

FACTORS AFFECTING RETENTION OF FIRST-TIME, FULL-TIME
FRESHMEN STUDENTS AT HIGHER EDUCATION
INSTITUTIONS WITHIN THE APPALACHIAN
COLLEGE ASSOCIATION

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ABSTRACT

This study examined factors that may affect the retention of first-time, full-time college freshmen to sophomore year. Institutions in the Appalachian College Association (ACA) were invited to participate, and nine of the 35 member schools provided data. The research questions were (1) Is there a relationship between retention for students' sophomore year and any of the following and (2) Based on any relationships identified in RQ 1, are there two or more variables that predict retention status for students?

The data set contained 7,198 student records. The independent variables included: High school GPA, cumulative college GPA at the end of the freshman year, ACT score, gender, ethnicity, and residency status. The dependent variable was retention to sophomore year.

Research question 1 used correlation analysis to establish relationships between the independent variables and retention. Point-biserial correlation analysis was performed for the three scale independent variables, ACT score, high school GPA, and cumulative college GPA. Pearson's chi-square was performed for the 3 nominal independent variables, gender, residency status, and ethnicity. The correlation analysis showed that 5 of the 6 variables had statistical significance with retention.

Research question 2 used regression analysis to examine the independent variables' ability to predict retention to sophomore year. Cumulative college GPA and residency status showed the strongest ability to predict retention to sophomore year.

Results from this study may encourage colleges and universities to begin or promote programs designed to assist students with maintaining a favorable GPA, such as study skills sessions or active learning environments. Information contained here may also lead to development of initiatives designed to increase social integration for students. These initiatives may include new programs or better scheduling of current offerings.

Further research areas include using this methodology on other campuses, as well as developing a qualitative or mixed methods study to use at a single campus. Of the schools in the ACA, there may be interest in comparing schools considered more conservative with those considered more liberal. Finally, predictive analytics may be employed to examine other variables common among students who retain for sophomore year.

DEDICATION

This dissertation is dedicated to the three people I love the most—Kevin, Isabel, and Charlie. Kevin, thank you for being the world’s best proof-reader and for knowing when sarcasm is the answer. Isabel, thank you for doing homework with me and letting my dissertation share your high school years. Charlie, thanks for being ok with the fact that I was the mom in the stands with a book and laptop. We did it!

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CHAPTER I

INTRODUCTION

Institutions of higher education continue to focus on attracting quality students and retaining them throughout their college careers (Morrow & Ackermann, 2012). At least part of the interest is economic, as students who drop out of college or transfer to another institution result in lost revenue for the school (Hotchkiss, Moore, & Pitts, 2006). Not only is there an economic impact on the institution, but also on the students themselves (Bureau of Labor Statistics, 2012). For example, a higher level of education has been shown to result in higher earning potential and lower unemployment rates (Bureau of Labor Statistics, 2012). Therefore, students who leave college without receiving a degree may never achieve their maximum employment potential.

This study focused on higher education institutions that are members of the Appalachian College Association (ACA). Available data from these institutions was examined to determine whether there are common characteristics among first-time, full-time freshmen students who return to their respective institutions for a second academic year. A list of variables examined may be found in Appendix A. The data may indicate new areas of study for retention programs.

Even though the subject of retention has been studied for several years, it remains an important topic for all colleges and universities. While many studies have been published, very few have focused on students at religiously-affiliated colleges and universities (Jamelske, 2009; Perry, 2010; Pritchard & Wilson, 2007). Since institutions within the ACA include both secular

and religiously-affiliated colleges and universities, this study presented an opportunity to identify data from institutions that are religiously-affiliated. This study attempted to determine if there are similar traits among retained students who are enrolled at ACA-member schools. A variable was added to distinguish whether or not the institution is religiously-affiliated. Coding this variable enabled the researcher to pursue another avenue of research such as separating the institutions into two groups depending on the presence of a religious affiliation. All of the participating institutions in the study claimed a religious affiliation, so the variable was not included in the final calculations. Retention data of the two groups were compared for any relationships. If relationships were established, institutions may consider developing retention-based programs and initiatives for students who may be at greater risk of not returning. The study may also show if institutions with higher retention have similar retention-based programs. If so, institutions without such programs may wish to explore development. For example, if data show institutions with fully developed First Year Experience (FYE) programs have high retention, colleges and universities without these programs may choose to devote resources toward their development. In spite of the data that have been accumulated, little has been accomplished in the area of program development based on that data. Program development at larger institutions may be more difficult to implement. Most of the campuses used for this study were relatively small, which may make implementation of new retention-based programs easier.

Background

A number of different factors related to retention and academic success indicators have been studied and published. DeBerard, Spielmans, and Julka (2004) attempted to link specific physical and social factors to academic achievement and retention. Others, such as Cherry and

Coleman (2010), reported a specific program in place at the College of Charleston that addresses academic deficiency and defines a plan to help those students succeed. Freshman learning communities, and their effect on performance and retention, have also been considered in the research; specifically, studies have investigated whether these communities help students achieve more academic success (Hotchkiss et al., 2006). These freshmen learning communities are a “mechanism by which college freshmen can develop a small community of peers who have an area of common interest” (Hotchkiss et al., 2006, p. 197). This study included a variable indicating whether or not the institution in question has a program of this type.

Many times college freshmen cannot successfully navigate the rigor of college-level work along with the added pressure of being away from home for the first time (Woosley & Shepler, 2011). The biggest indicator of inability to acclimate to the new environment is manifested by low first-year grade point averages (Folger, Carter, & Chase, 2004). Grade point averages (GPAs) are considered for continuation of scholarships, graduation requirements, and acceptance to graduate level programs (Woosley & Shepler, 2011). In an effort to help students acclimate to college, some institutions offer counseling services. However, since college counselors have a heavy workload, institutions need a way to identify students who may need these services. Coll and Stewart (2008) investigated the partnership between academic performance and academic counseling services by using the counseling services to administer scales by which to measure social integration. The students were early in their education coursework, but those who scored lower on the integration scales were considered to be at-risk. There are several current retention studies in the literature, but the topic of retention is also a historic issue. Over the past 30 years, there have been many studies regarding retention (DeBerard et al., 2004; Laskey & Hetzel, 2011; Pritchard & Wilson, 2007), and current research

continues to focus on ensuring that students remain engaged in their course of study (McCracken, 2015).

Retention is an ongoing challenge on college campuses, due in part to the budgeting concerns that occur as a result of non-retention (Rose, 2013). Specific reasons students leave a college vary from student to student. However, if identifiable patterns exist, there may be some characteristics that are specific to student groups who persist. These characteristics may not be found in student groups who are not retained.

The literature contains information regarding many of these retention-related topics, but there have been very few that relate specifically to religiously-affiliated higher education institutions. Nine institutions that are members of the Appalachian College Association (ACA) contributed data for this study. The ACA is composed of 35 colleges and universities in Tennessee, North Carolina, Virginia, West Virginia, and Kentucky (Appalachian College Association, 2015). For a complete list of ACA institutions, see Appendix B. The institutions participating in the study included Tennessee Wesleyan University, Brevard College, Campbellsville University, Carson-Newman, Maryville College, Mars Hill University, Milligan College, the University of Pikeville, and Tusculum College.

Tennessee Wesleyan University (TWU) is a small, private liberal arts institution located in Athens, Tennessee. TWU is a part of the Holston conference of the United Methodist Church. Founded as Athens Female College in 1857, TWU now has three instructional sites with several undergraduate degrees and one graduate program (Tennessee Wesleyan College, 2016).

Brevard College is located in Brevard, North Carolina. Affiliated with the Methodist church, Brevard promotes experiential learning with engaged faculty in a mountain location.

The college is focused on the liberal arts and has a low student to faculty ratio (Brevard College, 2016).

Campbellsville University is a Christian institution located in Campbellsville, Kentucky. Founded in 1906, the institution focuses on the liberal arts and offers both undergraduate and graduate degrees. The acceptance rate is 76 % (US News and World Report, 2016).

Carson-Newman is a Christian liberal arts institution located in Jefferson City, Tennessee. Carson Newman offers both undergraduate and graduate degrees in on-campus and online formats. They offer 19 intercollegiate sports in NCAA Division II and they have just over 2500 students (Carson-Newman University, 2016).

Maryville College is located in Maryville, Tennessee, and it offers classes in eight different divisions: behavioral sciences, education, fine arts, humanities, languages and literature, mathematics and computer science, natural sciences, and social sciences. The college is a Christian liberal arts institution, and they offer undergraduate degrees only and focus on experiential learning (Maryville College, 2016).

Mars Hill University (MHU) was founded in Mars Hill, North Carolina, in 1856 as the French Broad Baptist Institute. Mars Hill offers 34 majors and 32 minors, including one master's degree. MHU has a little over 1400 students, with a 53%-47% male to female ratio (Mars Hill University, 2016).

Milligan College is a Christian liberal arts college located in Milligan College, Tennessee, which is between Johnson City and Elizabethton in the tri-cities region. Milligan offers more than 100 majors, minors, pre-professional programs, and concentrations. They have around 1200 students and more than 40 clubs and organizations on campus (Milligan College, 2016).

Pikeville College was founded in 1889 and became the University of Pikeville in 2011. Located in Pikeville, Kentucky, their mission statement focuses on creating opportunities for Appalachia, maintaining a state-of-the-art infrastructure, and including community service and experiential learning in their curriculum (University of Pikeville, 2016).

Tusculum College is a liberal arts institution located in Greeneville, Tennessee that awards both baccalaureate and master's degrees. The college was founded in 1794 and is affiliated with the Presbyterian Church (USA). It is the 28th oldest college in the nation (Tusculum College, 2016).

Problem Statement

Since retention is an important factor for all institutions of higher education, administrators want definitive explanations for why students persist or do not persist at their institution (Pan, Guo, Alikonis, & Bai, 2008). While it may be difficult to determine individual circumstances regarding non-persistence, it may be possible to find commonalities among institutions with higher retention rates. Likewise, relationships may be found relating certain student demographic factors to a higher persistence rate. If those relationships can be established, further analysis may provide institutions with the ability to better predict student retention and success.

Purpose of Study

The purpose of this research was to identify the characteristics (i.e., variables) that are common to students returning for their sophomore year of college as well as to identify the differences in variables between retained students and students who do not return. The study

variables may also demonstrate whether there are certain retention-based programs common to institutions with higher retention rates.

Significance of the Study

Persistence to graduation affects both the economic climate of higher education institutions as well as the earnings potential of the students in question. A review of the literature showed that traditional retention variables (e.g., ACT, GPA, etc.) have been extensively studied (Perry, 2010; Pritchard & Wilson, 2007). Rather than those variables alone, retention studies have also focused on social integration as a research area of interest (Burks & Barrett, 2009). Social integration research has already focused on first-year experience programs (Burks & Barrett, 2009). Providing an in-depth study to identify common characteristics may assist institutions with recruiting and retention efforts. Adding the religiously-affiliated variable may lead to another avenue of investigation. If patterns emerge that exist specifically for these types of institutions, administrators might learn what may and may not work for retention efforts. Additionally, this study provided a framework for investigation that could be replicated at other colleges and universities.

Research Questions and Hypotheses

Specifically, the research questions considered in this analysis were,

Research Question 1 (RQ 1): Is there a relationship between retention for students' sophomore year and any of the following:

- High school GPA
- Presence of FYE program at the institution
- Cumulative college GPA at the end of the freshman year
- ACT score
- Gender

- Residence status
- Ethnicity
- Institution's religious affiliation

Research Question 2 (RQ 2): Based on any relationships identified in research question 1, are there two or more variables that predict retention status for students?

Overview of Methodology

The freshman registration lists for consecutive fall semesters were submitted by the institution effectiveness offices of the nine participating institutions. In addition to the variables requested, students' retention to sophomore year was reported. By examining the variables associated with each group and each institution, statistical analysis determined if certain variables can be used to predict whether or not a student will return. If those predictive variables are related to institutional initiatives, those initiatives may be expanded to increase enrollment. Likewise, if the group of non-retained students had certain characteristics in common, other students sharing those characteristics might benefit from extra college offerings such as study sessions.

The student populations from the member institutions of the Appalachian College Association were used for this study. For the purposes of this study, only first-time, full-time freshmen were used as participants. Due to the availability of the data, a census study was performed. The entire population of students meeting the specified criteria was included in the study sample. Students were coded through de-identified numbers, which ensured confidentiality. Complete transcripts, course history, and demographic information for all students were available. Three years of data were requested and used. The institutions'

databases provided data in Microsoft Excel spreadsheets, which were emailed to the researcher. The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 23.

The dependent variable in this study was enrollment status for sophomore year. Independent variables included ACT score, gender, ethnicity, and residence status. A complete list of variables may be found in Appendix A. Statistical analysis began with correlation to examine possible relationships. Once any relationships were established, multiple regression analysis was performed on the data to determine if any linear combination of variables was predictive of retention.

Definitions

The following definitions are listed to avoid ambiguity, as some of the terms may have several meanings:

Cumulative College Grade Point Average (GPA): The cumulative grade point average (GPA) is calculated by including all college coursework (Tennessee Wesleyan College, 2014) undertaken by the student until the end of their freshmen year. Some first-time, full-time freshmen have completed dual enrollment courses prior to beginning their on-campus coursework. All college coursework completed prior to the end of their freshman year will be included in this value.

First Year Experience (FYE) Programs: A comprehensive program designed to help freshmen college students with the transition to college. These programs vary in structure as well as context, and they include efforts to promote better academic performance while helping students with social integration (Barefoot, Fidler, Gardner, Moore, & Roberts,

1999). Some may last a few weeks, while others last the entire freshman year (Burks & Barrett, 2009).

Freshman: For the purposes of this study, a freshman is a student who is a first-time, first-year college student, regardless of his/her number of accrued semester hours (US Department of Education, 2015).

Grade Point Average (GPA): This number is determined for each class in which the student is enrolled. It is calculated by adding the quality points received for each class and dividing that sum by the total number of hours attempted. Quality points are calculated by multiplying the grade received in the class by the number of hours the class meets weekly based on the following scale: A = 4.0, B = 3.0, C = 2.0, D = 1.0, and F = 0.0 (Tennessee Wesleyan College, 2014).

Religiously-Affiliated: While the degree of affiliation varies widely, a basic definition can be “a college or university whose history or principles are tied to a particular religious group” (Akers, Rotramel, & Wellmann, 2010, p. 2).

Retention: For the purposes of this study, retention is defined as those students who return for their sophomore year. For 4-year institutions, this is the percentage of first-time bachelor’s (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall (US Department of Education, 2015).

Limitations of the Study

Students leave their programs of study for many reasons, and not all of them are due to academic performance (Berkman, Glass, Brissette, & Seeman, 2000; Pritchard, Wilson, & Yamnitz, 2007). One limitation of this study involved students who leave college after their

freshman year for non-academic reasons. These non-academic reasons may be financial or personal in nature (Berkman et al., 2000). For financial reasons, students may need to work full-time, which forces them to drop out of college. They may need to return home to care for a family member or their family situation may change. Students may suffer from social or emotional issues that lead to nonretention. They may not adjust well to being away from home and leave because they are homesick. During young adulthood, changes in relationships may cause students to withdraw or transfer to another institution (Berkman et al., 2000). Finally, students may be asked to leave their institution due to behavior. These limitations cannot be predicted, but they may contribute to students' non-retention (T. Williams, personal communication, July 13, 2015).

There may be institutional reasons for nonretention. Students occasionally transfer to other institutions due to a need for a specific academic program. These students may successfully complete graduation requirements at another institution. While this factor would not be applicable to retention, it might be necessary to examine it as it relates to persistence. For example, these students would appear in the non-retained dataset for the college in question, but they may still persist to a degree. Other colleges and universities may have temporary, but mandatory, academic withdrawals due to poor performance. Students who finish their freshman academic year with a lower than required grade point average may not be permitted to register for classes the following fall (Cherry & Coleman, 2010). These students would be included in the non-retained group, even though they may plan to return to that institution to continue their studies.

The variables chosen for analysis may not show relationships that are consistent across populations. Therefore, the results may not be generalizable to all student populations. Even

though the same variables may be collected for each university, there may be differing relationships between the variables at each institution.

High schools may employ different scales for GPA. Due to AP and honors courses, some schools employ a weighted scale in which the highest possible GPA is 5.00 (Volwerk & Tindal, 2012). This was accounted for during the data analysis.

Delimitations of the Study

The institutions chosen for this study are members of the Appalachian College Association (ACA). The ACA is a “non-profit consortium of 35 private four-year liberal arts institutions spread across the central Appalachian Mountains in Kentucky, North Carolina, Tennessee, Virginia, and West Virginia” (Appalachian College Association, 2015, para. 1). In total, these schools serve over 54,000 students. The ACA is dedicated to helping its members share ideas and knowledge (Appalachian College Association, 2015). Among its areas of focus are assisting the faculty in strengthening their knowledge base, providing research opportunities for students, and being of service in local communities. Since ACA member institutions will be used, the data may not be transferable to other institutions of higher education. Data are available for the last five consecutive years (2010-2015), and at least three years of data from this timeframe was used for analysis.

Even though institutional databases may contain information from previous years, data from all available years may not be included in the study. This would delimit the study to only the years considered. Likewise, the list of independent variables may be contracted, which would also narrow the research questions being considered. Extraneous variables, such as a student’s major, may also be excluded. Only first-time, first-year freshmen were used as participants. This study did not include students who have previously enrolled in other

institutions, even if they are still considered freshmen. Students who have completed dual enrollment courses in high school, but who are new to the higher education institution, were included.

Methodological Assumptions

The data found in the colleges' databases may have been entered by the students themselves during an online application process. If the student's application was in a paper format, a college employee may have entered it. The assumption that the information was entered correctly without typographical errors is necessary in order to use the data. At the outset, it is assumed that each institution's data will include the independent variables of interest.

CHAPTER II

LITERATURE REVIEW

Introduction

College student retention has broad economic implications and has been the subject of many studies. In the past 20 to 30 years, many different aspects of retention concepts have been examined. Both cognitive and non-cognitive factors have been considered in the research (Adebayo, 2008; Sparkman, Maulding, & Roberts, 2012). Cognitive factors traditionally include the student's high school grade point average and standardized test scores. Non-cognitive factors, such as emotional and physical well-being, may be involved as well (Sparkman et al., 2012).

History of Social Integration Theory

Emile Durkheim was a French philosopher and sociologist who first introduced the subject of sociology as a potential area of study in the late 19th century (Riley, 2015). After deciding against a career as a rabbi, Durkheim decided to devote his time to teaching. Since sociology was not a subject available to teach at that time, he taught philosophy and continued to work in the field of sociology. Durkheim (as cited in Riley, 2015) was specifically interested in the ways people are integrated socially. Durkheim posited the topic of positive solidarity as directly affecting how individuals are integrated into society. This type of solidarity is two-part, and it consists of mechanical and organic components working together to develop individuals'

reactions to their social environments. The mechanical component works “by binding individuals directly to the rest of the society” (Riley, 2015, p. 54), while the organic component “creates solidarity by linking individuals to some discrete part of the larger society” (Riley, 2015, p. 54). In mechanical solidarity, each person has similar beliefs and responses to interactions, while organic solidarity focuses on individual differences that combine to form a network of interpersonal relationships (Riley, 2015).

Durkheim’s (as cited in Riley, 2015) explanation for the structuring of relationships as strongly affecting a person’s social integration. Societies and groups with a high level of social integration had lower suicide rates, and low social integration levels were correlated with high suicide rates (Lukes, 2013; Thompson, 2002). As retention studies also include social integration theories, the works of Durkheim are sometimes used as a basis for the study of retention (Lukes, 2013). For instance, Durkheim’s (as cited in Berkman et al., 2000) theories were used as a foundation in a study on how social integration affects a person’s overall health. Social integration has also been examined for its relationship to student retention, especially on college campuses. This subject is the major focus of the work of Vincent Tinto (1987). Tinto has studied and written about retention on a broad scale, and his work has been the basis of further studies by researchers.

Tinto

Examining literature on the subject of retention leads to a discovery of the work of Vincent Tinto (1987). In addition to being a faculty member at Syracuse University, Tinto (1987) has studied and published information regarding learning communities, such as First Year Experience (FYE) classes, and student retention. Tinto (1987) found that student attrition is

most commonly associated with one of three factors: academic difficulties, students who cannot resolve their education with their vocation, and students' failure or inability to become integrated into the social and academic life of their institution. Studying these three factors led Tinto (1987) to develop his Model of Institutional Departure. This model outlines that college students need to become involved in both academic and extracurricular areas as well as develop interactions with both their faculty members and their peer groups (Tinto, 1987). In his work, Tinto (1975) sought to rectify issues with earlier studies of retention. His belief was that previous studies had failed to identify the differences in students who dropped out due to academic reasons and those who dropped out for other reasons. Likewise, he also believed in the need to examine those students who left higher education temporarily and then finished later (Tinto, 1975). Tinto studied both Durkheim's (as cited in Johnson, 1965) theory of suicide, as well as economic implications on the cost-benefit of dropping out of college, in an effort to develop "an institutional rather than a systems model of dropout" (Tinto, 1975, p. 91).

Tinto and Pusser (2006) reported that even though many studies and theories exist regarding student attrition, the theories have not resulted in the development of effective retention programs. The authors revisit this concept due to the realization that efforts at studying student attrition have not significantly changed any of the data. Tinto and Pusser (2006) stated, "it is clear that gains in our understanding of the process of student persistence have not been translated into gains in student persistence" (p. 2). Their work specifically called for more solid plans for promoting the retention of students from low-income backgrounds. Students from these backgrounds were more likely to enter two-year colleges, which then made them less likely to persist to a four-year degree.

Most studies agree that social integration is important to student retention, but specific programs to enhance social integration have not been solidified. It is well-established that the classroom is the most important place for student integration, especially during their first year on campus (Hotchkiss et al., 2006). As students acclimate to college life, the classroom is one place to see the same group of students on a regular basis (Hotchkiss et al., 2006). If a high percentage of students are employed off-campus or commute to and from classes, the classroom may be the only place they meet other students and their faculty. While the classroom's relationship to social integration is a well-known phenomenon (Tinto & Pusser, 2006), there have not been well-developed programs implemented to increase classroom socialization.

Retention Parameters Studied Previously

Some studies (Pan et al., 2008) include intervention efforts, but generally these research areas are coupled with other parameters, such as programs designed to use grants that have been funded. The emergence of First Year Experience programs has also been examined as it relates to retention of students. Student engagement provided through these programs is thought to be a factor in retention (Fuller, Wilson, & Tobin, 2011). A parameter that has been studied less frequently is whether or not library use played a role in freshman retention (Haddow & Joseph, 2010). According to Haddow and Joseph (2010), library use is considered one of the institutional systems through which students become more engaged in their campus. Studies regarding library use and its relationship to student engagement and retention were conducted by the Higher Education Academy in the United Kingdom. Results from their "What works? Student retention and success" (Thomas, 2012) program show that library use, in addition to

other factors like personal tutoring and working on teams in the classroom, increase student engagement.

Taking advantage of social media's popularity, one school in the United Kingdom created a Facebook page to begin the socialization of incoming freshmen. The page was created for the business school of the university, and pre-enrolled, first-year students were added to the group (Jackson, 2013). This was an attempt to begin social integration before the students began their coursework (Jackson, 2013). The page was formatted as a closed group for these students, and the page was used both for information and socialization. University employees and professors monitored the site so questions from the students regarding procedure or classes could be answered in a timely fashion. This monitoring also ensured that no unacceptable content was posted. The conversations between students on the site were asynchronous, as students could post comments or questions and then monitor updates throughout the day. After the first year, the students reported that the page helped them feel more connected to others on campus (Jackson, 2013). Rollins College and Mansfield University are also working with the idea of using Facebook to keep students engaged. In a similar vein, the University of Alabama has created a parents' Facebook page, which is aimed to help increase freshman student retention by 2% ("Alabama Creates Parents' Facebook to Boost Freshman Persistence," 2006). Twitter usage was also studied for its application in a first-year experience class. The study showed that faculty and students who used Twitter were more engaged in the class (Junco, Heiberger, & Loken, 2011).

Student attrition and retention have been widely studied over the last three decades (Fike & Fike, 2008; Laskey & Hetzel, 2011; Morrow & Ackermann, 2012). In spite of all the data collected, no one has successfully developed a theory that has satisfactorily solved the retention

debate (Tinto & Pusser, 2006). Tinto and Pusser (2006) posit that this may be the result of several issues: disagreement over the actual findings, how student persistence is defined, and institutional commitment. They make the point that knowing the reasons why students leave their program of study is not simply the opposite of the reasons why they retain. Previous theories address potential actions that may be taken, but they may not be easily transferable into action items. New programs may be encouraged but lack appropriate funding. There is also the possibility that the factors relating to retention are not under the control of the higher education institution. For example, high school GPA or the student's family situation may be shown to affect retention, but there is little that can be done by the higher education institutions regarding those factors. Care must also be taken when reviewing retention data, as some students may leave their program of study voluntarily for reasons "arising from external events such as family obligations" (Tinto & Pusser, 2006, p. 5). In previous studies, this voluntary exit may not be easily distinguishable from students who do not leave voluntarily.

The most recent data from the American College Testing (ACT) service indicate a national average first to second year attrition rate of 32.4% (American College Testing, 2014). As a result, most studies reviewed focus on this critical year in the life of the college student. Drawing on the works of Tinto (1975), FYE programs have emerged as a way to reduce attrition and increase retention (Clark & Cundiff, 2011; Jamelske, 2009; Potts & Schultz, 2008). These programs focus on the academic and social integration aspects espoused by Tinto (1987) in his work. They are specifically for students in their first year of college and are designed to address the transitioning of students to college life. Some programs are cohort-based, while other institutions offer several sections of the course in order to accommodate student schedules. Some first-year experience research has focused on at-risk students (Potts & Schultz, 2008), and

these studies have been conducted with universities of various sizes. Findings about FYE programs' effects on retention have been mixed, with some studies indicating a positive correlation with grade point average, but no correlation with retention (Clark & Cundiff, 2011; Jamelske, 2009). Other studies have found that students in FYE programs were more likely to enroll for a second year (Clark & Cundiff, 2011; Potts & Schultz, 2008).

Another aspect of attrition that has been widely examined is the classification of first-generation college students (Pritchard & Wilson, 2007; Stratton, O'Toole, & Wetzel, 2007; Woosley & Shepler, 2011). These students are defined as those "whose parents have had no college or post-secondary experience" (Saenz & Barrera, 2007, p. 1). In the literature, this group of students was found to have no more or less trouble assimilating than other students (Pritchard & Wilson, 2007; Woosley & Shepler, 2011). The only specific finding regarding these students was the part-time versus full-time distinction. Part-time, first-generation students had a higher attrition rate than full-time, first-generation students (Stratton et al., 2007).

In addition to the cognitive aspect of retention, emotional and physical well-being have been extensively examined as non-cognitive factors (Clark & Cundiff, 2011; Laskey & Hetzel, 2011; Morrow & Ackermann, 2012; Pritchard & Wilson, 2007; Sparkman et al., 2012). The view of these researchers is that these non-cognitive factors relate directly to Tinto's (1975) notion of integration and its relatedness to retention. Therefore, several factors of the students' well-being were tested. Emotional intelligence and its effect on integration to college life were considered, as were the categories of the Big Five personality matrix and the effects of personality type on students' behaviors (Judge, Martocchio, & Thoresen, 1997).

The Big Five personality traits refer to the five broad dimensions of personality that have been developed through years of testing (Nelson & Quick, 2011). These five traits are

extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience (Nelson & Quick, 2011). Knowing which categories pertain to a certain individual may indicate their attitude and performance in a variety of settings, both professional and academic. In terms of employee performance, “introverted and conscientious employees are less likely to be absent from work” (Judge et al., 1997, p. 745). Academically, students with high emotional intelligence and an extraverted personality were found to assimilate well to college life and experience lower attrition rates (Clark & Cundiff, 2011).

Furthermore, student health and personal lifestyle choices have been examined (DeBerard et al., 2004). Students who are depressed or stressed may resort to negative coping methods such as smoking or excessive drinking (Pritchard & Wilson, 2007; Pritchard et al., 2007). These negative coping methods may adversely affect the students’ health. Eventually, these health concerns can hinder academic performance and students’ persistence to degree.

All the studies reviewed aim to reduce attrition by discovering which factors contribute to student retention. Several institutions have addressed those factors with new programming. By implementing retention-based programs designed both to help students integrate and to reduce attrition, colleges and universities are demonstrating a commitment to improving their retention rates (Demski, 2011). Some aspects of these programs involve first-year experience classes, metacognitive strategies in the classroom, mentoring, and peer-tutor interactions (Fike & Fike, 2008; Laskey & Hetzel, 2011; Pan et al., 2008). Retention-based programs are found at higher education institutions of all types, and each individual program has certain aspects that are meant to assist students academically and to make them feel more socially integrated into the campus community. According to Morrow and Ackermann (2012), some students living off-campus feel more disconnected from the school, and programs can be designed with this in mind. For

example, activities may be planned during the afternoon so that commuters can participate in the activity before leaving campus for the day. Retention-based programs have many varying types of services. Therefore, their effectiveness is best assessed individually according to each school's goals (Pan et al., 2008). The focus of one institution may be to increase social integration in the classroom, while another may emphasize improving student-teacher interaction. For this reason, it is difficult to develop a retention program that works for all institutions.

If common characteristics exist between students who are retained for their sophomore year versus those who are not, it may help colleges and universities focus their recruitment and retention efforts (Perry, 2010). Previously, the focus has remained on high school seniors in order to meet recruiting metrics (Burks & Barrett, 2009). It may be more prudent to recruit from other pools of potential students as well. Other options might be to refine parameters for admissions criteria.

ACA-Specific Information

The Appalachian College Association (ACA) is a 501(c)3 entity headquartered in Berea, Kentucky (Appalachian College Association, 2015). Initially funded by the Andrew W. Mellon Foundation, the ACA has grown into a stable consortium of regional colleges and universities focused on supporting the work of the member institutions' faculty, staff, and students (Appalachian College Association, 2015). The ACA plans periodic workshops and meetings in order to provide faculty an opportunity for networking and learning. One specific workshop is the Teaching and Learning Institute, which is held annually at a member institution. This workshop is designed to assist faculty and staff with developing meaningful courses in which

students learn best. The workshop is one week long and focuses on pedagogy that enhances student learning (Appalachian College Association, 2015).

As the ACA is focused on the development of faculty, staff, and students, information regarding retention should prove useful. Students' engagement in the classroom has been shown to be a factor in retention (Laskey & Hetzel, 2011; Pan, et. al, 2008; Pritchard & Wilson, 2007). Therefore, these workshops and the resulting pedagogy could become a factor in an institution's retention rate. Data from the 35 member institutions within the ACA was analyzed for information regarding retention. A complete list of ACA-member institutions may be found in Appendix B.

Some ACA-member institutions are religiously-affiliated while others are not. In spite of all the research on the subject of retention, few studies have focused on religiously-affiliated colleges and universities. Tinto's social integration theory (as cited in Burks & Barrett, 2009) was considered as it related to the overall health of the students, curricular activity choices (e.g., study habits and interaction with teachers), extracurricular activity choices (e.g., socializing on campus and using electronic media), working while attending college, and place of residence. While an academic ability component was included, some of the more traditional variables, such as high school GPA or scores for the American College Test (ACT) and the Scholastic Assessment Test (SAT), were not examined. This study will include students' cumulative grade point averages as well as ACT/SAT score.

Patten and Rice (2008) take a look at religious affiliation from another viewpoint. They posit that the retention rate is lower if students are in the religious minority at an institution. Examining both the religious majority and religious minority at institutions, they noted a

significant decrease in retention from freshman to sophomore year among students in the religious minority. Perhaps this is a result of the social integration aspect of retention.

CHAPTER III

METHODOLOGY

Description of the Population and Sample

The student populations of the institutions in the Appalachian College Association (ACA) were used for this study (see Appendix B). For the purposes of this study, first-time, first-year freshmen were used as participants. Some students still classified as freshmen may have done some preliminary coursework elsewhere. Other students may have participated in dual enrollment courses during their junior and/or senior years of high school. This study did not include students who have been enrolled as freshmen at other institutions. However, it did include students new to the institution who may have completed dual enrollment courses. At least three years of data were examined, as each year provides a new list of freshmen participants. Due to the availability of the data, a census study was performed. All students who met the criteria were used as data points in the study.

Electronic grade reports and transcripts were available through a password-controlled database, and the data were available in Microsoft Excel spreadsheet format. After receiving permission from the appropriate Institutional Review Board(s), data collection began. Complete transcripts, course history, and demographic information for all students were available. A variety of student-related independent variables, including high school grade point average (GPA), ACT/SAT scores, and gender, were available (see Appendix A). A planned additional independent variable was each institution's religiously-affiliated status. However, all

participating institutions claimed a religious affiliation, even if only in the historical sense.

Therefore, this variable was not included in statistical analysis. Enrollment status for sophomore year served as the dependent variable.

Transcript and demographic information was assembled and coded with the students' identification numbers. Collection included records from the fall semesters of the specified years. The fall semester was chosen to indicate which students returned for their sophomore year. Each research question involved an independent variable and a dependent variable. Those research questions determined which data were examined for each measurement. Institutional databases were able to identify which students were retained, and this data point was reported along with all other data. Each institution reported three years of data.

Research Design

Data for student registrations were available in password-protected databases at each institution. Students were assigned student identification (ID) numbers, which ensured confidentiality. The student ID numbers for first-time, full-time freshmen were selected for each specific fall semester. Institutional databases were all able to provide output for queries which included students' retention status. These database output files were formatted as Excel spreadsheets and emailed to the researcher.

The dependent variable in this study was enrollment status for sophomore year. Independent variables to be considered were the presence of first-year experience programs at the institutions as well as the students' high school GPA, cumulative college GPA, ACT score, gender, residence, and ethnicity. Some extraneous variables include,

- Student's participation in extracurricular activities

- Student's financial aid status
- Student's major(s)
- Student's participation in dual enrollment
- The institution's mandatory probation or dismissal policy

Registration data from nine schools were used. All data available were collected, although not all schools collected the same demographic information for students. As more data became available for collection, variables were refined. Relationships for available data were examined to answer the research questions.

Colleges use retention numbers for budgeting and capital planning, and reliable information regarding student persistence is vital to this process (Pan et al., 2008). Like many studies before, the research described here is an attempt to understand and increase student retention on college and university campuses. This study focused on student persistence from freshman to sophomore year, and many variables pertaining to these groups of students were examined. All of the institutions used for this study are religiously affiliated, and retention at these institutions has not been studied as often. This analysis may result in the discovery of new relationships between variables. Regression analyses may show that predictions can be made between student or institution characteristics and retention. In turn, these predictions may lead to the development of new initiatives and programs designed to assist students and encourage them to persist to graduation.

Data Collection

This was a quantitative study. Data files were presented as Microsoft Excel spreadsheets, and the data were uploaded into SPSS version 23 for analysis. The dependent variable,

enrollment status for sophomore year, was a nominal variable with two levels of the variable. Four independent variables, including presence of first-year experience programs, gender, residence, and ethnicity, were nominal variables. The independent variables, high school GPA, cumulative college GPA, and ACT score were scale variables. All preliminary extraneous variables, including each student's major, participation in extracurricular activities, financial aid status, dual enrollment status, and presence of an institution probation or dismissal program, were scale variables with appropriate levels. A complete list of variables can be found in the Variables Analysis table located in Appendix A. For each freshman class, there was data for retained students versus non-retained students. As the research questions in this study are associational, inferential statistics will be employed to determine if relationships between the variables exist (Field, 2009).

Data Analysis

As a non-experimental study, all the data available for students from the particular years of interest were used. Since all students' reported data were included initially, there was no selection bias. Descriptive data analysis was used to parse the data to determine which data were included in the ensuing analyses. After the data had been analyzed for potential insufficiencies, statistical data analysis began. As stated in the limitations, students may leave their college careers due to some factor other than those examined. This poses some threat to internal validity, since the researcher will not be able to discover the reasons for non-retention. If relationships exist between the variables, further study at similar institutions may be conducted to establish external validity (Gliner, Morgan, & Leech, 2009).

Research Questions

RQ 1: Is there a relationship between retention for students' sophomore year and any of the following:

- High school GPA
- Presence of FYE program at the institution
- Cumulative college GPA at the end of the freshman year
- ACT score
- Gender
- Residence status
- Ethnicity
- Institution's religious affiliation

RQ 2: Based on any relationships identified in RQ 1, are there two or more variables that predict retention status for students?

Data for the research questions above were collected. For RQ1, retention for sophomore year was the dependent variable. The other variables, such as students' high school GPA, ACT score, and so forth, were the independent variables. Correlation analysis was performed on the data for each of the independent variables to determine if one or more of the independent variables had a relationship to retention. The dependent variable was nominal and dichotomous. A point-biserial correlation was indicated for the independent variables of high school GPA, cumulative college GPA, and ACT score, since these variables are scale and the dichotomous dependent variable is "a discrete dichotomy" (Field, 2009, p. 182). The point-biserial correlation coefficient (r_{pb}) is calculated as a "Pearson correlation when the dichotomous variable is coded with 0 for one category and 1 for the other" (Field, 2009, p. 183). For the independent variables of ethnicity, gender, and residency status, Pearson's chi-square and Cramer's V were used for correlation analysis, since both the independent and dependent variables were nominal (Field, 2009).

Once any relationships between the dependent and independent variables were identified, logistic regression was used for examination of RQ 2. Linear regression analysis was employed first in order to test the data for multicollinearity. With no multicollinearity present, logistic regression was used, as this analysis “predicts the probability of an event occurring” (Field, 2009, p. 267). According to Field (2009), “logistic regression is multiple regression but with an outcome variable that is a categorical variable and predictor variables that are continuous or categorical” (p. 265). The two levels for the dependent variable in this study were retained and non-retained. This regression analysis included any predictor (independent) variables shown to have a relationship with the one outcome (dependent) variable (see Appendix A). Using the results from our initial regression analysis, logistic regression was performed a second time using only the independent variables with a significant relationship to the dependent variable. This provided a best fit model of the data.

According to Field (2009), “logistic regression can be a very useful tool” (p. 265). Analyses in this study may provide a model showing which variables are predictive of retention. These models may then be used to identify students who are more statistically likely not to retain. If students are identified, intervention programs may be developed by institutions in order to assist these students. For example, if students who live off-campus (residence status) were more likely not to return for their sophomore year, institutions may try to assist these students with becoming more socially integrated in the campus community. Once programs are instituted, this study may be repeated to see if there has been a statistical improvement.

Summary

This study used the data available from consecutive fall registration lists to examine which students were retained and which students were not retained. These two groups were studied using statistical analysis for any similarities or characteristics between the groups. Analysis and findings will be discussed in Chapter IV, with conclusions and implications to follow in Chapter V. Methods used in this study are transferable to other institutions who have similar student data available.

CHAPTER IV

DATA ANALYSIS/RESULTS

Introduction

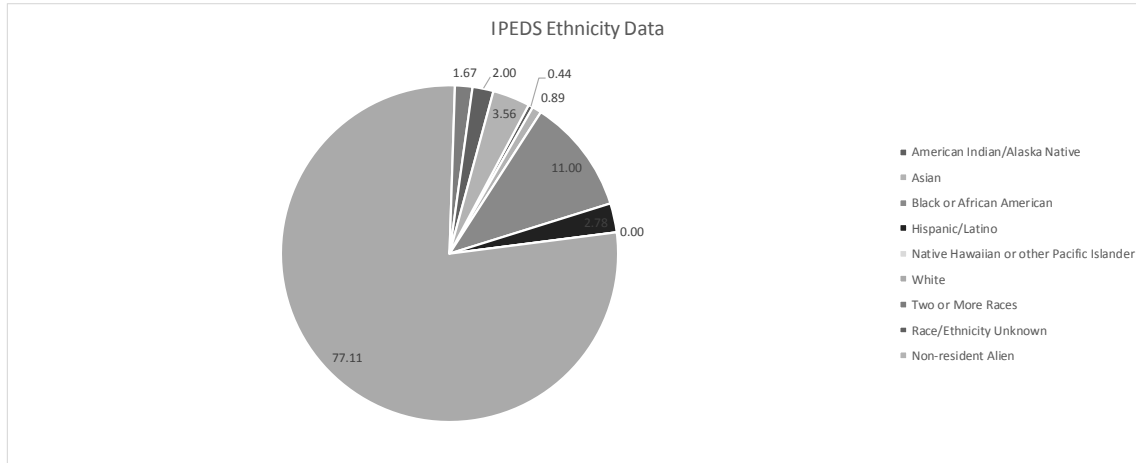
This study examined factors that contribute to freshman student retention. Specifically, the student data used for the study were from the institutions of the Appalachian College Association (ACA). There are 35 institutions in the ACA. Initially, the researcher made phone calls to determine the appropriate institutional research contact at each institution. The identified persons were then contacted via electronic mail and asked to respond regarding their institution's willingness to participate in this study. Of the 35 institutions, 13 responded affirmatively as willing to provide data. Ultimately, nine of the 13 institutions provided the researcher with data. All the institutions that provided data have first-year experience programs. Also, all reporting institutions are considered religiously-affiliated. Therefore, the potential independent variables addressing presence of first-year experience programs and religious-affiliation of the institution (see Appendix A) were not included in the statistical analysis.

Institutions were asked to provide three years' worth of data that included the following information for each student: high school grade point average (GPA), cumulative college GPA (measured at end of freshman year), gender, ethnicity, residency status (on-campus resident or commuter), and ACT composite score. In total, these data provided characteristics of 9,152 students.

Analysis

The data were analyzed using descriptive statistics to determine which data would be sufficient to be included in the data analysis processes. If any of the requested variables were missing, the data for that student were not included in the analysis. High school GPAs were examined, and it was noted that some of these GPAs were reported as higher than 4.00. Some high schools have a weighted scale in which the highest possible GPA is 5.00 due to advanced placement and honors courses (Volwerk & Tindal, 2012). For consistency, any subject with a reported high school GPA over 4.0 was excluded from the study. Some high school and college GPAs were reported as 0.00, which may have been a formatting issue with the data files from the participating institutions. Therefore, data for these students were also excluded. The final data file used for statistical analysis contained data for 7,198 students.

Descriptive statistics indicated that the sample ethnic groups consisted of 77.5% White, with another 14.8% of the sample consisting of students reporting their ethnicity as Black. Hispanics accounted for 2.4%. The remaining ethnic groups (biracial, Asian, American Indian/Alaska native, Hawaiian/Pacific Islander, non-resident alien, or multi-racial) made up the remaining 5.3% of the sample. These data were cross-referenced with information reported to the Integrated Postsecondary Education Data System (IPEDS) by each of the schools in the study. The ethnic percentages found in this study appear to be consistent with the data reported to IPEDS (see Figure 1).



Figure

1 IPEDS Ethnicity Data

Analysis of ethnic groups showed that data collected for this study showed ethnic percentages that closely matched the IPEDS reported percentages for the same schools. The number of data points for the White ethnic group was much greater than the combination of all other ethnic groups. Therefore, the final iteration of the data uses two ethnic codes, White and non-Whites.

Statistical analyses performed for the data in this study included point-biserial correlation, Pearson's chi-square with Cramer's *V*, and logistic regression. The dependent variable, retention from freshman to sophomore year, was nominal. Three of the independent variables used were nominal and three were scale. If the independent variable was scale, then point-biserial correlation was used to determine the relationship between the independent variable and the dependent variable (Field, 2009). If the independent variable was nominal, Pearson's chi-square with Cramer's *V* was used to examine the relationship (Field, 2009). Once relationships were measured, logistic regression analysis was used to determine the independent variables' ability to predict the retention outcome.

Multicollinearity in data is defined as a situation when “two or more variables are very closely linearly related” (Field, 2009, p. 790). If multicollinearity is present, it means that two of the predictor variables are so closely related that it is difficult to estimate the regression coefficients. This is because many number combinations would give the same results. Multicollinearity presents three potential problems with the SPSS output: the *b* coefficient will “be less likely to represent the population” (Field, 2009, p. 224), the value of R will be limited, and the specific importance of an individual predictor is difficult to assess. Logistic regression analyses do not provide data regarding multicollinearity (Field, 2009). Instead, linear regression analysis is performed to assess multicollinearity in data. Field (2009) recommends analyzing the variance inflation factor (VIF) provided by SPSS to diagnose multicollinearity. Myers (as cited in Field, 2009) suggests that a value of 10 be used as a threshold to indicate multicollinearity problems. Collinearity statistics in the linear regression analysis for these data show the VIF values for these data range between 1.020 and 1.934, which is well below the threshold of 10. Therefore, there was no multicollinearity present in this data.

Research Questions

This study utilized two research questions. Research question 1 used a nominal dependent variable and several nominal or scale independent variables to determine if students who returned for their sophomore year of college and/or students who did not return for their sophomore year shared any similar characteristics. Once any relationships were established, Research question 2 examined whether any combination of the independent variables was predictive of retention. Specific details of the statistical analyses for the research questions are provided.

RQ 1: Is there a relationship between retention for students' sophomore year and any of the following:

- High school GPA
- Presence of FYE program at the institution (removed from calculations)
- Cumulative college GPA at the end of the freshman year
- ACT score
- Gender
- Residence status
- Ethnicity
- Institution's religious affiliation (removed from calculations)

Nine schools reported data for this study. Each of the nine schools has a first-year experience program, as well as a reported religious affiliation. Therefore, these two data points were removed from the statistical analysis.

The point-biserial correlation analysis was run if the independent variables were scale variables. Since the dependent variable was nominal and had only two possible outcomes, the point-biserial correlation was indicated (Field, 2009) with scale independent variables. The dependent variable was retention to sophomore year, with returning student data coded as 1 and data coded as 0 for those not returning.

For this study, college GPA was defined as the cumulative GPA for the student at the end of their first year. Table 1 shows the point-biserial correlation for cumulative college GPA was significant, with a point-biserial correlation coefficient (r_{pb}) = .321, p = .01. This indicates that cumulative college GPA had a positive correlation with retention to sophomore year.

Table 1 College GPA

		college gpa	new retain code
college gpa	Pearson	1	.321**
	Correlation		
	Sig. (2-tailed)		.000
	N	7198	7198
new retain code	Pearson	.321**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	7198	7198

** . Correlation is significant at the 0.01 level (2-tailed).

High school GPA was submitted as part of the college application process. High school GPA is an indication of the student's cumulative high school GPA. High school GPA had a significant point-biserial correlation coefficient (r_{pb}) = .206, $p = .01$. Data analysis shows that GPAs in high school are positively correlated with retention to sophomore year. Table 2 shows the results of this analysis.

Table 2 High School GPA

		new retain	hs gpa
		code	
new retain code	Pearson	1	.206**
	Correlation		
	Sig. (2-tailed)		.000
	N	7198	7198
hs gpa	Pearson	.206**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	7198	7198

** . Correlation is significant at the 0.01 level (2-tailed).

A student's ACT composite score, submitted by the student as part of the college application process, was shown to be statistically significant by the results of the point-biserial correlation analysis, $r_{pb} = .145$, $p = .01$. Statistical analysis results are shown in Table 3. Therefore, ACT composite score had a positive relationship with a student's retention to sophomore year.

Table 3 ACT Composite Score

		new retain	ACT
		code	comp
new retain code	Pearson	1	.145**
	Correlation		
	Sig. (2-tailed)		.000
	N	7198	7198
ACT comp	Pearson	.145**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	7198	7198

** . Correlation is significant at the 0.01 level (2-tailed).

Residency status involves whether or not a student lives on-campus or commutes to campus for classes. This variable is classified as a nominal variable. Since the dependent variable is also nominal, Pearson’s chi-square was used for correlation analysis (Field, 2009). As shown in Table 4, residency status had a statistically significant relationship to retention. Students who lived on-campus showed a higher likelihood of retention. The value of the chi-square statistic is 112.564 (df = 1) ($p < .01$).

Table 4 Residency Status

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	112.564 ^a	1	.000		
Continuity Correction ^b	111.882	1	.000		
Likelihood Ratio	107.649	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	112.549	1	.000		
N of Valid Cases	7198				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 427.24.

b. Computed only for a 2x2 table

Cramer’s *V* is used to demonstrate the size of the effect calculated by Pearson’s chi-square. Table 5 shows a value for Cramer’s *V* of .125, which is a small effect. This value is also highly significant ($p < .01$).

Table 5 Residency Status Contingency Table

		Value	Approximate Significance
Nominal by	Phi	.125	.000
Nominal	Cramer's V	.125	.000
N of Valid Cases		7198	

Ethnic groups were parsed into White and non-White groups, due to low numbers of data points for other ethnic groups. As shown in Table 6, ethnicity had a statistically significant relationship to retention. White students showed a higher likelihood of retention. The value of the chi-square statistic is 40.123 (df = 1) ($p < .01$).

Table 6 Ethnicity

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	40.123 ^a	1	.000		
Continuity Correction ^b	39.727	1	.000		
Likelihood Ratio	39.063	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	40.117	1	.000		
N of Valid Cases	7163				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 461.87.

b. Computed only for a 2x2 table

Cramer's *V* is used to demonstrate the size of the effect calculated by Pearson's chi-square. Table 7 shows a value for Cramer's *V* of .075, which is a small effect. This value is also highly significant ($p < .01$).

Table 7 Ethnicity Contingency Table

		Value	Approximate Significance
Nominal by	Phi	.075	.000
Nominal	Cramer's V	.075	.000
N of Valid Cases		7163	

Gender was not shown to be statistically significant with retention to sophomore year. Pearson's chi-square value = 3.604, $p = .058$, which showed no significant relationship between gender and retention to sophomore year.

Presence of a first-year experience program and the institution's religious affiliation were originally considered as variables for analysis. Each institution that provided data had a first-year experience program. Additionally, each institution was affiliated in some way with a religion. Therefore, these two variables were excluded from analysis.

RQ 2: Based on any relationships identified in RQ 1, are there two or more variables that predict retention status for students?

Binary logistic regression was used to determine whether gender, ethnicity, high school GPA, cumulative college GPA, ACT composite score, or residency status predicted the likelihood that students would retain for their sophomore year. Logistic regression was indicated due to the dichotomous dependent variable (Field, 2009). According to Field (2009), "logistic regression is multiple regression but with an outcome variable that is a categorical variable and predictor variables that are continuous or categorical" (p. 265). Logistic regression produces a coefficient (b) that shows each independent variable's contribution to the outcome of the dependent variable and shows any relationships and strengths among the variables (Burns & Burns, 2008).

For this study, the goal was to analyze the data to determine if any combination of the independent variables would predict a student's retention to sophomore year. Table 8 shows the overall test of the logistic regression model.

Table 8 Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step 1 Step	891.707	6	.000
Block	891.707	6	.000
Model	891.707	6	.000

These data show a significant model with Chi-square = 891.707, $p < .01$. The next step is to determine if any combination of variables has a stronger predictive ability than this overall model. Table 9 shows the results of the logistic regression model.

Table 9 Variables in the Equation

	B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1 ^a Gender code	-.225	.059	14.741	1	.000	.798
New ethnic group code	.062	.070	.787	1	.375	1.064
ACT comp	.005	.009	.282	1	.595	1.005
HS GPA	.277	.069	16.184	1	.000	1.319
New residency code	.785	.066	139.936	1	.000	2.193
College GPA	.767	.039	395.577	1	.000	2.153
Constant	-2.653	.200	176.123	1	.000	.070

a. Variable(s) entered on step 1: gender code, new ethnic group code, ACT comp, hs gpa, new residency code, college gpa.

Table 9 shows that four variables were statistically significant in predicting retention.

Residency status had the strongest predictive ability (B = .785; Exp B = 2.193; $p < .01$), followed

by cumulative college GPA ($B = .767$; $\text{Exp } B = 2.153$; $p < .01$). High school GPA ($B = .277$; $\text{Exp } B = 1.319$; $p < .01$) and gender ($B = -.225$; $\text{Exp } B = .798$; $p < .01$) had positive but weaker predictability. Neither ACT composite score ($B = .005$; $\text{Exp } B = 1.005$; $p > .01$) nor ethnic group ($B = .062$; $\text{Exp } B = 1.064$; $p > .01$) showed any predictive ability for retention.

Table 10 shows the results of the best fit regression model using the four variables that had some predictive ability. These variables were residency status, cumulative college GPA, high school GPA, and gender.

Table 10 Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	898.857	4	.000
	Block	898.857	4	.000
	Model	898.857	4	.000

The best fit regression analysis found in Table 11 shows the following results: gender ($B = -.223$; $\text{Exp } B = .800$; $p < .01$), high school GPA ($B = .309$; $\text{Exp } B = 1.362$; $p < .01$), residency status ($B = .785$; $\text{Exp } B = 2.192$; $p < .01$), college GPA ($B = .772$; $\text{Exp } B = 2.164$; $p < .01$). College GPA and residency status remain the independent variables with the strongest predictive relationship to retention.

Table 11 Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a Gender code	-.223	.058	14.657	1	.000	.800
HS GPA	.309	.062	25.201	1	.000	1.362
New residency code	.785	.066	141.948	1	.000	2.192
College GPA	.772	.038	408.241	1	.000	2.164
Constant	-2.625	.184	204.451	1	.000	.072

a. Variable(s) entered on step 1: gender code, hs gpa, new residency code, college gpa.

College GPA was the best single predictor of retention ($B = .823$; $\text{Exp } B = 2.278$; $p < .01$), and this variable accounted for a large amount of the overall predictive model. This analysis is shown in Table 12.

Table 12 Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a collegegpa	.823	.032	659.018	1	.000	2.278
Constant	-1.261	.086	216.132	1	.000	.283

a. Variable(s) entered on step 1: collegegpa.

Summary

Nine ACA institutions provided student data for this study. Correlation analysis was used to determine if there were any relationships between the dependent variable and any independent variables. Logistic regression analysis was used to examine whether any combination of independent variables was predictive of retention.

Variables with a strong relationship to retention were college GPA, high school GPA, ACT score, and residency status. Students with higher college GPAs, higher high school GPAs,

higher ACT score, and those who lived on campus were all more likely to retain. Students in the non-White ethnic group were less likely to retain than White students, while gender had no significant relationship to retention. Regression analysis showed that higher cumulative college GPA and on-campus residency status were most predictive of retention.

CHAPTER V

SUMMARY AND DISCUSSION

This study was designed to assist colleges and universities with retention efforts for first-time, full-time freshmen. Several variables for these students were collected from institutions in the Appalachian College Association. The variables were coded and analyzed statistically to examine any relationships to freshmen students' retention to sophomore year.

Statement of the Problem

There are sound economic reasons causing higher education institutions to continue to examine retention of their students. Any student who leaves an institution prior to graduation results in lost revenue for the college or university. Additionally, lacking a degree prohibits the students from achieving their earnings potential as well (Bureau of Labor Statistics, 2012).

Higher education administrators look for definitive answers for why students remain or do not remain at an institution (Fike & Fike, 2008). While it may be difficult to determine individual circumstances regarding non-persistence, it may be possible to find commonalities among institutions with higher retention rates. Tinto (1987) has worked on the issue of retention for years, and his Model of Institutional Departure has been developed from research conducted with many institutions and their students. Likewise, his later work has shown that, in spite of the work done on the subject of retention, there have been very few programs developed as a result of the research (Tinto & Pusser, 2006). If the study outlined here shows that certain student

characteristics indicate a higher persistence rate, that might lead to opportunities for development of retention-based programs designed to assist students.

Two research questions were developed for this study. Research question 1 used the nominal dependent variable of retention status, which is a dependent variable with only two possible outcomes (Field, 2009). The dependent variable and several independent variables were analyzed to determine if students who returned for their sophomore year of college shared any similar characteristics. Once any relationships were established, Research question 2 examined whether any combination of the independent variables was predictive of retention.

RQ 1: Is there a relationship between retention for students' sophomore year and any of the following:

- High school GPA
- Presence of FYE program at the institution
- Cumulative college GPA at the end of the freshman year
- ACT score
- Gender
- Residence status
- Ethnicity
- Institution's religious affiliation

RQ 2: Based on any relationships identified in RQ 1, are there two or more variables that predict retention status for students?

Methodology Review

All 35 institutions in the Appalachian College Association were contacted and extended an invitation to participate in this study. Of the thirteen institutions that expressed an interest in providing data, nine institutions provided retention data to the researcher. A representative at each of the nine colleges or universities collected data into Excel spreadsheets and emailed them to the researcher. The data points provided included students' retention status to sophomore

year, which was the dependent variable. Data provided and used as independent variables included high school GPA, composite ACT score, cumulative college GPA (at end of freshman year), on-campus residency status, gender, and ethnicity. Originally, two additional data points were considered: presence of a first-year experience program at the institution and whether the institution had a religious affiliation. However, since all institutions reported both a religious affiliation and a first-year experience program, these data points were not included in the statistical analysis.

The Excel spreadsheets were organized, sorted, and initial coding was performed. Some data points were deemed insufficient and excluded from the analysis. The spreadsheets were uploaded into SPSS 23 for statistical analysis. For independent variables that were scale, point-biserial correlation was used to determine relationships between each independent variable and the dependent variable. A point-biserial correlation was indicated since the dependent variable was dichotomous (Field, 2009). If the independent variable was nominal, then Pearson's chi square with Cramer's V was used to examine the relationship (Field, 2009). Once these relationships were measured, logistic regression analysis was used to determine the independent variable's ability to predict the retention outcome.

Results Summary

Research question 1 examined the relationship between the dependent variable and all the independent variables. Descriptive statistical analysis was performed first. This analysis indicated that the ethnic group breakdown among the 7,198 data points was 77.5% White, 14.8% Black, and 2.4% Hispanics, with the remaining ethnic groups (biracial, Asian, American Indian/Alaska native, Hawaiian/Pacific Islander, non-resident alien, or multi-racial) making up

the remaining 5.3% of the sample. These data were closely aligned with the data reported to IPEDS by the participating institutions. Due to the fact that the percentage of White students was so much larger than all other ethnic categories, the final iteration of the data used only two ethnic groups, White and Non-white.

The next step was to assess the presence of multicollinearity in the data. Linear regression was used for this analysis. The results showed that no multicollinearity was present.

There were four independent variables that were statistically shown to have a relationship to retention. Cumulative college GPA showed a relationship between a higher cumulative college GPA and retention to sophomore year. High school GPA was also significant, and students who entered college with a higher GPA from high school were more likely to return for their sophomore year. A student's ACT composite score was shown to be statistically significant by the results of the analysis, with higher ACT scores indicating a positive relationship to retention. The final variable with a strong relationship to retention was residency status, as students who lived on-campus showed a higher likelihood of retention. While there was a much weaker relationship, ethnic group was also shown to have a relationship to retention. White students were more likely than non-whites to return for their sophomore year.

Research question 2 analyzed whether any characteristics were predictive of a student's retention to sophomore year. While linear regression was used to determine multicollinearity, logistic regression was used for this research question. Logistic regression was employed in order to show any predictive relationship between the independent variables and the dependent variable (see Appendix A).

Logistic regression analysis showed that gender, high school GPA, residency status, and college GPA contributed to the prediction, but ethnicity and ACT score did not. Analyzing the

data further, cumulative college GPA and residency status are the variables most able to predict retention to sophomore year.

Discussion

The findings of this study are fairly consistent with Tinto's (1987) research. His work found that student attrition is most commonly associated with one of three factors: a student's academic difficulties, a student's inability to resolve their education with their planned vocation, or a student's failure or inability to become integrated into the social and academic life of their institution. Studying these three factors led Tinto (1987) to develop his Model of Institutional Departure. This model outlines that college students need to become involved in both academic and extracurricular areas as well as develop interactions with both their faculty members and their peer groups (Tinto, 1987).

The results of this study addressed some of the findings found in Tinto's work. Regarding a student's academic difficulties, this study showed a positive relationship between a student's cumulative GPA and retention. A higher GPA resulted in a higher incidence of retention. There was also a positive relationship between high school GPA and/or composite ACT score and retention (DeBerard et al., 2004). It is not clear, however, whether students achieved this higher college GPA through their own devices or with the help of institutional programs aimed at developing study skills and good academic habits (Pan et al., 2008).

Social integration of students has been shown to affect retention (Morrow & Ackermann, 2012; Tinto, 1987). Past studies have shown that students who do not live on campus develop much of their social interaction through in-class meetings (Hotchkiss et al., 2006). Living on campus can help a student become integrated into the social life of their institution due to

campus activities and opportunities to meet others (Thomas, 2012). This study showed that on-campus residency had a strong relationship with returning for sophomore year. Living on-campus instead of commuting gives students an opportunity to increase involvement in academic and extracurricular activities.

Cumulative college GPA and residency status both showed the strongest ability to predict retention for sophomore year. For this reason, colleges should persist in identifying factors of students who keep high GPAs as well as helping to socially integrate students who live off-campus. Many colleges and universities have funded first-year experience programs to address both of these issues (Jamelske, 2009). While these programs vary from institution to institution, it is very important that they include instruction on study skills and best practices. Furthermore, many students are unable to adjust to life away from home for the first time, and their study habits and GPA may suffer as a result. A low GPA at the end of freshman year can either cause students to be academically suspended from the school or discourage them from continuing their college career. In this study, the data provided by participating institutions included whether students returned for their sophomore year, but no information was given on academic suspension policies. Students who live off campus can feel disconnected from the campus community and its academic and extracurricular activities (Hotchkiss et al., 2006). First-year experience programs can assist with social integration as well by developing activities that promote interaction (Schrader & Brown, 2008).

Implications for Future Research

The results of this research can help college and university administrators consider new programs related to retention. Some of these programs may be related to assisting students with maintaining an acceptable GPA. Since this study shows that lower cumulative GPA had a

relationship to nonretention, a college could develop courses to ensure that students have the necessary study skills for success. The institution, or its individual colleges or departments, may offer regularly-scheduled study sessions and tutoring. These programs offer students a mechanism for keeping grades at an acceptable level. Extended and weekend library hours offer students a quiet place to study. In coordination with FYE classes, library staff can offer research instruction as well as a place for study skills workshops. Learning commons are replacing traditional library spaces, and one goal of the learning commons is collaborative workspaces (Mueller, 2015). These types of workspaces can benefit students both academically and socially.

In addition to the learning commons and its potential for providing both academic and social support, institutions may also identify student and faculty leaders to assist freshman students with their academic and social integration on campus. Student peer leaders could have a group of students with whom they schedule regular conversations to identify any problems that may arise. At-risk students could be directed to the appropriate area on campus for assistance. Faculty advisors may be assigned to students who may be identified as being at-risk through early grade reporting. Institutional effectiveness administrators should develop an early academic alert form that faculty members can complete if students are not performing well in their classes. This could expedite efforts to assist students in successfully completing their coursework.

This research also offers the argument for living on-campus as opposed to commuting. This may not be an option for some students, and some campuses may be space-limited and unable to build more dormitories or apartments on-campus. However, there may be other options to assist students with integrating socially. Campuses may consider scheduling student events at a time that is more compatible with a students' commuting schedule. These student

events can encourage students to engage in social interactions. On a smaller scale, faculty may be encouraged to group students into active learning groups that combine on-campus residents and commuters. This can provide students more opportunities to participate in academic and social groups.

Replication of this study should be possible on other college campuses. In addition to completing other quantitative studies of this type, there are implications for qualitative studies as well. In his work, Tinto (1975) sought to rectify issues with earlier studies of retention. His belief was that previous studies had failed to identify the differences in students who dropped out due to academic reasons and those who dropped out for other reasons. Likewise, he also believed in the need to examine those students who left higher education temporarily and then finished later. One possibility is that an institution may implement retention programs and then find that the programs indicate a need for other areas of improvement. Retention data must be collected regularly and retention efforts must be viewed as dynamic and able to change in order to best meet the needs of a particular institution (Tinto & Pusser, 2006).

Further research may also be indicated to review differences among the schools in this study. This study did not differentiate between data from different institutions, and additional examination of the data may indicate some statistically significant factors. One area that may be examined is retention rates among more conservative versus more liberal schools.

There may also be a need to study students who are campus residents and explore reasons why they return for their sophomore year. This analysis may also disclose reasons why students live on campus but do not retain. There are many other student variables that were not included within the scope of this study. This study provides the methodology for examining institution data sets for different variables, all of which may be studied as they relate to retention.

In some settings, answers to these questions might be better suited to a qualitative or mixed methods study. Rather than completing a study on several campuses, researchers could examine these variables on a qualitative level using only one college campus. By using an interview data collection technique and visiting required FYE classes, researchers could delve deeper into reasons why students retain for sophomore year. This would be especially feasible on a small campus. Researchers could visit FYE classes, explain their study, and collect contact information and some basic data from the students. The next fall, student records would indicate which students returned to the classroom and which did not. Questionnaires for each group could be administered and the data could be examined for patterns and themes among the retained and the non-retained groups.

Conclusion

Retention remains an important topic for college students, faculty, and administrators. Even though retention continues to be studied, no institution has discovered or implemented a solution to solve all retention problems. This may be due to the political environment of the institution and its effect on new policy efforts (Tinto & Pusser, 2006). Additionally, implementation of retention initiatives may be assigned to an institution staff member who does not have the necessary skill set. Rather than retention as a primary focus, administrators may view it as a superfluous endeavor. For this reason, goals for student success should be studied within the local political environment of the institution. Retention initiatives must be embraced by the entire campus community in order to be effective. By examining retention data and understanding the factors that affect it, institution stakeholders may be better able to keep

students enrolled in higher education institutions until graduation (Tinto & Pusser, 2006). This could greatly benefit both students and their respective institutions over the course of time.

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APPENDIX A
VARIABLES ANALYSIS TABLE

	Variable Label	Level of the Variable	Scale of Measurement
Dependent Variable	Enrollment for sophomore year	1 = Yes 2 = No	Nominal
Independent Variables	Presence of first-year experience programs	1 = Yes 2 = No	Nominal
	High school GPA	0.00-4.00	Scale
	Cumulative college GPA	0.00-4.00	Scale
	ACT score	1-36	Scale
	Gender	1 = Female 2 = Male	Nominal
	Residence	1 = On campus 2 = Community/Home	Nominal
	Ethnicity	1 = Black or African American 2 = Asian 3 = White 4 = Hispanic 5 = American Indian or Alaska Native 6 = Native Hawaiian or other Pacific Islander 7 = Two or more races 8 = Race or ethnicity unknown	Nominal
	Is the institution religiously-affiliated?	1 = Yes 2 = No	Nominal
	Extraneous Variables	Major	1 = Business 2 = Exercise Science 3 = Education 4 = Science 5 = Other
Participation in extracurricular activities		1 = Yes 2 = No	Nominal
Financial aid recipient		1 = Yes 2 = No	Nominal
Dual enrollment		1 = Yes 2 = No	Nominal
Probation/dismissal		1 = Mandatory 2 = Non-mandatory	Nominal

APPENDIX B
APPALACHIAN COLLEGE ASSOCIATION
MEMBER INSTITUTIONS

Kentucky:

Alice Lloyd College
Berea College
Campbellsville University
Kentucky Christian University
Lindsey Wilson College
Union College
University of Pikeville
University of the Cumberland

North Carolina:

Brevard College
Lees-McRae College
Lenoir-Rhyne University
Mars Hill University
Montreat College
Warren Wilson College

Tennessee:

Bryan College
Carson-Newman University
Johnson University
King University
Lee University
Lincoln Memorial University
Maryville College
Milligan College
Tennessee Wesleyan University
Tusculum College
University of the South

Virginia:

Bluefield College
Emory & Henry College
Ferrum College

West Virginia:

Alderson-Broadus University
Bethany College
Davis & Elkins College
Ohio Valley University
University of Charleston
West Virginia Wesleyan College
Wheeling Jesuit University

VITA

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