their included amenities) on their own time and at their own pace. Studies have found a link between the use of campus recreation facilities and the overall health as well as the subjective vitality of students who visit (Todd et al., 2009, Xie et al., 2018). Use of campus recreation facilities, or the programs contained therein, has also been linked to an improved quality of life among student users (Henchy, 2013). For college and university students who are experiencing an unhealthy lifestyle, regular exercise can lead to better physical and mental health (Biber & Knoll, 2020). A campus recreation facility can offer the type of environment and equipment necessary to pursue this type of transformation. The initial draw to use campus recreation facilities, and any desire to return to reuse the facilities can be driven by a number of factors. Osman et al. (2006) found that “Facility ambiance, operations

quality, and staff competency positively influenced users' overall satisfaction levels" (p. 27). Regardless of what motivates students to come visit, utilization of these facilities can be connected to various positive outcomes, including higher retention, better academic performance, and a healthier lifestyle (Danbert et al., 2014, Brock et al., 2015, Roddy et al., 2017, Belch et al., 2001).

Impact on Retention

Previous studies have found a link between recreation center usage and persistence in first-year students (Belch et al., 2001). Forrester (2015), after analyzing the results of the 2013 National Association of Student Personnel Administrators Assessment and Knowledge Consortium, reported that "73.9% of students indicated CRS facilities, were at some level important in their decisions to continue at their college/university" (p. 8). In other research, Danbert, et al. (2014) found that those who purchased a membership for a recreation facility at a Midwestern university retained at a higher rate than those who did not purchase a membership. In fact, for fitness center members ($n = 1,138$), 90.7% retained for one year compared to 88% of nonmembers ($n = 3,705$). Similarly, when looking at two-year retention, the members still retained higher than nonmembers (88.5% for members, 85% for nonmembers). When studying recreation center usage, Milton et al. (2020) concluded, "that students who visit the recreation center were more likely to return the following semester than those students who did not visit" (p. 93). Based on these findings, non-usage of the recreation facility led to lower rates of retention among undergraduate students. In fact, "It can be concluded that freshmen and sophomore students who used the recreation center more frequently were more likely to enroll in the fall semester" (Milton et al., 2020, p. 94).

Other research studied whether the amount, or frequency of usage predicted various outcomes for students visiting their campus recreation facilities. Huesman et al. (2009) researched the first-year retention rates and 5-year graduation rates of students who used the campus recreation facilities at a large, public university in the Midwest. The researchers had access to a large sample ($n = 5,211$) of students who scanned in electronically to the facilities on campus. The data was analyzed using a logistic regression, which fit since the outcomes (retained not did not retain, graduated or did not graduate) were dichotomous. Based on their analysis, the researchers asserted that students who used the recreation facilities approximately 25 times per semester (equating to one standard deviation higher than the average, $M = 9.93$ and $SD = 15.36$) increased their “predicated probably of first-year retention by 1% and predicted probably of 5-year graduation by 2%” (Huesman et al., 2009, p. 59). The results were controlled for various factors including social, academic, and financial factors.

In a study surveying graduate and undergraduate students regarding campus recreation, Henchy (2013) asked students about campus recreation and if it influenced their decision to continue attending their school. The results indicated that campus recreation facilities and programs had a “strong or moderate” impact on 38% of undergraduate students as they made this decision. When asked more specifically, “99% of the undergraduate students... either strongly agreed or agreed that campus recreation facilities and programs improved the quality of student life at the university” (Henchy, 2013, p. 102). These students recognize the role that campus recreation plays in their overall collegiate experience as well as their own decision-making process.

Academic Impact

In addition to increased retention, another benefit of using a recreation facility regularly could include a better grade point average. While studying a midsized university with a population of 14,000 students, Roddy et al. (2017) found that students with higher GPAs were those who went to the recreation center on campus regularly while those with lower GPAs were those students who went irregularly. When comparing genders, this study found that women who used the recreation center had a higher GPA than men during their freshmen and sophomore years. The differences in usage patterns between genders was explored by Stankowski et al. (2017) as they surveyed students regarding the constraints they experienced when considering going to the recreation center on campus. While usage patterns were similar between male and female students, there were differences in the types of constraints reported with females indicating their top reasons as being intimidated by the facility, memberships at other facilities, and not enjoying the facility (Stankowski et al., 2017). These studies suggest that campus recreation participation can have varying effects on different populations. Similar findings were echoed by Brock et al. (2015) who reported that students who increased their facility usage by 2 days per week (or more) increased their GPA by approximately 2.5%. Conversely, students in this study who decreased their use of the recreational facility saw a 1% drop in GPA.

After studying three cohort groups of first-time freshmen ($n = 11,067$) and their use of the on-campus recreation center, Belch et al. (2001) found that users had a higher GPA after both one semester and one year than their non-user counterparts. The mean first-semester GPA for users was 2.53 compared to 2.44 for nonusers. The mean first-year cumulative GPA for users was 2.57 compared to 2.54 for non-users. Additionally, users reported a higher mean number of total earned hours after one year (25.7) compared to nonusers (25). Additionally, they reported “that as the number of visits increased, parallel increases in both first-semester and first-year

GPA and persistence occurred as well” (Belch et al., 2001, p. 261). Students who used the recreational facility more reported better academic progress (as measured by GPA) than those who used it less, or not at all.

A previously discussed study of 6,098 undergraduate students at a Midwestern university employed a quartile split when assessing the Total Visit Number (TVN) during the spring and fall semesters during one entire year. The quartiles included the categories of low, midlow, midhigh, and high and the TVN ranged from 1 single visit to more than 20 visits (Roddy et al., 2017). The researchers concluded “that students who used the recreation center more often each semester were more likely to have higher GPAs than those students who only visited the center on an irregular basis” (Roddy et al., 2017, p. 71). They also reported a difference in GPA between male and female students, with females in the midlow, midhigh, and high quartiles experiencing a higher GPA. It should also be noted that this study might also have uncovered that there is a point of diminishing returns for use of the recreation center. That is to say, at a certain point, increased usage does not seem to be related to a positive increase in GPA.

Das et al. (2020) studied students who entered either the indoor or outdoor recreation center through a turnstile at a large public university in the southeastern United States. Their sample ($n = 8,703$) included a majority of first time in college (FTIC) students ($n = 6,828$). The results of this study found a higher GPA among the students who visited the recreational facilities more frequently. The researchers conducted a multinomial logistic regression analysis and found that “students with a high CR usage level were 3.1 times more likely to have a high GPA than low users, Odds ratio = 3.082, 95% CL [2.16, 4.39]” (Das et al., 2020, p. 6).

In a study with a much smaller sample ($n = 127$), Chu and Zang (2018) studied students who participated in sport clubs during their time in college. They discovered that freshmen who

reported great satisfaction with their sport club, also reported a higher GPA. For non-freshmen, those who reported both higher visits to the recreation center as well as higher sport club satisfaction also reported a higher GPA. These researchers conclude, “we found positive associations between sport club participation (quantity and quality) and health-related outcomes, which were primarily defined by sport club satisfaction, GPA, and subjective vitality” (Chu and Zang, 2018, p. 44).

Ancillary Benefits

Using the campus recreation facilities has been associated with other positive outcomes related to the academic life of a student. This includes building healthy habits such as regular exercise. A campus recreation facility could “encourage previously sedentary students to adopt regular physical activity patterns” (Zizzi, Ayers, Watson, & Keller, 2004, p. 601). However, it should be noted that facility usage might not be uniform or consistent across the full spectrum of the student body. Gathman et al. (2017) looked at the differences in campus recreation usage patterns between those students who were enrolled in a major related to health (such as kinesiology, physical education, health science and nursing) and those who were enrolled in a non-health related major (such as history, business, or art). They concluded that those involved in health-related academic programs are more likely to use campus recreation facilities.

Despite these differences in various segments of the student body, recreation facilities can still impact the entire campus. Farneti and Ditch (2018) studied a university that was faced with closing their fieldhouse facility, which was used for a variety of campus groups (including athletics, club sports, intramural sports, and open recreation). The researchers made a note that this college was located in a rural location, which potentially limited the options that these students had for recreation. Due to a dangerous blizzard, this facility was closed for a period of 3

months while repairs were conducted. The researchers discovered various important themes that developed as a result of this unexpected closure. Among these were the impact on the campus community and socialization as well as overall student satisfaction. These areas were negatively impacted when a recreation facility was unavailable. In turn, this impacted recruitment since “Admissions employees did not feel they were able to present the normal, full campus picture without the fieldhouse facility to show to potential students” (Farneti & Ditch, 2018, p. 199).

Social Aspects

Campus recreation facilities can provide an environment for students to connect to each other and foster their social relationships. These social relationships can form bonds that help students feel connected and thus desire to stay at their school. Miller (2011) developed the Attraction, Bonding Involvement, Belonging and Persistence (ABIBP) cycle based on usage of a student recreation center. This research discussed how “the student recreation center was essential in creating a social bonding experience” (Miller, 2011, p. 123). It also pointed to the recreational facility as a factor in students coming to the university as well as deciding to stay. This type of facility provided a place on campus where students could connect with one another and build relationships. Building relationships like this allows for social bonding to occur. Zizzi et al. (2004) reported that 61.2% of their survey respondents ($n= 655$) feel more at home at their particular institution since a new student recreation center was built on their campus. These feelings of being at home can be related to a positive social atmosphere on campus.

Health Aspects

Participating in fitness and exercise has been found to help improve cognitive performance (Chang et al., 2014). This type of exercise could occur for students in a recreation center or fitness facility on their campus. Previously mentioned research pointed out the link

between campus recreation facilities and improved regular exercise habits (Zizzi et al., 2004). The motivating factors for those who decided to use the recreation center were “to stay in shape, to lose fat, and to build self-esteem” (Zizzi et al., 2004, p. 600). The mere presence of a recreation center on campus can help with the exercise patterns of students. The same study found that around 40% of those who used the recreation center would not consider themselves regular exercisers before the facility was built on campus (Zizzi et al., 2004). In a study by Makubuya et al. (2020), researchers found a connection between overall satisfaction and the healthy habits of students. The healthy habits included dealing with stress, meeting people, and using cardio equipment. Other research compared users and nonusers of campus recreation facilities to compare various health factors. Those who were categorized as “high users” (defined by visiting the recreation facility an average of three or more times each week) were found to have lower fat intake, and lower body mass index (BMI) than the groups categorized and nonusers, low users, and moderate users (Todd et al., 2009). The same study found the user group participating in other healthy behaviors that can help contribute to overall wellness for a college student. This included using less electronic media than nonusers (5.56 hours per day compared to 6.55 hours per day) and smoking less than their peers (only 2% of high users indicated they were daily smokers). A recreation facility on campus can result in healthier students as they begin to adapt their own unique usage patterns and perhaps engage in a healthier lifestyle.

There are additional health benefits related to campus recreation participation include more than just physical health and wellness. Ellis, Compton, Tyson, and Bohlig (2002) found links to four other “quality of life” variables, including life satisfaction, satisfaction with their institution, energy levels, and emotional health. Of these categories, energy and emotional health

relate directly to the overall health of a student. When looking at the benefits of campus recreation facilities and programs, Lindsey (2012) studied students at a historically black college and university (HBCU). The study consisted of a convenience sample of students from this HBCU who answered questions from NIRSA's Quality and Importance of Recreational Services Survey. Various categories demonstrate the health and wellness benefits associated with campus recreation. For instance, in the category of "Fitness" 31.68% ($n = 51$) responded that they benefit much and 43.48% ($n = 70$) benefit somewhat from their participation. In the category of "Physical strength" 29.81% ($n = 48$) benefit much and 44.72% ($n = 72$) benefit somewhat from their participation. The researchers used independent samples t tests ($\alpha = .05$) and found statistically significant differences between males and females related to the categories of physical well-being, fitness, physical strength, stress reduction, and balance/coordination. While there were differences reported between males and females, overall, there were clear physical benefits associated with participation in campus recreation (Lindsey, 2012). These studies show campus recreation playing a part in the holistic well-being of a student.

Effects of Programming

Some users or participants might be self-directed and make use of the amenities within the facilities outside of any organized activities. However, some enjoy the organized programming offered by campus recreation staff. This could include intramural sports leagues, club sports, group exercise classes, social events, or off-campus outdoor recreation trips. These types of programming opportunities are broadly enjoyed by college and university students. A study of the data reported in the 2013 National Association of Student Personnel Administrators (NASPA) Assessment and Knowledge Consortium found that "Students participated in an average of 4.49 ($SD = 2.77$) activities (ranging from zero to 13), and their median frequency of

participation was two times per week (ranging from never to more than five times per week)” (Lower-Hoppe et al., 2020).

Phipps, Cooper, Shores, Williams, and Mize (2015) discuss the link between playing intramural sports and overall sense of community. In their study of intramural sports participants, they asked 24 different questions and used a sense of community instrument to measure the results. After conducting a regression analysis, they reported a positive relationship between increased participation and increased sense of community. Similarly, a relationship was reported between participation and shared emotional connection (Phipps et al., 2015). However, these researchers did point out that their data came from a small sample size, so future research should look for a larger sample. Webb and Forrester (2015) directly compare positive and negative affect among intramural sports participants. Their results show that intramural sports participation resulted in a report of positive affect, regardless of other variables (such as gender, classification, or whether the participant won, lost, or tied their game). Overall, very little negative affect was reported (such as upset, guilty, irritable, nervous, afraid, and other negative affects). Based on these results, staff members can feel confident recommending that students find the time and energy to participate in programming such as intramural sports.

Other types of campus recreation programming, such as outdoor recreation, also report positive outcomes. Andre et al. (2017) point to mental health benefits, such as a reduction in stress, as a result of engagement in outdoor recreation programming opportunities. Researchers in the United Kingdom used the Theory of Planned Behavior to study university students who participated in recreational programming (St. Quinton & Brunton, 2020). They identified “enjoyable” as one of the significant behavioral beliefs driving student participation. A link between the success of an intercollegiate football program and higher freshmen retention rates

has been explored by researchers (Mixon and Trevino, 2005). Based on their data, the researcher theorized “that athletics helps students to deal with the psychic costs of leaving home” and “Other examples might include intramural sports and some extra-curricular activities” (Mixon & Trevino, 2005, p. 99).

Co-curricular or extra-curricular programming can be seen as a positive addition to collegiate life, and not necessarily a distraction from academic pursuits. The diversity of programming offered by campus recreation is a strength because it can find a way to connect with each segment of the student body. Organized and intentional programming, whether it is a sports league, fitness classes, or swimming lessons can become a place for students to find community, improve their health, lower their stress, and continue to deepen their connections to the broader institution and campus community (by connecting with one another as well as faculty and staff). College and university students participating in such recreational programming have been found to have better academic performance (Bergen-Cico & Viscomi, 2012; Gibbison et al., 2011), less stress and anxiety (Kanters, 2000), increased out-of-classroom learning (Haines & Fortman, 2008) and better social integration (Artinger et al., 2006).

Social Aspects

The idea of social connectedness undoubtedly impacts the decision (or even ability) to retain at a college or university. A study by Beil et al. (1999) concluded that “academic and social integration influence students’ level of commitment to the university” and “Greater academic and social integration were related to greater commitment to the college in the first year” (p. 382). Elkins et al. (2011) used the Campus Community Scale to measure the responses for those involved in campus recreation. They analyzed the correlation between participation in campus recreation and the sense of community experienced by participants. The researchers

focused on the category entitled *Diversity and Acceptance* as a main area contributing to this sense of community. Additionally, follow-up analysis through univariate tests found that for those who participated in campus recreation had higher scores regarding their residential experience and lower scores regarding loneliness and stress (Elkins et al., 2011). Other research found a connection between participation in club sports and a positive overall sense of belonging (Lifschutz, 2019). A sense of belonging, or an overall positive environment for recreational programming could be explained by a number of factors. Further research on club sports participants measured their perception of whether it was a caring climate using the Caring Climate Scale developed by Newton et al. (2007). Using a 5-point Likert scale, participants indicated they found their clubs sports team to be a caring environment with a median score of 4.56 (SD = .54) (Scott et al., 2021).

Bell (2006) studied participants in a preorientation programs at Princeton and Harvard Universities. These preorientation programs included either outdoor recreational programming, community service programming, or preseason athletics. In order to compare the level of social support between the various preorientation programs, Bell (2006) developed the Campus-Focused Social Provision Scale (CF-SPS) which was based on the Social Provisions Scale (SPS). The SPS relies on six social subfactors, which are condensed into three independent subfactors for the CF-SPS. The first includes attachment, guidance, and tangible support, the second includes social integration and competence, and the third is nurturance. After studying the results, the researcher concluded that “The wilderness orientation group is unique among other preorientation experiences in this study because it showed significant differences for all social support subfactors” (Bell, 2006, 163). Outdoor recreation programming can provide an environment for students to deepen their social ties.

When researching the motivating factors for participating in campus recreation, Beggs et al. (2014) used the Leisure Motivation Scale (LMS). They went on to identify “the social factor as the second highest rated motivational factor” (Beggs et al., 2014, p. 171) behind the category of competency/mastery. Mayers, Wilson, and Potwarka (2017) considered campus recreation participation and five different Student Engagement scales. They found that participation in recreation could be associated with a positive influence on the Beyond-Class Engagement Scale. This particular scale considers the social life and community connections made by students. This social aspect is prominent in both Tinto (1975) and Astin’s (1999) theories.

A study conducted at a midsized institution in the Southwest used students who participated in either intramural sports, sport clubs, or group fitness in order to study the differences in perceived benefits. The participants ($n = 1,176$) in these recreational programming options responded to a 44-item survey that used portions of the Task and Ego Orientation in Sport Questionnaire (TEOSQ) and the Quality and Importance of Recreational Services (QIRS) perceived benefit scale. Instead of comparing campus recreation participants to non-participants, this study compared users of one particular area to users of the other areas by using three benefit subgroups (intellectual, social, and fitness). After conducting four one-way analyses of covariance (ANCOVA), the researchers found “Sport clubs reported the greatest mean score in all three perceived benefit subgroups” (Lower, Turner, & Petersen, 2013, p. 78). For the perceived social benefit subgroup, the researchers point to several reasons that sport club participants reported the highest score. This includes the ways that the “consistent, cohesive team structure creates opportunity for continual interaction and the development of interpersonal relationships” as well as “the program’s unique structure which fosters interaction and requires student leadership” (Lower, Turner, & Petersen, 2013, p. 79).

Research by Artinger et al. (2006) examined how intramural sports participants benefited socially from their involvement in this programming option. The researchers developed an instrument that included five categories regarding social benefits (university integration, personal social benefits, cultural social benefits, social group bonding, and reliable alliance) and they surveyed participants ($n = 349$) who responded on a 5-point Likert scale. The responses showed that students found the categories of personal social benefits and social group bonding the most beneficial. However, they found the least amount of value in the category of cultural benefits. The researchers also compared the students based on various demographic information on the survey. They reported, “Each of the Tukey’s post hoc analyses revealed that first-year students reported significantly higher social benefits in these areas than fourth-year students” (Artinger et al., 2006, p. 78).

Additional research on recreational programming examined the learning outcomes associated with participation in a soccer tournament. The tournament was co-hosted by campus recreation and the office of global engagement and it had the stated purpose to “create unity among domestic students and a growing international population, while providing several key learning outcomes for student participants” (Buzzelli, 2016, p. 83). Based on survey results, the students reported an overall positive experience (68% responded that they were “very satisfied”). The learning outcomes indicated the highest scores (on a 5-point Likert scale) in the categories of the importance of raising money for charitable organizations ($M = 4.55$, $SD = .89$), the link between recreational sports participation and health and wellness ($M = 4.13$, $SD = 1.04$), and the link between learning values (fair play, integrity) and recreational sports participation ($M = 4.13$, $SD = 1.04$). These results showed the value of a social space created by campus recreation, in

conjunction with other campus partners, that helped to connect domestic and international students.

Building off of the idea that students will connect to one another socially through sports, Lower-Hoppe et al. (2020) studied sport clubs at a large, public university in order to better understand how participation in this form of programming impacts attachment to the institution. The researchers used the 9-item University Attachment Scale and surveyed a convenience sample of 175 club sports participants during a spring semester. They found that those involved in club sports with higher inclusionary tactics showed a higher attachment to the university than those involved in club sports with lower social inclusionary tactics. They were able to conclude “that the mere presence of social inclusionary tactics can move the needle on university attachment” and “Clubs should facilitate social activities throughout the academic year to establish and deepen friendships among club members, enhancing the student experience and retention” (Lower-Hoppe et al., 2020, p. 11).

Other research points out that recreational programming options do not need to be as formal or organized as intramural sports or sport clubs. Eubank and DeVita (2015) studied students who participated in informal recreational swimming to look for the impact it had on their overall college experience. The researchers used Astin’s (1999) I-E-O Model and conducted a case study consisting of interviews with various students. Their results revealed 4 distinct themes (support networks, involvement, well-being, and academics and student life) which led to their conclusion that “there is just as much a need for informal recreation opportunities as there is for formal recreation opportunities in higher education” (Eubank and DeVita, 2015, p. 128). The researchers postulate that other informal programming areas within a

facility (specifically a fitness area or a climbing wall) could have similar positive effects for those who chose to participate.

Programming options and opportunities offered by campus recreation departments will vary from institution to institution. The type of programming will oftentimes depend on the facilities available, the local weather, geography, institutional budgetary commitment, and other factors. Programming might change depending on the usage patterns of students or the budgetary funds committed to recreation each fiscal year. Despite the differences, common themes or patterns can be observed. Andre et al. (2017), when discussing outdoor recreation in particular, mention benefits such as “higher levels of social engagement” and “group effectiveness, group cohesion, and personal effectiveness” (p. 18). These social benefits can help certain segments of the student body at the institution where they occur. For instance, Dyk and Weese (2019) specifically studied Indigenous Peoples studying at institutes of higher education in Canada, and how they could benefit from participating in campus recreation programming. They found ways that campus recreation programming can help increase student engagement with this particular segment of students, and thus help them to retain at higher rates. Additionally, Lindsey (2012) studied African-American students at a HBCU and found several positive social benefits associated with campus recreation. For instance, of the male students who participated in this study, 73% benefit in communication skills, 81% benefit in the respect for others category, and 72% benefit in the category of belonging/association. Males and female respondents combined to report 39.75% benefit somewhat and 35.40% benefit much in the category of developing friendships (Lindsey, 2012).

Frauman (2005) compared users of campus recreation programs and facilities to non-users in order to look for any similarities or differences in their perception of their college

experience. After receiving 389 usable responses, it was reported that 80.7% of the students indicated that they were participants in campus recreation. Responding on a 5-point Likert scale, 51.8% of participants indicated that they were either “very” or “extremely” satisfied with their overall college experience. This compares to only 43.5% of the non-participants. However, it should be noted that when independent sample *t*-tests were performed to look for differences between participation or non-participation and their perception of their overall college experience, no statistically significant differences were reported. Campus recreation programming environments can become important places for students to connect which is essential since “social integration occurs primarily through informal peer group associations, semi-formal extracurricular activities, and interaction with faculty and administrative personnel within the college” (Tinto, 1975, p. 107).

Ancillary Benefits

Beyond these social benefits associated with campus recreation programming, various other ancillary benefits have been explored by researchers. One benefit of participation includes increased quality of life (Ellis et al., 2002). In this study, researchers used six different quality of life variables and found that campus recreation participation was associated with four of them, including overall life satisfaction, satisfaction with experience at their university, their emotional health, and energy levels (Ellis et. al, 2002). Some of these variables have been previously discussed in relation to health. While the categories of satisfaction with life and satisfaction with the institution are harder categories to quantify, they still certainly point to a student who is gaining value from their participation in campus recreation. When students from a Midwestern university were studied regarding their motivation for participating in campus recreation (using the Leisure Motivation Scale), they most identified with the competency/mastery category which

included items such as “keep in shape” and “develop skills and abilities” (Beggs et al., 2014). The researchers point out that “campus recreation providers should be aware that competency/mastery elements of the experience are the most important for student participants” (Beggs et al., 2014, p. 171).

College and university students deal with the stresses associated with being in school, and their specific stage of life. Kanters (2000) conducted research to determine if participation in campus recreation could help students as they deal with stress. Students who participated in this study ($n = 44$) completed diaries where they recorded their recreational patterns and their daily anxiety. The independent variables were perceived social support and recreational sport participation and the dependent variable was daily anxiety. After analyzing the results, this research “confirmed the initial predictions that subjects who participated more frequently in recreational sport also report lower anxiety during a stressful event” (Kanters, 2000, 20).

When specifically studying the programming area of club sports, researchers looked at how this type of recreation impacts the out-of-classroom learning of student participants. Club sports members from two different schools, along with club volleyball players ($n = 954$) filled out a 41-item survey that asked respondents about their perceived outcomes (Haines and Fortman, 2008). The students were asked to report on their perceived level (based on a 10-point scale) before they participated in club sports, and now (since they were actively participating). The researchers hypothesized “that club sports participants make gains in life skills, diversity, social interactions, communication, character, leadership, and self-beliefs” (Haines & Fortman, 2008, p. 52). After completing an analysis using a paired sample t -test, they found “there was an increase in all of the outcome items, and all Before to Now differences were significant ($p = .001$)” (Haines & Fortman, 2008, p. 55). The club sports participants reported the highest

differences from “Before” to “Now” in the categories of travel planning skills, sense of belonging, time management, school pride, and overall leadership development.

Campus recreation departments offering sport clubs as a programming option can share the benefits of out-of-classroom learning with their participants. In fact, Haines and Fortman (2008) assert, “There is significant personal growth as a result of participation in sport clubs that includes growth in the following broad categories: life skills, acceptance and appreciation for diversity, social interactions, communication, character, leadership, and beliefs about themselves” (p. 58). Additionally, Scott et al. (2021) suggest that club sports team members participate in the type of positive environment that results in better mental health as well as positive physical health.

Gathman et al. (2017) explored the relationship between various academic disciplines and campus recreation usage patterns. They found that certain majors related to fitness or health contain students who are more likely to participate in campus recreation. This increased physical activity and physical fitness can in turn have professional benefits once they graduate, since “maintaining favorable physical activity patterns established in college will likely correlate well with professional success” (Gathman et al., 2017, p. 95). These ancillary benefits can combine with social and academic benefits to give a fuller picture of the ways that campus recreation programming can impact the lives of students who choose to participate.

Academic Benefits

Campus recreation can have an effect on what happens for students in the classroom. Previous studies found a link between participation in campus recreation programming and higher GPA when compared with those who do not participate (Bergen-Cico & Viscomi, 2012, Gibbison, Henry, & Perkins-Brown, 2011, Vasold, Deere, & Pivarnik, 2019). Mayers et al.

(2017) studied first-year students and their campus recreation usage to see if it related to their grade point average or their level of engagement. They found a positive relationship for those students who chose to participate in campus recreation (particularly students with lower grade point averages). However, the impact was positive for other students as well. They point out that “Students with high GPA who participated in campus recreation reported higher facets of engagement overall, specifically for beyond-classroom engagement” (Mayers et al, 2017, p. 108). Similarly, Gibbison, Henry, and Perkins-Brown (2011) found that freshmen who participated in campus recreation benefited from a higher GPA. Their study, conducted at a mid-sized public university, specifies that the amount of participation mattered since in their particular model, “students who participate in recreational activities a little more than once a week (20 or more times per semester) have a higher grade point average when compared to those who visit less than twenty times per semester” (Gibbison et al., p. 252-253).

Academic benefits can be found when recreation ties in directly with academic experiences. For instance, outdoor recreation programs can be used to help facilitate classes for first-year courses or orientation classes offered to new students. Bell (2012) studied a first-year experience (FYE) course offered in two different formats at a large mid-Atlantic university. The first format was a traditional classroom experience, and the second format was an outdoor adventure course. The traditional course took place over the course of 10 weeks and the adventure course took place for 4 to 7 days. Both courses shared the same textbook and the same curriculum. For the adventure course, students were able to participate in recreational activities such as rock climbing, white-water rafting, backpacking, and canoeing. After the completion of these classes, course outcomes based on the First Year Initiative Survey (FYI) were analyzed using an independent samples *t* test. Based on the results, it was concluded, “there is evidence

that the adventure class is associated with significantly higher mean scores on a number of variables including: improved knowledge of academic services, course included an engaging pedagogy, and course improved critical thinking” (Bell, 2012, p. 353). In order to engage academically, recreational programming does not need to be only co-curricular or extra-curricular in the life of a student. It is possible to use recreational programming directly in academic courses.

Vasold, Deere, and Pivarnik (2019) conducted a large ($n= 178,091$) multinomial logistic regression regarding intramural and club sports participants and their grade point average. They generally found a positive relationship between participation and a higher grade-point average, particularly for club sports participants. Participation in intramural sports or club sports resulted in being more likely to report an A versus a C grade average as well as more likely to report a B versus C average than their peers who reported not participating. The researchers concluded, “that students reporting participation in club and/or intramural sports report higher grade averages than students who do not” (Vasold et al., 2019, p. 59).

Lindsey (2012) asked survey respondents about if they benefited from participation in campus recreation activities. In regards to their study habits, 30.44% reported that they benefited much, and 40.99% reported that they benefited somewhat in this category. In this same study, when students were asked to respond to their satisfaction regarding their overall academic experience, 38.53% were very satisfied, and 47.13% were somewhat satisfied. This satisfaction rate combines to show that full 85% of respondents were satisfied with their overall academic experience, which closely matched the findings of Lindsey and Sessoms (2006) who found that 86% of the respondents in their study reported that they either somewhat or very satisfied with

their overall academic experience. Both of these studies used the Quality and Importance of Recreational Services Survey (QIRS) developed by NIRSA.

The academic benefits related to campus recreation participation can involve more than sports related, or physical fitness activities. Some colleges and universities offer co-curricular programming opportunities that include various types of on-campus events and activities. Sometimes these are offered through the student government association, a student activities board, or various clubs and organizations. Bergen-Cico and Viscomi (2012) studied 2 different cohorts (Cohort A, $n = 1,437$ and Cohort B, $n = 1,710$) of students at a private university to see if their GPA was impacted by their attendance at co-curricular programs (such as speakers concerts, theatre, dances, and other artistic performances). The researchers looked at three different clusters within each cohort: low-level participants (those who attended 4 or fewer events), mid-level participants (those who attended 5 to 14 events), and high-level participants (those who attended 15 or more events). After analyzing the data from multiple semesters for both cohorts, the researchers found that students in the mid-level group had a better GPA. In fact, for Cohort A, “the group attending 5 to 14 events consistently have a higher GPA of approximately a quarter of a point” (Bergen-Cico and Viscomi, 2012, p. 335). While the researchers conclude that “there is a positive association between attendance at co-curricular events and GPA” (Bergen-Cico and Viscomi, 2012, p. 340), it should be noted that the high-level group (those who attended 15 or more events) were omitted due to the small sample size (Cohort A, $n = 52$ and Cohort B, $n = 24$). These results show the academic benefit of participation in co-curricular programming, but also show that there might be a maximum point of positive involvement. This point might be difficult to pin down specifically, but Lower-Hoppe et al. (2020) studied both the depth (frequency) and breadth (variety) of participation in recreational

sports participation among college students to look for the point of diminishing returns. Regarding depth, they concluded that “the point of diminishing returns occurs at a frequency value of approximately eight times per week” (Lower-Hoppe et al., 2020, p. 38). For breadth, their data showed, “Student learning outcome scores start to decline once students start to participate in a considerably high number of different CRS activities (approximately 30), suggesting that participating in different types of CRS activities seems to have a beneficial effect on student learning outcomes” (Lower-Hoppe et al., 2020, p. 38).

Summary

Colleges and universities regularly face the demand related to recruiting new students, and retaining their current student body. In order to succeed in these pursuits, administrators and staff members should understand what leads to successful students, and what might be some of the root causes behind students who drop out. Studying the theory of student persistence can assist with looking at the underlying factors for persistence and non-persistence. In addition, the theory of student involvement will show the benefits of students being connected to one another, to faculty and staff, and ultimately to the institution itself. By understanding the role of campus recreation in light of these two theories, the various effects it can have on students can better inform practices and decision making for those in leadership positions.

Campus recreation departments include both facilities (such as gymnasiums, rock walls, aquatics centers, sports fields or courts, and other fitness spaces) as well as programming options (such as intramural or club sports, group exercise classes, personal training, swimming lessons, and events). Involvement and participation include either going to a facility or taking part with the programming. By doing so, students receive the benefits associated with recreation which might include higher rates of retention or better academic scores. There are other benefits as

well, such as social interaction and improved health. The literature has shown the effects of both programming and facilities on the lives of students. It has also shown how campus recreation can play a part in both retention and recruitment at a college or university. However, a gap in the literature has emerged regarding the differences and similarities in the different types of campus recreation offerings. While discussion exists regarding the benefits associated with specific aspects of campus recreation, a more specific and nuanced understanding needs to be developed that shows the similarities or differences by participating in some aspects, but not others. By examining the benefits associated with specific parts of campus recreation, administrators can determine which is the best predictor for increased retention for their institution.

CHAPTER THREE: METHODS

Overview

This chapter discusses the method used to investigate participation of first-year college students in campus recreation as it pertains to retention. First, the purpose and rationale of the research design is discussed. Then, the research question and hypothesis are clearly stated. This chapter also addresses the sample, setting, instrumentation, and procedures that guide the study. Finally, the data analysis section justifies the use of logistic regression as well as the effect size.

Design

In order to explore the relationship between the predictor variables (participation in intramural sports, outdoor recreation, student activities, or the fitness center), and the criterion variable (year over year academic retention), this study used a quantitative, predictive correlational design. A correlation can determine whether or not there is a predictive relationship between each of the predictor variables and the criterion variable. Since this study examines the potential of a cause and effect relationship between the variables, this study fits the basic research design for correlational research (Gall, Gall, & Borg, 2007). Similar correlational designs have been used by researchers studying this topic, thus validating this design choice (Forrester, McAllister-Kenny, & Locker, 2018; Kampf & Teske, 2013). The predictor variables in this study are defined as follows: participation in intramural sports, participation in outdoor recreation, attendance at student activities, and attendance at the fitness center. For four of the predictor variables (intramural sports, outdoor recreation, student activities, and fitness center) participation will be measured by the number of times a student used their identification card to swipe or scan in order to indicate their presence at a facility or programming location. For the

remaining predictor variable (club sports), participation will be measure by membership on a team roster.

The criterion variable is year over year academic retention. At this institution, year over year retention is measured by students who persist in their academic program from one academic year to the next academic year (from fall semester to fall semester). Based on these factors, this approach is the best fit to pursue the following research questions.

Research Questions

The research questions for this study are:

RQ1: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2017-2018 academic school year?

RQ2: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2018-2019 academic school year?

RQ3: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2019-2020 academic school year?

Hypotheses

The null hypotheses for this study are:

H₀1: There will be no statistically significant predictive relationship between the criterion variable (retention of first-year college students) and the predictor variables (participation in club sports, intramural sports, outdoor recreation, student activities, or the fitness center) for students during the 2017-2018 school year.

H₀2: There will be no statistically significant predictive relationship between the criterion variable (retention of first-year college students) and the predictor variables (participation in club sports, intramural sports, outdoor recreation, student activities, or the fitness center) for students during the 2018-2019 school year.

H₀3: There will be no statistically significant predictive relationship between the criterion variable (retention of first-year college students) and the predictor variables (participation in club sports, intramural sports, outdoor recreation, student activities, or the fitness center) for students during the 2019-2020 school year.

Participants and Setting

Population

The population for this student includes students from a large university located in Virginia. This institution has undergraduate as well as graduate degrees. It offers a residential program with over 15,000 students. Of these residential students, approximately half of them live in on-campus dormitories, and the rest live off-campus and commute to campus. For the fall semesters, there are approximately 2,700 to 2,900 first-year students.

Participants

The participants for this study were residential undergraduate students attending a private, religious, liberal arts university who participated in some form of campus recreation during the 2017-2018, 2018-2019, and 2019-2020 academic year. The institution is situated in a suburban area outside of a small city and contains a large population of residential students. On this campus, students had the ability to enter various facilities, and participate in various programs offered by the campus recreation department. Participation is recorded by students swiping or tapping their student identification card and the data is collected and stored in Swiper

software. This process is monitored and supervised by campus recreation staff members.

Additionally, students have the opportunity to try out for various club sports teams. If selected, they can be on the roster of that team.

The intramural sports department offers both single-gender sports as well as co-ed sports opportunities. There are outdoor sports (such as softball and flag football) as well as indoor sports (such as basketball and soccer). The outdoor recreation department has an on-campus outfitter facility that rents out gear and equipment for excursions and activities (such as camping gear, mountain bikes, various water craft- canoes, kayaks, and stand-up paddleboards). It also offers students the chance to attend off-campus trips associated with outdoor recreation events such as hiking, horseback riding, and whitewater rafting. The fitness facility includes strength equipment, free weights, cardio equipment, a rock wall, an indoor pool, basketball courts, volleyball courts, racquetball courts, and indoor soccer fields. At this institution, the student activities department is responsible for providing various arts and entertainment events for the campus community, such as concerts, movie nights, talent shows, art expos, and more.

Any involvement in campus recreation, including both the facilities and the programming, is completely voluntary for members of the student body. Students pay an activity fee each semester. This allows them to access various recreation facilities on campus, such as the fitness facility, various outdoor recreation spaces, and a game room. It also allows them to enter certain events provided by the student activities office at no cost. However, certain facilities and programming options come with additional cost. These costs include items such as personal training sessions, swimming lessons, concert tickets, and renting certain pieces of equipment.

This study used archival data consisting of a total 8,379 students, some of whom participated in campus recreation. Since this study looks at the retention of first-year college

students, using archival data containing multiple years allows for a larger sample size and several iterations of first-year students. According to Gall et al. (2007), a minimum of 66 participants are needed, assuming a medium effect size with a statistical power of 0.7 at the 0.05 alpha level. This study was able to easily meet these criteria by obtaining 2,857 participants for 2017-2018, 2,780 participants for 2018-2019, and 2,742 participants for 2019-2020.

The sample size for the 2017-2018 school year contained students with ages from 16 to 50 years old. Ethnicity was broken into 1,866 white, 432 unreported, 180 Hispanic or Latino, 128 Black or African-American, 92 of two or more races, 77 non-resident Alien, 66 Asian, and 16 American Indian or Alaskan native. There were 1,335 males and 1,522 females.

The sample size for the 2018-2019 school year contained students with ages from 16 to 42 years old. Ethnicity was broken into 1,951 white, 283 unreported, 166 Hispanic or Latino, 133 Black or African-American, 87 non-resident Alien, 77 of two or more races, 77 Asian, 10 American Indian or Alaska Native, and 3 Native Hawaiian or Pacific Islander. There were 1,264 males and 1,516 females.

The sample size for the 2019-2020 school year contained students with ages from 14 to 72 years old. Ethnicity was broken into 1,912 white, 223 unreported, 183 Hispanic or Latino, 145 Black or African-American, 105 non-resident Alien, 90 of two or more races, 72 Asian, 7 American Indian or Alaska Native, and 5 Native Hawaiian or Pacific Islander. There were 1,291 males and 1,451 females.

Instrumentation

The use of institutional data and archival data has been helpful in previous studies of the effects of campus recreation on college students. Danbert, Pivarnik, McNeil, and Washington (2014) used institutional data in correlational research related to the relationship between the use

of an on-campus fitness facility and the academic success and retention of college freshmen. Forrester et al. (2018) obtained archival data for intramural sports participants, intramural sports student staff members, and other campus recreation student staff members in their longitudinal study of student retention rates. In a similar vein, Kampf and Teske (2013) use census data requested from an office of institutional research as well as archived participation data from a student affairs office to then conduct a logistic regression related to retention rates. In a multi-site study related to campus recreation facilities and their potential impact on retention, Kampf, Haines, and Gambino (2018) demonstrate the appropriateness of using student identification card swipes as an accurate source of archival data.

Predictor Variables

The first predictor variable is participation in intramural sports. Students at this institution can voluntarily participate in intramural sports during both the fall and spring semesters. Both indoor and outdoor sports are offered, and all students are welcome to take part, regardless of their skill level. Some sports are co-ed, and some are single-gender. There are certain fees associated with playing, depending on the sport and the team size. Intramural sports are advertised across campus via paper flyers, digital signage, social media posts, and promotional tables staffed by intramural sports staff members. Each sport has a regular season, and some go on to a playoff mode for the top contenders. Students are permitted to play in as many sports as they have the time for each semester. Registration occurs online, and students must register in advance prior to coming to their first match or game. Upon arrival, students must present their valid student identification card, and use it to sign in by tapping on a card reader manufactured by Blackboard. The data from students signing in via their identification card is kept in a secure, customized database by the information technology (IT) department.

The second predictor variable is participation in outdoor recreation. The outdoor recreation department offers various events and programming opportunities for students each semester. Programming opportunities involve options including off-campus trips to destinations that provide activities such as kayaking, canoeing, hiking, caving, camping, and more. These programming opportunities vary in price and they generally do not require any previous experience. Students register for these trips through the outdoor recreation website. When they arrive to check-in for their trip, they must present their student identification card to verify their identity. The trips are organized and staffed by employees of the outdoor recreation department, and occasionally require assistance from third-party businesses. Students are made aware of these trips through various advertising channels on campus including flyers, posters, social media, digital displays, and promotional tables staffed by outdoor recreation staff members. The outdoor recreation department also operates a facility a short drive from campus. This facility offers a lake for swimming, canoeing, kayaking, and stand-up paddle boarding. There is also an area for camping, a high ropes course, a low ropes course, and a zipline. Students can use this facility at no charge, although some items require pre-registration. In order to use equipment, or to verify their identity, students present their student identification card which is then tapped into a card reader manufactured by Blackboard. The data from students signing in via their identification card is kept in a secure, customized database by the IT department.

The third predictor variable is attendance at student activities events. This institution has a department of student activities made up of both professional staff and student workers. This department is responsible for producing dozens of events each semester to help enrich the lives of the student body. These events vary from concerts, to movie nights, to comedians, art expos, talent shows and more. Some of these events are free to currently enrolled students, and others

come with a cost (such as concerts). These events are hosted in various locations around campus. Attendance at these events is completely voluntary. In order to gain entry to some of these events, students must present their student identification card to staff members. The cards are tapped on a card reader manufactured by Blackboard, and the data is kept in a secure, customized database by the IT department.

The fourth predictor variable is usage of the on-campus fitness facility. This facility is open to all undergraduate students who are currently enrolled in classes, have financially checked-in and who have paid the activity fee. There are also memberships available for graduate students, faculty and staff, and their spouses. The fitness facility has cardiovascular equipment, free weights, cross-training equipment, an indoor track, a rock wall, an aquatics center, basketball courts, volleyball courts, racquetball courts, and indoor soccer fields. It offers various programming options such as group exercise classes, personal training, rock wall classes, and swimming lessons. Some of the programming options come with additional costs, but general use of the facility does not involve cost for students who are eligible. The facility is open 7 days a week, with amended hours during breaks and holidays for the institution. In order to access the facility, students must present their identification card at a turnstile, and tap it. The turnstiles are programmed to run the information from the identification card against a database in an application called Banner. As long as the students meet the aforementioned criteria, then the turnstile will open and grant them access. The record of information from the turnstiles is stored in a database secured and managed by IT.

The fifth predictor variable is membership on a club sports team. This institution offers both men's and women's sports. Men's sports include archery, hockey, swimming, volleyball, wrestling, and other sports for a total of 20 teams. Women's sports include disc golf, figure

skating, gymnastics, synchronized swimming, and other sports for a total of 19 teams. Tryouts are held depending on the time of year that the season occurs for each particular sport. These teams participate in leagues, tournaments, games, and meets with other schools. A student who is accepted on a team will then participate in practices, team meetings, and competitions (which can include traveling to other schools or other locations). The teams are coached by paid staff members who are overseen by the club sports department. Students who successfully join a team are provided with uniforms, equipment, and other gear necessary to train for, and participate in their sport. There is not a scholarship offered for those who participate in club sports. Membership on these teams is reported by the club sports department so that it can be recorded in a database called Banner which is maintained by the IT department.

Criterion Variable

The criterion variable for this study is year of year retention of first-year college students. This will require students to be enrolled from one fall semester to the next fall semester one year later and will be studied over 3 different academic years (2017 to 2018, 2018 to 2019, and 2019 to 2020). A review of literature by Burke (2019) found that “Student retention in higher education is typically defined as the continued enrollment of a student from the first year to the second year” (p. 13). For this study, the binary result (retained or not retained) will be provided by data from the information technology (IT) department which will be tracked by the student identification number.

Procedures

The information necessary for this study included the data related to the campus recreation department at the host institution. The campus recreation department recorded the participation information for the students involved in intramural sports, outdoor recreation, as

well as the students who swiped or tapped into the fitness facility and those who attended student activities events on campus. The club sports department maintained rosters for the students who were members of each team. Informal written permission was requested from the executive director of campus recreation, the athletic director for club sports, and the director of student activities. Following this, informal written permission was requested from the chief information officer who oversees the IT department. The IT department was able to pull the requested data after it was requested. After these permissions are granted, the next step was to request formal permission from the institution's Institutional Review Board (IRB). See Appendix I for IRB approval.

Once IRB approval was obtained, the formal request was submitted to the IT department. The data was requested to be returned in three documents- one for each of the school years represented (2016-2017, 2017-2018, and 2018-2019). The request included that the data be returned as CSV files so that they can be opened in Microsoft Excel for preliminary data screening. The request included the predictor variable data: the number of times (indicated in numeric value) each student swiped their identification card to indicate participation in intramural sports, outdoor recreation, the fitness facility, or student activities as well as their membership in club sports. It also included the criterion variable: whether the student retained year over year (expressed with a 1) or did not retain year over year (expressed with a 0). The request also asked for demographic information of the student sample, including their gender, ethnicity (if reported) and their age. When placing the request, the researcher included the importance of scrubbing all of the data of any identifying information. The data was requested to be delivered with random numbers signifying each unique participant. Once the request was processed, it was returned via email to the requestor, in accordance with the procedures of the

host institution.

Once the data was received from the institution, it was reviewed for accuracy and completeness. Once it was determined that it was acceptable and formatted correctly, it was be uploaded into IBM's Statistical Product and Service Solutions (SPSS) version 27. Then, the researcher began the process of data analysis using Microsoft Excel as well as SPSS.

Data Analysis

In order to examine the predictive relationship between the predictor variables of participation in intramural sports, outdoor recreation, the fitness facility, student activities and the criterion variable of retention, a binary logistic regression was used. Gall et al. (2007) support the use of logistic regression when the criterion variable is dichotomous (in this case the options are either retained or not retained). In regard to the predictor variables, Hatcher (2013) points out that a logistic regression can use as many of them as are deemed necessary for the given study. Warner (2013) compares binary logistic regression to linear regression and concludes that the former does not contain the same restrictive assumptions as the latter. Additionally, this study meets another requirement found in Warner (2013) regarding the statistical independence of the criterion variable (retention). Descriptive statistics will be reported, as well as mean and standard deviation for all continuous variables.

The logistic regression required that the criterion variable is categorical and dichotomous (Gall et al., 2007). Furthermore, Warner (2013) asserts that "a binary logistic regression does not perform well when many cells have expected frequencies less than 5" (p. 1009). Additionally, the criterion variable should contain a 50/50 split. For this study, all tests were conducted at the 95% confidence interval. A Wald ratio was reported and odds ratios were conducted on each of the variables and were also reported.

CHAPTER FOUR: FINDINGS

Overview

This study examines the potential of a predictive relationship between participation in various forms of campus recreation and year over year retention for first-year college students. The specific purpose of this quantitative, correlational study was to determine whether participation in specific campus recreation variables (club sports, intramural sports, outdoor recreation, student activities events, and usage of the fitness facility) held predictive significance for year over year retention of first year residential students at a large, private university. This chapter provides research questions and associated hypotheses. In order to examine these research questions, archival student data from three different academic years (2017-2018, 2018-2019, and 2019-2020) was gathered. These specific data sets were then each analyzed via binary logistic regression. This chapter contains descriptive statistics for the data sets related to each research question. To test the statistical significance of each model, the Omnibus Tests of Model Coefficients are reported. Pseudo R^2 values are calculated with the Cox and Snell and Nagelkerke R^2 in order to provide context for the overall strength of each model. For each of the predictor variables, the Wald chi-square test are reported in order to show whether or not there is significance. Additionally, odds ratios are provided for each variable to help assess the nature and direction of the relationship with the criterion variable.

Research Questions

RQ1: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2017-2018 academic school year?

RQ2: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2018-2019 academic school year?

RQ3: How accurately can retention of first-year college students be predicted by participation in club sports, intramural sports, outdoor recreation, student activities events or usage of the fitness facility during the 2019-2020 academic school year?

Null Hypotheses

H₀1: There will be no statistically significant predictive relationship between the criterion variable (retention of first-year college students) and the predictor variables (participation in club sports, intramural sports, outdoor recreation, student activities, or the fitness center) for students during the 2017-2018 school year.

H₀2: There will be no statistically significant predictive relationship between the criterion variable (retention of first-year college students) and the predictor variables (participation in club sports, intramural sports, outdoor recreation, student activities, or the fitness center) for students during the 2018-2019 school year.

H₀3: There will be no statistically significant predictive relationship between the criterion variable (retention of first-year college students) and the predictor variables (participation in club sports, intramural sports, outdoor recreation, student activities, or the fitness center) for students during the 2019-2020 school year.

Descriptive Statistics

This study drew from archival data from three different academic years (2017-2018, 2018-2019, 2019-2020) provided by the Analytics and Decision Support (ADS) department at a large, private university. The sample was made up of all undergraduate, residential, freshmen

students who were considered full-time (taking at least 12 credit hours each semester). For the 2017-2018 academic year, the sample consisted of 2,857 students. For the 2018-2019 academic year, the sample consisted of 2,780 students. For the 2019-2020 academic year, the sample consisted of 2,742 students. Descriptive statistics are provided below and are separated by academic year.

Descriptive Statistics (2017-2018 Sample)

The sample for the 2017-2018 school year was comprised of 2,857 residential freshmen who were enrolled full-time. The criterion variable was year-over-year retention, and is summarized for the 2017-2018 sample in Table 1.

Table 1
Descriptive Statistics, 2017-2018 Sample
Criterion Variable: Retention

<i>Retained</i>		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Retained	479	16.8	16.8	16.8
	Retained	2378	83.2	83.2	100.0
	Total	2857	100.0	100.0	

There were four predictor variables (intramural sports, outdoor recreation, fitness center, and student activities) that were calculated based on the total number of times a student used their institution-issued identification card to gain entry into each of those locations or events over the course of the year. There was one categorical variable (club sports) that was based on whether or not a student was on the roster of a club sports team. Table 2 presents the descriptive statistics for the academic year 2017-2018 sample which includes the sample size, mean, and

standard deviation for four predictor variables. Since the predictor variable club sports is dichotomous in nature, it is not included in Table 2.

Table 2

Descriptive Statistics, 2017-2018 Sample, Predictor Variables

	N	Mean	Std. Deviation
Outdoor Rec	2857	.09	.338
Intramural Sports	2857	1.63	4.147
Fitness Center	2857	19.85	22.089
Student Activities	2857	.17	.458

Descriptive Statistics (2018-2019 Sample)

The sample for the 2018-2019 school year was comprised of 2,780 residential freshmen who were enrolled full-time. The criterion variable was year-over-year retention, and is summarized for the 2017-2018 sample in Table 3.

Table 3

Descriptive Statistics, 2018-2019 Sample
Criterion Variable: Retention

<i>Retained</i>		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Retained	468	16.8	16.8	16.8
	Retained	2312	83.2	83.2	100.0
	Total	2780	100.0	100.0	

There were four predictor variables (intramural sports, outdoor recreation, fitness center, and student activities) that were calculated based on the total number of times an individual used their student identification card in order to validate their identify and gain entry into each of those locations or events over the course of the year. There was one categorical variable (club

sports) that was based on whether or not a student was on the roster of a club sports team. Table 4 presents the descriptive statistics for the academic year 2018-2019 sample which includes the sample size, mean, and standard deviation for four predictor variables. Since the predictor variable club sports is dichotomous and categorical in nature, it is not included in Table 4.

Table 4

Descriptive Statistics, 2018-2019 Sample, Predictor Variables

	N	Mean	Std. Deviation
Outdoor Rec	2780	.08	.304
Intramural Sports	2780	1.76	4.506
Fitness Center	2780	17.15	19.656
Student Activities	2780	.27	.595

Descriptive Statistics (2019-2020 Sample)

The sample for the 2018-2019 school year was comprised of 2,742 residential freshmen who were enrolled full-time. The criterion variable was year-over-year retention, and is summarized for the 2019-2020 sample in Table 5.

Table 5

Descriptive Statistics, 2019-2020 Sample
Criterion Variable: Retention

<i>Retained</i>		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Retained	448	16.3	16.3	16.3
	Retained	2294	83.7	83.7	100.0
	Total	2742	100.0	100.0	

There were four predictor variables (intramural sports, outdoor recreation, fitness center, and student activities) that were calculated based on the total number of times a student provided

their student identification card and used it to enter any of those locations or events over the course of the year. There was one categorical variable (club sports) that was based on whether or not a student was on the roster of a club sports team. Table 6 presents the descriptive statistics for the academic year 2019-2020 sample which includes the sample size, mean, and standard deviation for four predictor variables. Since the predictor variable club sports is dichotomous and categorical in nature, it is not included in Table 6.

Table 6

Descriptive Statistics, 2019-2020 Sample, Predictor

Variables

	N	Mean	Std. Deviation
Outdoor Rec	2742	.17	.568
Intramural Sports	2742	2.04	5.374
Fitness Center	2742	19.09	22.344
Student Activities	2742	.39	.908

Results

Data Screening

Prior to analyzing the data in SPSS, all three of the original data files (one file for each academic year) were loaded into Microsoft Excel and reviewed for consistency, irregularities, and overall accuracy. After evaluating each of the variables, it was determined that the necessary data was present and accurate. Unnecessary data deemed irrelevant to the current study was removed. This included entry counts into facilities that were not within the scope of this study. It was determined that there were 2,857 valid participants for the 2017-2018 academic year, 2,780 valid participants for the 2018-2019 academic year, and 2,742 valid participants for the 2019-

2020 academic year. Each of the valid participants were first-year students during the year that their usage was counted, and their retention was counted for the following fall semester.

Assumption Tests

In order for this study to meet the proper requirements for a logistic regression, several assumption tests must be met. Logistic regressions require the criterion variable to be dichotomous in nature (Gall, Gall, & Borg, 2007; Warner, 2013). Since the criterion variable in this study was binary (either “retained” or “not retained”), the first assumption was satisfied. Next, Warner (2013) recommends that for logistic regression models, there needs to be a minimum N of 5 participants per cell. This assumption was met at a higher level for this study. Another assumption is that “each observation is unrelated to every other observation” (Hatcher, 2013, p. 342). This assumption, known as the independence of observations, was met for this study. Finally, the data was screened for extreme outliers through box and whisker plots, but none were found.

Results for Null Hypothesis One

For this study, a binary logistic regression was performed in order to determine how accurately retention could be predicted based on participation in various forms of campus recreation during the 2017-2018 school year at a large, private university. The predictor variables were participation in club sports, intramural sports, outdoor recreation, fitness center usage, and the student activities. A 95% confidence interval was used for this analysis. The results of the Omnibus Tests of Model Coefficients for Null Hypothesis One show that it is statistically significant at $X^2(5) = 19.098, p = .002$. Based on this result, the null hypothesis was rejected. See Table 7 for the Omnibus Tests of Model Coefficients.

Table 7

		Chi-square	df	Sig.
Step 1	Step	19.098	5	.002
	Block	19.098	5	.002
	Model	19.098	5	.002

Additionally, the strength of the association between retention and campus recreation was examined through pseudo- R^2 statistics. The relationship was examined with the Cox & Snell R^2 (.007) and the Nagelkerke R^2 (.001) which both provided weak results. Table 8 provides the Model Summary.

Table 8

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2564.508 ^a	.007	.011

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Next, Wald chi-squares and odds ratios were developed for each of the five predictor variables in order to determine their interaction with the criterion variable. For Null Hypothesis One, during the 2017-2018 academic year, two of the predictor variables showed statistically significant relationships with the criterion variable. First, intramural sports showed a statistically significant result. Intramural sports had a Wald chi-square test of $X^2(1) = 6.295, p = .012$. The odds ratio for intramural sports, $\text{Exp}(B) = 1.037$, showed that there would be over a 3% increase in the likelihood that a student would retain for every 1-unit increase in intramural sports participation. A second predictor variable, student activities, reported a Wald chi-square test of $X^2(1) = 7.141, p = .008$. The odds ratio for student activities was even higher than that of

intramural sports, with $\text{Exp}(B) = 1.421$. The remaining variables (club sports, outdoor recreation, and fitness center) produced nonsignificant Wald chi-square tests. Table 9 summarizes the Wald chi-squared statistics, odds ratios, and 95% confidence interval for all five predictor variables.

Table 9

Variables in the Equation (2017-2018)

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	Club Sports	1.031	.564	3.345	1	.067	2.805	.929	8.472
	Outdoor Rec	.157	.163	.927	1	.336	1.170	.850	1.612
	IMS	.036	.014	6.295	1	.012	1.037	1.008	1.067
	Fitness Center	-.003	.002	1.716	1	.190	.997	.992	1.002
	Student Activities	.351	.131	7.141	1	.008	1.421	1.098	1.839
	Constant	.522	.567	.847	1	.357	1.685		

a. Variable(s) entered on step 1: Club Sports, Outdoor Rec, IMS, Fitness Center, Student Activities.

Results for Null Hypothesis Two

For this study, a binary logistic regression was performed in order to determine how accurately retention could be predicted based on a participation in various forms of campus recreation during the 2018-2019 school year at a large, private university. The predictor variables were participation in club sports, intramural sports, outdoor recreation, fitness center usage, and the student activities. A 95% confidence interval was also used for this hypothesis. The results of the Omnibus Tests of Model Coefficients for Null Hypothesis Two show that it is statistically significant at $X^2(5) = 28.780, p < .001$. Based on this result, the null hypothesis was rejected. See Table 10 for the Omnibus Tests of Model Coefficients.

Table 10

Omnibus Tests of Model Coefficients (2018-2019)

		Chi-square	df	Sig.
Step 1	Step	28.780	5	.000
	Block	28.780	5	.000
	Model	28.780	5	.000

Additionally, the strength of the association between retention and campus recreation was examined through pseudo- R^2 statistics. The relationship was examined with the Cox & Snell R^2 (.010) and the Nagelkerke R^2 (.017) which both provided weak results. Table 11 provides the Model Summary.

Table 11

Model Summary (2018-2019)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2491.305 ^a	.010	.017

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Next, Wald chi-squares and odds ratios were developed for each of the five predictor variables in order to determine their interaction with the criterion variable. For Null Hypothesis Three, during the 2018-2019 academic year, two of the predictor variables showed statistically significant relationships with the criterion variable. The first predictor variable to show a statistically significant relationship with retention was fitness center usage. Fitness center usage reported a Wald chi-square value of $X^2(1) = 6.150, p = .013$. This resulted in a reported odds ratio of $\text{Exp}(B) = 1.008$. The second variable to show a statistically significant relationship with retention was participation in student activities. Student activities reported a Wald chi-square value of $X^2(1) = 16.045, p < .001$. This resulted in an odds ratio of $\text{Exp}(B) = 1.559$. The remaining three variables (club sports, outdoor recreation, and intramural sports) produced

nonsignificant Wald chi-square tests. Table 12 summarizes the Wald chi-squared statistics, odds ratios, and 95% confidence interval for all five predictor variables.

Table 12

Variables in the Equation (2018-2019)

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	Club Sports	-.367	.760	.233	1	.629	.693	.156	3.074
	Outdoor Rec	.078	.181	.189	1	.664	1.082	.759	1.541
	IMS	.001	.013	.004	1	.951	1.001	.975	1.027
	Fitness Center	.008	.003	6.150	1	.013	1.008	1.002	1.014
	Student Activities	.444	.111	16.045	1	.000	1.559	1.255	1.938
	Constant	1.734	.759	5.211	1	.022	5.662		

a. Variable(s) entered on step 1: Club Sports, Outdoor Rec, IMS, Fitness Center, Student Activities.

Results for Null Hypothesis Three

For this study, a binary logistic regression was performed in order to determine how accurately retention could be predicted based on a participation in various forms of campus recreation during the 2019-2020 school year at a large, private university. The predictor variables were participation in club sports, intramural sports, outdoor recreation, fitness center usage, and the student activities. A 95% confidence interval was also used for this hypothesis. The results of the Omnibus Tests of Model Coefficients for Null Hypothesis Three show that it is statistically significant at $X^2(5) = 25.330, p < .001$. Based on this result, the null hypothesis was rejected. See Table 13 for the Omnibus Tests of Model Coefficients.

Table 13

Omnibus Tests of Model Coefficients (2019-2020)

		Chi-square	df	Sig.
Step 1	Step	25.330	5	.000
	Block	25.330	5	.000

Model	25.330	5	.000
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Additionally, the strength of the association between retention and campus recreation was examined through pseudo- R^2 statistics. The relationship was examined with the Cox & Snell R^2 (.009) and the Nagelkerke R^2 (.016) which both provided weak results. Table 14 provides the Model Summary.

Table 14

Model Summary (2019-2020)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2416.363 ^a	.009	.016

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Finally, Wald chi-squares and odds ratios were developed for each of the five predictor variables in order to determine their interaction with the criterion variable. For Null Hypothesis Three, during the 2019-2020 academic year, two of the predictor variables showed statistically significant relationships with the criterion variable. The first predictor variable to show a statistically significant relationship with retention was fitness center usage. Fitness center usage reported a Wald chi-square value of $X^2(1) = 9.783, p = .002$. This resulted in a reported odds ratio of $\text{Exp}(B) = 1.009$. The second variable to show a statistically significant relationship with retention was participation in student activities. Student activities reported a Wald chi-square value of $X^2(1) = 7.672, p = .006$. This resulted in an odds ratio of $\text{Exp}(B) = 1.223$. The remaining variables (club sports, outdoor recreation, and intramural sports) produced nonsignificant Wald chi-square tests. Table 15 summarizes the Wald chi-squared statistics, odds ratios, and 95% confidence interval for all five predictor variables.

Table 15
Variables in the Equation (2019-2020)

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	Club Sports	.330	.655	.254	1	.615	1.391	.385	5.026
	Outdoor Rec	.169	.114	2.184	1	.139	1.184	.946	1.481
	IMS	-.014	.011	1.635	1	.201	.986	.966	1.007
	Fitness Center	.009	.003	9.783	1	.002	1.009	1.003	1.015
	Student Activities	.201	.073	7.672	1	.006	1.223	1.061	1.410
	Constant	1.077	.655	2.704	1	.100	2.937		

a. Variable(s) entered on step 1: Club Sports, Outdoor Rec, IMS, Fitness Center, Student Activities.

CHAPTER FIVE: CONCLUSIONS

Overview

First year students who participated in various forms of campus recreation were studied in order to examine if there was a predictive relationship between their usage of the facilities and programs and their retention in the next academic year. This study used a logistic regression with three different years of archival data to explore if the predictor variables (club sports membership, intramural sports participation, outdoor recreation participation, student activities participation, and fitness center usage) impacted the criterion variable (year over year retention). The chapter opens with a discussion of the overall findings and their implications. Then, this chapter moves on to the limitations of the study, as well as recommendations for future research.

Discussion

The purpose of this quantitative, correlational study was to determine whether participation in club sports, intramural sports, outdoor recreation, student activities events, or usage of the fitness facility held predictive significance for year over year retention of first year residential students at a large, private university. The five predictor variables were measured with archival data from three distinct and consecutive academic years. These variables represent many of the common forms of campus recreation available to students. Previous research found connections between participation in campus recreation and various positive or desirable outcomes for students, including recruitment and retention (Lindsey & Sessoms, 2006; Milton et al., 2020) as well as increased GPA (Das et al., 2020; Roddy et al., 2017; Vasold et al., 2019). Given the rising cost of higher education, and the potential financial strain that this places on students and their parents, it is critical for all relevant stakeholders to have a better understanding of what factors might be related to improved or increased retention rates. This is particularly

important for freshmen, who oftentimes have difficulty retaining into their sophomore year (Tinto, 2006). In fact, for private, non-profit colleges and universities, the retention rate for freshman was 77.6% (Zemsky et al., 2020). Higher education administrators and staff will benefit from insights into the ways different types of campus recreation participation positively influence the persistence of their freshmen students. This will aid them in making decisions on which programs and facilities could be marketed specifically towards first-year students. Therefore, this study adds to the existing body of literature surrounding the topic of retention and campus recreation.

Research Question One (2017-2018)

The first research question dealt with archival data from the 2017-2018 school year. A logistic regression analysis was conducted using archival data of all first-year students at the institution. Based on the results, a chi-squared value of $X^2(5) = 19.098$, $p = .002$ shows that there is statistical significance between participation in various forms of campus recreation and year-over-year academic retention for first-year students at this institution. However, both of the pseudo- R^2 tests revealed poor model fit (Cox and Snell $R^2 = .007$ and Nagelkerke $R^2 = .001$). While the pseudo- R^2 indicate a weak model fit, it should be noted that both of these tests suffer from their own inherent weaknesses and are not true R^2 statistics (Hatcher, 2013). The results of the logistic regression allow for the null hypothesis to be rejected. This result aligns with previous research that linked participation in campus recreation with improved retention rates (Danbert et al., 2014; Forrester et al., 2018; McElveen & Rossow, 2014). Two of the predictor variables (intramural sports and student activities participation) each indicated statistical significance. Four out of the five predictor variables aligned with increased odds of retention.

Only one, fitness center usage ($\text{Exp}(B) = .997$) did not, but it was very close to even, with only a .3% drop in retention for every one-unit increase in usage.

Research Question Two (2018-2019)

For the second research question, the same question was asked, but a different year of data was explored. For this school year, another logistic regression was performed using the same five predictor variables. Compared to the date from the previous year, the results had a higher chi-squared value ($X^2 = 28.780, p < .001$) which also showed significance. Again, the pseudo- R^2 statistics had poor model fit (Cox and Snell $R^2 = .010$ and Nagelkerke $R^2 = .017$). Overall, the results of the logistic regression allow for the rejection of the null hypothesis. The results for this year also had two predictor variables that showed statistical significance based on Wald chi-square results. Student activities participation remained significant ($p < .001$), but the second variable for this year was fitness center usage ($p = .013$). Similar to the first research question, four of the five predictor variables demonstrated increased odds of retention. However, for this year the one that had decreased odds of retention was club sports ($\text{Exp}(B) = .697$).

Research Question Three (2019-2020)

Finally, the third research question looked at first-year students from the 2019-2020 school year. A third logistic regression produced additional insights related to first-year students associated based on this particular academic year. For the third year in a row, campus recreation participation showed to be statistically significant based on chi-square results ($X^2 = 25.330, p < .001$). Just like the previous two research questions, there was poor model fit for the third and final research question (Cox and Snell $R^2 = .009$ and Nagelkerke $R^2 = .016$). The null hypothesis for this final research question was rejected. Student activities participation proved significant for the third time based on the Wald chi-square. For the second time, fitness center usage also

showed significance. As was the case in the previous two research questions, four out of the five predictor variables showed that there were increased odds of retention based on participation. This time, intramural sports showed decreased odds of retention ($\text{Exp}(B) = .986$) indicated a 1.4% decrease in retention for every one-unit increase in participation.

Predictor Variables

This study looked at five specific predictor variables associated with various types of campus recreation facilities and programming. The purpose was to determine if participation in these campus recreation opportunities resulted in predictive significance for year-to-year retention. All three of the research questions revealed statistically significant chi-squared results. Based on these results, all three null hypotheses were rejected. A closer look at the results of the predictor variables across all three years yields insights into their impact on student retention. The three predictor variables that yielded statistically significant results were student activities participation, intramural sports participation, and fitness center usage.

Student Activities Results

The only predictor variable that showed statistical significance for each research question was student activities. Student activities participation also had odds ratios all three years that indicated a positive relationship with retention. During the 2017-2018 school year, for every one-unit increase in participation in student activities, students were 42% more likely to retain. For 2018-2019 this statistic was 56%, and for 2019-2020 it was 22%. This variable seems to have the greatest impact on year-over-year retention for the students accounted for in the study.

Of all of the predictor variables, student activities participation is the one that is most focused on social environments and interactions among students, as opposed to athletic or physical activities. This fits neatly with Tinto's (1975) views on the importance of social

integration into the life of the campus community. The results of this present study, showing a statistically significant relationship between student activities participation and year-over-year retention, help validate the theory of student persistence which directly champions the idea of increased social integration as leading to positive outcomes for students. Additionally, participation in student activities events would fit under the idea of “involvement” as it is explained in Astin’s (1999) theory of student involvement. Students coming to these events are choosing to spend their time in a way that is connected to their institution, and to their peers. The current findings regarding student activities participation are further validated given the research that finds links between academic success, social involvement, and student persistence (Beil et al., 2000; Burke, 2019). This correlation provides statistical evidence of a positive relationship between participating and attending social events organized by a student activities department, and year-over-year retention for first year students.

Fitness Center Results

Fitness center usage showed statistical significance for two out of the three years (2018-2019 and 2019-2020). These years indicated that for every one unit increase in fitness center usage, there was a higher percentage chance that those students would retain. However, these odds ratios produced an increase of less than 1% (2018-2019 $\text{Exp}(B) = 1.008$, 2019-2020 $\text{Exp}(B) = 1.009$). It should also be noted that fitness center usage reported the highest mean usage with each research question. During the 2018-2019 school year, the reported mean usage was 17.15 (SD = 19.656) and during the 2019-2020 school year, the reported mean usage was 19.09 (SD = 22.344). For the first year in the study (2017-2019) fitness center usage did not show statistical significance with a Wald chi-square result of $p = .190$. Additionally, for this year the odds ratio resulted in a negative correlation with retention with $\text{Exp}(B) = .997$.

Students using an on-campus fitness center would fall within the scope of what is classified as “involvement” in Astin’s (1999) theory. However, the various types of amenities offered within this particular fitness center do not allow for the current study to be more specific regarding the type of involvement. Students might come in to exercise, but even within that category there are various options available to them (free weights, cardio equipment, group exercise classes, meeting with a personal trainer, running or walking on the indoor track, and more). Other types of involvement include rock wall climbing, swimming, or playing various types of informal sports (basketball, volleyball, racquetball) that are not organized by a particular department or academic class. While the participants are involved, they are not necessarily engaging in a way that is primarily social. Tinto’s (1975) theory of student persistence discusses the social and academic systems a student finds themselves in during their time at college. Other research has found a link between campus recreation participation and building a sense of community (Hall, 2006). Additional research that surveyed undergraduate students found that a recreation facility is associated with developing social bonds, and that it is one of the reasons students chose to stay at their chosen institution (Miller, 2011). Forrester (2015) points out the importance of recreational facilities for students deciding to stay at their college or university (73.9% of those surveyed made this connection). The results of the current study, showing the statistical significance of fitness center usage, fit with and reinforce these previous studies.

The fitness center provides an environment that allows for both academic and social integration to occur. However, specific interactions and participation were not under observation or within the scope of the available data. The participation represented by this variable could be very individualistic in nature, or highly social, but pointed to a positive relationship with retention during both 2018-2019 and 2019-2020. Additionally, fitness center usage was also

associated with increased odds of retention during 2018-2019 and 2019-2020. These results align with previous research. Studies have found that using a fitness center is associated with greater retention among freshmen students (Belch et al., 2001; Danbert et al., 2014). Similarly, Huesman et al. (2009) studied first-year student who used a campus recreation facility and were able to conclude that visiting “one standard deviation more than average, or about 25 times over the course of the semester, increased a student’s predicted probability of first-year retention by 1%” (p. 59).

Intramural Sports Results

For the first research question, representing the 2017-2018 school year, intramural sports participation showed statistical significance ($p = .012$). However, it was not statistically significant for the second research question for the year 2018-2019 ($p = .951$) or the third research question for the year 2019-2020 ($p = .201$). The odds ratios for intramural sports showed a positive association with retention for two out of the three research questions. For the first research question, intramural sports participants had approximately a 4% increase in the likelihood that they would retain for every one-unit increase in their participation. However, for the second research question, the relationship was negligible, with $\text{Exp}(B) = 1.001$. Finally, the in the third research question there was a negative (but minor) correlation with retention, with $\text{Exp}(B) = .986$.

Other research has pointed out a positive relationship between general campus recreation sports involvement and developing a sense of community (Elkins et al., 2011) as well as the more specific instances of intramural sports participation and developing a sense of community (Atringer et al., 2006; Phipps et al., 2015). This would fit squarely with the social integration portion of Tinto’s (1975) theory of student persistence. Students participating in intramural

sports are playing on teams where they develop bonds over the course of a season by playing in multiple games or matches together (Artinger et al., 2006; Phipps et al., 2015). Intramural sports participation has been directly tied to rate of retention that is higher than non-participants (McElveen & Ibele, 2019; McElveen & Rossow, 2014). Therefore, the observed outcome is in line with prior research that finds intramural sports to be a factor that correlates with higher rates of retention. The social and communal nature of intramural sports, along with the direct involvement in an activity that is sponsored by the institution, fit with the main theories informing and underlying the current study (Astin, 1999; Tinto, 1975). In summary, it is reasonable to hypothesize that intramural sports participation would lead to higher retention rates. The results of this study add to the narrative regarding the impact of intramural sports participation on retention rates while at the same time expanding that narrative by placing intramural sports alongside other campus recreation variables.

Non-Significant Variables

The other predictor variables in this study did not provide statistical significance for any of the three research questions. This includes club sports participation and outdoor recreation participation. For the first research question, with a Wald chi square value of 3.345, $p = .067$, club sports participation fell just outside the set alpha level of .05. However, it was not close to statistical significance for the second research question ($p = .629$) or the third research question ($p = .615$). Interestingly, club sports participation resulted in the odds ratio with the highest positive correlation with retention over the course of all three research questions (Research Question One, $\text{Exp}(B) = 2.805$) as well as the odds ratio with the highest negative correlation with retention (Research Question Two, $\text{Exp}(B) = .693$). It is also worth noting that club sports

participation was the only dichotomous variable and does not take into account the amount of usage or participation, only that students were on a team.

Similar to intramural sports, the team-focused nature of club sports participation should fit well within the social integration aspect of Tinto's (1975) theory. Students who make a club sports team practice with their teammates regularly, compete against other schools, workout together, and travel with one another to games or matches. There is lot of potential for relational growth for those exposed to this type of team atmosphere. Since these club sports teams are sponsored by the institution, the involvement by students is integrating them more and more into the life of their school community. Researchers have found a link between club sports participation and developing a sense of belonging (Lifschutz, 2019). Additionally, these participants are making a choice to use their time and energy related to an activity directly related to the institution. The type of participation experienced by club sports members is directly addressed as "athletic involvement" in Astin's theory of student involvement. However, club sports participation failed to reach statistical significance in the current study, and had inconsistent results related to the reported odds ratio across all three research questions. This is inconsistent with previous research that found links between club sports participation and retention rates for first year students (Kampf & Teske, 2013). Other research has found links between participation in sports or athletics and student persistence (Leppel, 2005). However, it should be noted that for this study, the sample size for club sports participants was a very small percentage of the overall sample size related to each research question (Research Question 1- $n = 2,857$, club sports participants = 14, Research Question 2- $n = 2,780$, club sports participants = 14, Research Question 3- $n = 2,742$, club sports participants = 14).

Outdoor recreation participation never reached statistical significance, but was positively associated with retention for all three research questions. Participation in outdoor recreation has been linked various positive outcomes such as physical health benefits, mental health benefits, and social connectedness (Andre et al., 2017). Students participating in outdoor recreational programming are going to be involved in situations and environments that necessitate a high degree of interaction with their peers. Outdoor recreation programming, such as going on an adventure trip (canoeing, hiking, camping, or similar opportunities) requires students to be actively involved, and not just passive observers. Research found that when outdoor adventure programming was incorporated into a first-year experience course, several variables proved to be statistically significant, including the variable associated with social connection (Bell, 2012). As with the other types of campus recreation programming and facilities, outdoor recreation participation relates well to Tinto's (1975) theoretical framework. While it did not reach statistical significance for any of the three research questions, the fact that the odds ratios for outdoor recreation were all positively associated with retention matches previous research that connects outdoor recreation experiences with increased social connection and integration among participants (Bell, 2006; Bell, 2012).

Implications

Recreational programs and facilities exist in various forms and sizes at different colleges and universities across the country. These extra-curricular and co-curricular options come at a cost for the institution which can be reflected in student fees or additional charges on their student bill. Due to the rising cost of higher education, various stakeholders might question the necessity or value of campus recreation. Parents and students who are financing an education and paying for tuition need to understand what part campus recreation plays in the life of a student,

or in the overall student experience. Administrators and staff, tasked with maintaining reasonable budgets, need to justify the value of committing funding towards campus recreation. Indeed, some recreation amenities can be controversial or seen as superfluous (Stripling, 2017). Since all stakeholders are interested in student success, and seeing students through from freshman year to graduation, it is important for them to consider any elements that can lead to improved student retention, including campus recreation.

The current study adds to an existing body of research that explores the various outcomes associated with student participation in recreation programming, or the usage of recreation facilities. While other research has focused on one aspect of campus recreation, such as recreation centers, or sports programming, this study sought to explore a wide variety of opportunities and their relationship to student retention. By looking at an institution that offers club sports, intramural sports, outdoor recreation programming, student activities events, and a fitness center, the data presented gives insight into a situation where students had access to a large swath of opportunities. Instead of focusing on just recreational facilities, or only recreational programming, these logistic regressions combine the various aspects of a recreational program to give a full picture of what choices might be available to a first-year student. Understanding whether or not these various options are statistically linked with an increase or decrease in student retention helps to advance the narrative regarding the effects of campus recreation.

Each of the models showed statistical significance and thus each null hypothesis was rejected, despite the fact that each also displayed weak model fit according to the Cox and Snell and Nagelkerke R^2 . The predictor variables showed a wide range of odds ratios over the course of all three academic years, and only failed to be positively associated with retention three

different times (fitness center usage during 2017-2018, club sports participation during 2018-2019, and intramural sports participation during 2019-2020). During each year, four out of the five predictor variables showed that their participants were more likely to retain. Also, during each year, two of the predictor variables showed statistical significance with a set alpha level of .05. Student activities participation was the only variable to show significance across all three years, while fitness center usage was significant twice, and intramural sports participation was significant once. The results point to the existence of a relationship between various types of campus recreation participation and year-over-year retention for first year students.

Additional analysis of these findings reveals the importance of social events and programming such as those offered by a student activities department. Interestingly, the student activities variable was the only one out of the five that did not contain an explicit physical fitness component. Instead, this recreational offering was primarily social events such as movie nights, concerts, art expos and other events. These results fit with previous research that examined the link between social integration and student persistence (Beil et al., 2000). This would make sense since other research studied those who attended campus events and found that they had a higher GPA than those who did not attend these type of co-curricular events (Bergen-Cico & Viscomi, 2012). These results reenforce the recommendations of Stirling and Kerr (2015) who not only tout the value of co-curricular programming, but call for greater emphasis, quality, and organization at the institutional level, in order to better serve students.

An additional implication of these logistic regressions is the variety of recreational offerings available to students during any given semester. While the models themselves each showed statistical significance according to the Omnibus Tests of Model Coefficients, they each reported poor model fit, and they contained differences from year-to-year in regards to odds

ratios for individual variables along with predictor variable significance (aside from the consistency of student activities participation). These results lend credence to the idea that a variety of options is helpful for first-year students. Instead of a narrow set of programming options and facility choices, a student can benefit from various choices as they explore their interests and perhaps develop new habits. The findings in this study also show how using a logistic regression to analyze data can help college and university administrators find ways that a campus recreation department can influence the retention of their first-year students.

Limitations

Various limitations were present in this study, as is common with many different research projects. The first limitation revolves around the specificity of year-over-year retention for first-year college students. Additional research would be necessary to follow the results for students into their second, third, and fourth years. A fuller picture of the impact on student would retention if the data followed them all the way through to graduation. However, due to the importance of retaining first-year students, this study may still prove to be valuable. It should also be noted that the retention rates at the institution used for this study are already high compared to national averages. For the three years in this study, the retention rates were 83.2% for both the 2017-2018 and 2018-2019 academic years, and 83.7% for the 2019-2020 academic year. Nationwide, the retention rate was 73.2% in 2017 and 73.5% for full-time, first-year students (National Student Clearinghouse Research Center, 2020). With rates already much higher than the national average, it should be considered that even small percentage increases in retention are potentially meaningful.

A second limitation is the unique nature of the singular institution studied. This particular institution has its own campus recreation facilities and programming options. The population

sample had access to these options during their particular year, and their unique situation would not apply for students at other college or universities with different campus recreation offerings. Not every college or university offers programming such as outdoor recreation or club sports. Some schools have student activities departments that are smaller in scope, linked with sorority and fraternity culture, or just offer fewer social opportunities for their student body.

The third limitation involves the recording keeping for several of the variables. Participation information for all club sports members, intramural sports participants, and fitness center users is inclusive of all users. However, the data for outdoor recreation and student activities participants, while accurate regarding the usage numbers for what is represented, does not necessarily include all of the programming opportunities utilized over the course of the academic year represented in the study. To put it another way, there were events or activities offered by outdoor recreation and student activities that did not require a student to swipe in to the event with their identification card. This means that the overall usage numbers could have been higher for individual users, and that there could have been users not represented in this data set at all.

The fourth limitation involves the impact of the COVID-19 global pandemic on retention for students during the 2019-2020 academic year. Due to the ongoing nature of this catastrophic event at the time of this current research, the overall impacts of the pandemic on student retention cannot yet be fully known or realized. There is a possibility that there was an impact on the data for the third research question as a result of the circumstances surrounding this phenomenon that impacted higher education, the economy, public health, and various other aspects of both public and private life.

Recommendations for Future Research

This study adds to growing body of literature related to the intersection of campus recreation opportunities and their relationship to student retention. Drawing from the results and limitations of the current study, future research could focus on the following areas and topics.

1. Future studies should be reproduced at other types of institutions, including public, non-religious, and smaller colleges and universities.
2. Additional studies should consider retention between other years (sophomore to junior, junior to senior) as well as consider 4-year graduation rates for campus recreation participants.
3. Using similar data sets, future studies should compare retention rates among various populations to determine if there are similarities or differences among various ethnicities, between genders, or between residential and commuter student populations.
4. When considering fitness center usage, other studies should drill down further to consider the particular type of programming each user is participating in once they enter the facility. For instance, some users are coming to lift weights, others are coming to use the aquatics area, and still others are coming to play pick-up sports (such as basketball or racquetball) with their peers. The predictor variable of fitness center usage is very broad, and could benefit from more specificity in future studies.
5. Additional studies focusing on Astin's (1999) theory of student involvement should compare campus recreation participants alongside students involved in other co-curricular or extra-curricular activities (such as student clubs, theatre, marching band, NCAA athletics, or fraternities and sororities).

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APPENDIX A: IRB APPROVAL

From: irb@liberty.edu 
Subject: IRB-FY20-21-526 - Initial: Initial - Exempt
Date: February 16, 2021 at 4:12 PM
To: cjmisiano@liberty.edu, mtshenkle@liberty.edu

LIBERTY UNIVERSITY

INSTITUTIONAL REVIEW BOARD

February 16, 2021

Christopher Misiano
 Michael Shenkle

Re: IRB Exemption - IRB-FY20-21-526 CAMPUS RECREATION AND RETENTION IN HIGHER EDUCATION: A BINARY LOGISTIC REGRESSION

Dear Christopher Misiano, Michael Shenkle:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46: 101(b):

Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:

- (i) The identifiable private information or identifiable biospecimens are publicly available;
- (ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects;
- (iii) The research involves only information collection and analysis involving the investigator's use of identifiable health information when that use is regulated under 45 CFR parts 160 and 164, subparts A and E, for the purposes of "health care operations" or "research" as those terms are defined at 45 CFR 164.501 or for "public health activities and purposes" as described under 45 CFR 164.512(b); or
- (iv) The research is conducted by, or on behalf of, a Federal department or agency using government-generated or government-collected information obtained for nonresearch activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 et seq.

Your stamped consent form can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. This form should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office