Abstract: Tinto, Astin and countless others have researched the retention and attrition of students from college for more than thirty years. However, the six year graduation rate for all first-time full-time freshmen for the 2002 cohort was 57%. This study sought to determine the retention variables that predicted continued enrollment of entering freshmen at a large urban, four-year, public institution. Logistic regression was utilized to analyze data collected over a four-year period for 1,346 first-time full-time freshmen enrolling fall of 2007. The variables chosen for analysis were ACT composite, cumulative GPA and high school GPA, ethnicity, gender, Pell eligibility, unmet financial need, advising, early alert notices, engagement and freshman year experience courses, honors participation, change of major, campus housing, and supplemental instruction. Data were analyzed by year of enrollment through spring 2011. Correlation studies eliminated the threat of multicollinearity. The logistic regression models passed goodness-of-fit tests for Hosmer Lemeshow, Omnibus Test of Coefficients, and Cox and Snell and Nagelkerke. This paper will discuss the results of the four logistic regression models constructed for each academic year of enrollment, implications and recommendations for future research.

Introduction

This study sought to identify the academic preparation and performance variables, family background and demographic variables, and institutional constructs that predicted retention for first-time full-time freshmen over a period of four academic years. The site of the study was a large public, urban, very high research activity institution. The population selected was all first-time full-time freshmen entering the institution in the fall term of 2007 without having any prior attendance at a four-year or two-year post-secondary institution. Student data were collected and analyzed for the population of 1,346 students for each semester beginning fall 2007 through spring 2011. Logistic regression was utilized to study the interactions between the variables which included ACT Composite, cumulative GPA, high school GPA, ethnicity, gender, age, unmet financial need, advising appointments, early alerts, engagement courses, changed majors, and their effect on the binary outcome of persistence.

The research questions posed included:

1. Does the academic preparation and performance of students predict retention?
2. Do student characteristics and family background predict retention?
3. Does participation in institutional approaches to retention predict retention?

Creswell (2003) recommended including hypotheses when they build on the research questions or follow the tradition in the literature. Because a number of the articles reviewed utilized prediction models, null hypotheses indicating the direction of the prediction models were written (Creswell, 2003, p. 109). These were:

1. Academic Preparation and Performance variables do not predict retention;
2. Family Background and Demographic variables do predict retention; and
3. Institutional Construct variables do not predict retention.
Findings and Implications

Fifteen variables were chosen for analysis. Logistic regression was utilized to examine the relationships among the independent variables and their ability to predict the outcome of retention. Of the fifteen variables examined, nine made significant contributions to one or more of the four logistic regression equations. These variables were ACT composite, cumulative GPA, ethnicity, advising, engagement courses, freshman year experience courses, change of major, campus housing, and supplemental instruction. The six variables not having statistical significance were high school GPA, gender, Pell eligibility, unmet financial need, early alerts, and honors participation.

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*Note: Min.=Minimum in range, Max.=Maximum amount in range SE=Standard Error; df= degrees of freedom; Sig.= Significance; OR= Odds Ratio; Sup. Instruction= Supplemental Instruction; N= 937; Confidence interval 95%; *p<.05
1. Summary of Logistic Regression Results for Year One, Two, Three and Four

Peer Institutions

It is important to note the uniqueness of the institution and the difficulty it encounters when seeking to identify peer institutions with which to compare. The Carnegie Foundation allows institutions to perform queries in collected data as a means by which to locate similar institutions. The college in this study had no peers when all the classification areas were chosen. To demonstrate the significance of this a more in-depth evaluation of the classification system was performed (Carnegie Foundation, 2012).

The Carnegie Foundation maintains data on 4,633 institutions. Of the Carnegie schools, 2,713 were four-year schools. There were 294 Research Universities with 108 having very high research activity. Those figures place the school in a category comprising only 2.3% of all the institutions. There were 3,601 colleges offering undergraduate programs. There were three categories of offerings, a) Associate
degrees only, b) Associate degrees dominant, and c) Baccalaureate degrees dominant. Forty-six percent of the schools offering undergraduate programs were Baccalaureate Dominant. Within this category, there were five subcategories, a) Arts & Sciences Focus, b) Arts & Sciences + Professions, c) Balanced Arts & Sciences/Professions d) Professions + Arts & Sciences and e) Professions Focus. The study institution’s classification was Balanced Arts & Sciences/Professions with a High Coexistence with graduate programs. This placed the school among only 3% of all schools offering undergraduate programs. The profile noted that the program was five percentage points of the next category for Professions + Arts & Sciences (Carnegie Foundation, 2012).

The size and setting of the institution was Large (10,000+ students) and Primarily Nonresidential. This category contained 4% of undergraduate institutions. The results of the query noted that the number of students in residence was only five points from being placed in the next category for Primarily Residential (Carnegie Foundation, 2012).

The undergraduate profile was Medium Full-time Four-year, Selective, Higher Transfer-in. The explanation of this profile was that between 25% and 49% of the student population were undergraduates. To determine the level of selectivity of the admission criteria for the institution, Carnegie utilized college entrance scores reported to IPEDS and College Board for first-time full-time freshmen. Using the top score of the bottom 25% of the distribution of scores (25th percentile), the admission criteria were labeled as selective. Selective was the middle rank between inclusive and more selective. More than 20% of the undergraduate population consisted of transfer students. Of all the institutions with undergraduate programs 3% had this undergraduate profile (Carnegie Foundation, 2012).

Finally, the school was among 3% of all graduate institutions who were STEM Dominant. The STEM classification indicated that science, technology, engineering, and mathematics programs were emphasized (Carnegie Foundation, 2012).

The number of areas where data show that the institution was on the outer-range and close to being in another category is important. Kuh, Cruce, Shoup, Kinzie, and Goneya (2008) stated that to adequately offer the programmatic measures to support students through to degree completion, “a school must first understand who its students are, what they are prepared to do academically, and what they expect of the institution and themselves” (p. 555). The institution may benefit from a reexamination of its mission (Kuh et al., 2008).

**Academic Preparation and Performance**

To measure academic preparation and performance the following variables were considered: high school GPA, ACT composite and cumulative GPA. Two of the three were significant. The strongest predictor of retention across the four years of collected information was cumulative GPA. An increase of one point in cumulative GPA made students 3.99 times more likely to return following Year One; 3.3 times more likely to return in Year Two; 3.5 times more likely to return in Year Three and 11.58 times more likely to return in Year Four. This finding is commensurate with other retention studies. Glenn and Ryan (2003) targeted students on academic probation. By introducing a summer bridge program and teaching study skills, students’ retention rates increased. However, counter to Glenn and Ryan’s findings, this study did not observe high school GPA as a significant factor for predicting retention across any of the four years (Glenn & Ryan, 2003).

In 2004, Astin revisited his recommendation to estimate the expected retention rates of students based on entering characteristics. In a research project examining the trends in access and equity, he observed that the ability of high school GPA measures to predict persistence had weakened. His belief was that high school grades had become inflated and therefore were not weighted as heavily among admission criteria (Astin, 2004). This inflation was observed in the descriptive frequencies for the entering freshmen in this study as the range of high school GPA’s began at 1.81 and topped-out at 5.28. This may account for the lack of effect observed in the calculations.

Kuh et al. (2008) reported that academic preparation had positive influences on college grades in the first and fourth years of college (2008). Wells also found a composite test score in reading and math to positively predict persistence for years one and two (2008-2009). In this study, ACT composite scores did
not predict the likelihood of students persisting. In the fourth year, students were less likely to be retained by a factor of .80 for each one point increase in ACT Composite. Astin’s 2005-2006 study concluded that academic preparation variables were the strongest predictors of degree completion. He stated that differences in degree completion rates among institutions were a reflection of the differences among the individual entering student bodies (Astin, 2005-2006).

Arredondo and Knight (2005-2006) observed in their analysis that students with high SAT scores participating in honors programs did not perform academically at expected levels. Honors program participation was not a predictor of retention in the logistic regression models. However, when crosstabs were examined for degrees awarded, 24% of the entering students earned a degree by spring 2011. Of these 319 degrees, students participating in honors programs comprised 18% of the degrees awarded for this population.

Astin (2005) also identified academic preparation variables to be predictors of retention; however, ACT composite scores did not predict retention in Years One through Three. In Year Four, the beta-weight of ACT composite was negative indicating that a raise in ACT composite did not increase the likelihood of students remaining enrolled in the spring of Year Four. For each one point increase in ACT composite score, students were less likely to return for spring term in the Fourth Year by a factor of .80. Since degree attainment was coded as "retained" graduates would not have accounted for this result. However, there is a possibility that of the students who were not retained some may have entered professional schools not requiring the completion of a baccalaureate degree. As noted earlier, the institution has a strong emphasis in the STEM fields and offers a host of professional programs. Also, data were not collected beyond the spring semester therefore, it is unknown if students returned for a fifth fall term.

To further examine the academic performance of students by ACT score, degrees awarded were plotted by ACT. The average ACT score was 24. The distribution was positively skewed with the range being from 16 to 35. When plotting the students’ ACT composite scores with the number of degrees awarded, the ACT composite score leveled-out with the number of degrees awarded to students with higher ACT scores. Figure 1 displays the number of students by ACT composite scores and the number obtaining degrees.

![ACT Composite Score and Number of Degrees Awarded](chart.png)

2. ACT Scores and Degrees Awarded to Students entering in the Fall of 2007 through Spring 2011
Of the 1,346 students, 319 or 24% of them completed a degree within the four-year academic time frame examined. The average ACT score for the group was 24. Students having an ACT composite score of 24 or better had a degree attainment rate of 29% while students having a 23 or less had a degree attainment rate of 19%. Of the 56 students having a 16, 17, 18, or 19 ACT composite score, only four (7%) of the students obtained a degree within the same time frame.

Family Background and Demographics

Five factors were targeted for examination in the area of family background and student characteristics. These factors were ethnicity, gender, first generation, unmet financial needs, and Pell eligible. Of these five factors, the number of students identified as first generation did not comprise enough of the population to be included in the logistic regression equations. However, a number of the studies reviewed provided insight into students who fit within this category.

Duggan’s 2005 study sought to evaluate the effect of social capital on the retention of students who were first generation college students. Duggan’s study found that first generation students who used email had retention rates similar to their peers. Also, first generation students who did not use email were less likely to be retained (Duggan, 2005).

Wells (2008-2009) also examined the effect of social capital on student persistence. The results of his study found that students who had at least one parent who had earned a college degree were 2.73 times more likely to persist than students who were first generation (Wells, 2008-2009).

Although the population of first generation students was not included in the logistic regression models, their frequencies and outcomes point to a lack of success at the university. There were only 24 students who self-identified as first generation on the entering application to the university. Of these 24, only 13 were retained into Year Two; 8 were retained into Year Three; and 7 were retained into Year Four. The U.S. Department of Education, National Center for Education Statistics (NCES) reported an 80% retention rate for first-time full-time freshmen starting in fall 2009 (NCES, 2011). Further study should be conducted to determine how better outcomes might be obtained for students entering the institution who are first generation college attendees.

Of the remaining four predictors for family background and demographics, only ethnicity was statistically significant. Students who reported their ethnicity as White, were more than twice as likely to be retained from year one to fall of year two and more than 2.7 times more likely to return their third year. In years three and four, ethnicity was not predictive of retention. The findings were similar to the studies conducted by Glenn and Ryan (2003), Hendel (2007), Johnson (2008), Kuh et al. (2008), Oseguera (2005-2006), and Wells (2008-2009). Each observed ethnicity to be a variable influencing the likelihood of persistence.

Hendel’s 2007 study examined the effects of first year seminars. He found that White students participating in the courses were more likely to persist (2007). Conversely, Kuh et al. (2008) found that the positive effects of targeted institutional programming encouraged persistence equally across students of differing racial and ethnic groups in years one and two (2008). Completion rates for White students were higher in Oseguera’s 2005-2006 study while Wells’s 2008-2009 study found that students possessing higher levels of social capital were more successful in college. Social capital was equally beneficial to students of all races and mitigated the effects of membership to low socioeconomic groups and/or minority groups (Wells, 2008-2009).

To better understand the educational participation and completion rates of students by ethnic and racial groups, the Digest of Education Statistics: 2010 was examined. The report indicated that the percent of high school dropouts had experienced a steady decline over the past 20 years across all groups. However, the percentage of students not completing high school either by obtaining a diploma or equivalency was disparate. The dropout rate for Whites was 5.2%; for Blacks it was 9.3%; and for Hispanics it was 17.6%. Overall, the number of adults ages 25 and older who possessed high school diplomas rose from 84% to 87% between 2000 and 2010. The portion of young adults between the ages of 25 and 29 having completed high school remained the same for this period. The number of young
adults completing a bachelor’s degree rose from 29% to 32% (National Center for Education Statistics, 2011).

The College Navigator provided by NCES collects the retention and institutional data for higher education institutions and makes the data available to the public via the web. For students beginning in fall 2004, the institution of this study had an overall graduation rate of 41%. The 6-year graduation rate for White students was 43%; for Black or African American students it was 34%; and for Hispanic/Latino students it was 37%. Students who were Asian/Native Hawaiian/Pacific Islander had a graduation rate of 67% while students who were Non-resident alien had a rate of 59% for the same population of students entering in 2004. Students not reporting a race or ethnicity had a graduation rate of 41% (National Center for Education Statistics, 2011).

Programs designed to support groups of students with lagging graduation and retention rates were described in a 2004 article by Keels. Outreach programs were recognized by the Noel-Levitz award program for their measurable outcomes, originality and effectiveness (Keels, 2004).

Four schools were recognized for strategies promoting the persistence of traditionally underrepresented racial and economically-challenged groups.

- Southeastern Oklahoma State University offered structured academic advising that included degree maps for students, a college success course and freshman convocation to welcome first generation students and their families to campus.
- Georgia Institute of Technology designed a summer program for students to learn strategies for college success.
- State University of New York at New Paltz ended a long-running summer bridge program on their campus and replaced it with a summer orientation program that overlapped with the general orientation sessions and a freshman year experience course.
- University of North Carolina at Greensboro restructured their academic probation policy and instituted a non-credit course with required attendance whereby students learned goal-setting, behavior modification principles and were asked to evaluate what they liked.

The schools each experienced measurable increases in retention rates for the targeted groups and made improvements in other calculable areas (Keels, 2004).

It is recommended that the institution of this study reevaluate the methods for identifying first-generation students and conduct a more in-depth analysis of between-group tests to determine if the groups are performing at lower than expected rates. Once vulnerable groups are identified, existing student support programs can be modified to meet the needs of students.

Surprisingly, financial status was not significant in any of the four regressions. Researchers Kuh et al. (2008) and Wells (2008-2009) found instances in their research where financing was an issue as it related to family background and other factors associated with low socioeconomic status. For this study, neither unmet financial need nor Pell eligibility predicted the retention status for students. In his 2000 paper, Lechuga predicted students would increasingly begin to rely on Pell Grants and potentially, be disappointed. For this reason, it may be fortunate that the findings for Pell Grant recipients in the study were not indicative of students not remaining enrolled (Lechuga, 2000). During the design phase of the study, many fields in the data addressed a variety of issues related to financial aid and the ability of students and their families to cover the price of tuition and fees. It is recommended that the institution revisit the financial aid measures to determine if more appropriate data are needed to analyze the effects of merit-based scholarships, need-based support, student loans, and other means of financial assistance and the effects they may have on persistence.

**Institutional Constructs**

**Advising**

For the variables tested for institutional constructs, advising was predictive of retention in Year One. The freshmen who attended advising appointments were 1.2 times more likely to persist with each additional visit to their academic advisor. Year One was the only year that netted a significant contribution to the model from advising. In the literature, researchers Carini, Klein, and Kuh (2006) found
partial correlations with advising and seniors’ retention while Lowe and Toney (2000) examined the quality of advising and student satisfaction with the appointments. This study contrasted with these findings in that the quality of advising was not addressed. However, the findings indicated that freshmen retention benefited from the interactions.

Bai and Pan (2009-2010) also found advising to encourage retention rates for first year entering freshmen. The results they observed also indicated that advising programs had stronger effects for institutions with more selective admission criteria (2009-2010). Dudek, Marriner, and Herreid (2005) presented a case study for methods of advising students in honors programs. They recommended that students be taught to prepare for advising sessions in advance. Preparing directed questions allowed students to maximize the benefits of meeting with their academic advisors (Dudek et al., 2005).

Since advising was a statistically significant contributor to the logistic regression model for Year One, a more comprehensive approach to the advising model for the university may be warranted to identify how academic advising may be structured to affect retention rates of upper classmen as well as improve the current retention rates for first and second year students.

**Change in Major**

A related institutional predictor was change in major. Researchers who examined changing majors as it is related to retention were Astin (1997), and Oseguera (2005). Of these, specific majors were recommended for further review as well as institutional curriculum decisions such as the sequencing of courses and role of disciplines in promoting retention (Astin, 1997; and Oseguera, 2005).

The study institution has a policy regarding students changing majors that allows students to change majors without the approval of an advisor or faculty member. The student information system only collects the major of record at the close of the semester each term Therefore, the number of times a student has entered the system and chosen a different major might not be reflected precisely in the data (R. Scott, personal communication, October, 2011). It is interesting that a change of major was a positive predictor for retention in Year One but a negative predictor in Year Four. Further study should examine the choices of majors students make, the factors that influence a change, and the effects participation in majors may have on persistence.

**Engagement**

Student engagement was examined for its role in predicting retention. The variable did not increase the likelihood of students returning for Spring of Year Four and was not a statistically significant factor in Year One, Two, or Three. In Year Four, students who enrolled in courses incorporating Undergraduate Research, Service Learning, or Study Away components were .41 times less likely to be retained for each additional course taken. This outcome is curious as a number of researchers have observed the positive benefit of students becoming involved in courses designed to have increased faculty interaction, community service components, and research methodologies at the undergraduate level. Carini, Klein and Kuh (2006), Kuh et al. (2008), and the National Survey of Student Engagement (2008) each observed positive effects of incorporating these types of courses into undergraduate curricula.

Kuh et al. (2008) determined that student engagement variables were positively related to on first-year grades and continued enrollment from the first year to the second. Therefore, it is recommended a further investigation into the students enrolling in the courses identified and examination of the specific traits associated with this group. It is possible the students were high performers who transferred to other schools or entered professional programs prior to completing an undergraduate degree at the institution. Note that the Carnegie Classification for the undergraduate program was Arts and Sciences balanced with Professions (Carnegie, 2012). Only a critical evaluation of the specific groups can reveal if this is an accurate picture or if there are problems with the data housed in the student information system.

**Freshman Year Experience (FYE)**

This study found that participation in Freshman Year Experience (FYE) courses was significant for predicting retention in Year Two. However, the direction of the beta weight was negative indicating that participation in an FYE did not encourage retention. The students in the dataset completing FYE courses were .37 times less likely to be retained. This result may be due to the measure which combined FYE and
University 101 course completions. Traditionally, U101 courses were recommended for students who entered the institution with indicators of academic difficulty. Although the course satisfied the requirement that incoming first-time freshmen enroll in an FYE, the results may have been skewed by a disproportionate number of students with lower ACT scores and/or lacking high school GPA’s.

In 2007, FYE’s became a requirement of the institution. However, the data did not contain any record of students completing FYE courses in Fall 2007. The measure did not appear in the student data until Fall of 2008. Independently, the sample of students enrolling in FYE’s did not comprise even ten percent of the population to allow the predictor to be included in the model. Therefore, question of the accuracy of the student data system to reflect the actual number of students who completed FYE’s was in question.

Early Alert

Implementing early alert or early warning systems has been a popular tactic for institutions wanting to increase retention rates. Hudson’s 2005 article attempted to measure the effect of an early warning system for students whose performance may have indicated academic difficulty (Hudson, 2005). The number of early alert notices received by students was not statistically significant for predicting continued enrollment in any of the four periods studied. The results do not support or contradict the assumption that a system of contacting students whose performance is not commensurate with faculty expectations is an effective means for encouraging retention.

Housing

The students who lived on campus in university housing were more likely to be retained in Year One by a factor of 1.46. The predictor was only statistically significant for Year One. However, this outcome is commensurate with other retention research. Foust, Potts, and Schultz (2004) found that living on campus had a positive effect on students’ academic achievement. Astin (1997) recommended that universities require students to live on campus. The institution in this study was making a transition from being a largely commuter campus to having a campus-feel with university housing. In recent years, a new dining hall, dorm, and recreation center were constructed. Streets in the center of campus were closed and a green area designed and opened for students, faculty and staff. As the campus continues to offer student services and on-campus support, additional programs to reach students could be designed around the residence halls.

Supplemental Instruction

The final predictor included in the logistic regression analyses was Supplemental Instruction (SI). SI was a method whereby students taught other students outside of the classroom in disciplines that were traditionally difficult. It is interesting to observe the outcomes of the analysis for this area as the predictor was only significant in the Year Four model. Students who participated in SI were 1.13 more likely to remain enrolled spring term of the fourth year. The program was largely run by students and managed by the advising office for the College of Arts and Sciences. To determine if the influx of SI sessions noted could be caused by the SI leaders also being included in the data, an inquiry was sent to computing services. The assistant director reviewed course participation reports and verified the results. The system was configured to only record attendees through the use of pre-populated class rosters. Leaders of the sessions were not registered for the classes and were therefore not included on the rosters. The conclusion was, “Students who are already serious about graduating are the ones who attend SI sessions” (R. Scott, personal communication, March 13, 2012).

The finding that participating in SI sessions was predictive of retention was in keeping with studies in retention literature. Engle, Levine, and Reilly (2004) and Glenn and Ryan (2003) found that students taking study skills instruction courses performed better academically and had higher retention rates. The study Engle et al. conducted targeted at-risk students and focused on study techniques, test taking strategies, and career skills training. The implementation of the program lasted for a duration of 12 weeks. Twenty six percent more of the students who participated enjoyed an improved GPA as compared to students who did not attend. Additionally, lasting effects were observed. Twenty seven percent more of the participants continued to experience success compared to the other students and they had higher retention rates (Engle et al., 2004).
Glenn and Ryan (2003) conducted a longitudinal study of retention rates. They also targeted students who had been identified as at-risk by the institution’s academic probation policies. By increasing supplemental instruction offerings they saw a 10% improvement in retention rates for students on academic probation (Glenn & Ryan, 2003).

**Recommendations**

Retention studies have often represented two approaches aimed to increase the persistence of college students. Much of Astin’s past research sought to show that background characteristics of students such as high school performance and pre-college testing could predict student persistence in higher education (Astin, 1972, 1993, 2004, 2005, 2009). Tinto dedicated his research to examining the strategies higher education institutions can employ to involve students in the campus culture to promote retention (Tinto, 1987, 1993, 1997, 2007). This study sought to identify the variables associated with retention that predict the likelihood of students remaining enrolled. It examined background characteristics, academic preparation and performance traits, and institutional constructs. The results revealed that each of the areas were significant at different points in the students’ undergraduate careers.

**Academic Preparation and Performance**

Since it is generally accepted in college retention literature that ACT scores contribute positively to predicting retention, further investigation should be conducted to understand the negative correlation of ACT scores with retention rates at this institution in the fourth year of enrollment. Four questions to address the predictability of ACT scores are recommended.

- Are students with higher than average ACT Composite scores leaving to enter professional schools not requiring baccalaureate degrees for entry?
- Are students transferring to other higher education institutions?
- What are the demographics of students with higher than average ACT Composite scores who leave before obtaining a degree?
- How can student engagement programs affect these graduation rates?

**Family Background and Demographics**

The study institution was ranked by The Princeton Review as being a diverse campus. In fact, it was number five on the list only behind Loyola University New Orleans, Stanford University, the University of Miami, and Franklin W. Olin College of Engineering (Princeton Review, 2012). However, the results of the analyses showed that students who were White were more likely to be retained than students who were another ethnicity. After the first year, 60% of White students returned for the second fall. After the second year, 84% of the students who were White returned for the third year. The institution should further examine the differences between the groups of students retained versus not retained by ethnic group and examine the nature of the differences among corresponding student characteristics. There are several areas to investigate further.

- Are racial or ethnic groups equally represented in programs targeted for improving retention?
- Did the students who left the institution participate in institutional programs designed to encourage retention?
- What programs are other institutions implementing that are having success at making college more accessible?

**Institutional Constructs**

Better metrics need to be identified for the study institution. Of the eight predictors for institutional Constructs, advising, change of major, and on campus housing were positive predictors for retention in Year One. Supplemental Instruction participation was the only other positive predictor for retention and it was in Year Four. The first step to determine the needs of students at the sophomore and junior class standing should include a review of literature and on-campus qualitative analyses.

Second, a review of the types of transcript requests correlated with GPA could resolve the open issues regarding the students who leave in later years of enrollment. The National Student Clearinghouse is a
service that works with higher education to verify degrees and certificates of students. Working closely with this organization could help to provide information regarding the degree completion status of students (National Student Clearinghouse, 2012). Knowing the student outcomes may not improve the graduation rate reported for individual institutions, but it may prove to inform schools of where they are losing students and help with formulating retention methods using more targeted approaches.

Third, Kuh (2001) stated, “The keys to developing a success-oriented institutional culture is to capture the power of the peer group and to focus on the classroom as the primary locus of culture building” (p. 37). He provided six steps for colleges to follow to create the “success oriented campus culture” (p. 32).

1. Clarify institutional values and expectations early and often to prospective and matriculating students,
2. Conduct a comprehensive examination of the student experience inside and outside the classroom,
3. Consistently use good practices in teaching, learning, and retention programs,
4. Intentionally tie the curriculum to students’ lives outside the classroom to bring students into ongoing contact with one another and with campus resources, especially after the first year of study,
5. Remove obstacles to student success associated with disciplinary cultures, and
6. Determine the effects of proximal peer groups on persistence (p. 32-36).

Given the retention and graduation rates reported for the study institution, it is important an instructional evaluation is conducted. This structured approach can serve to inform decision-makers of the programs needed for cultivating a campus culture that promotes student success (Kuh, 2001-2002).

Finally, in addressing freshman year experience courses it was revealed that the data in the student information system may not be accurate. Therefore, an audit of the system for the measures associated with student retention should be conducted.

**Conclusion**

This study sought to analyze the relationship between student variables associated with student persistence and their ability to predict continued enrollment. The literature review discussed the findings of predictive institutional models, institutional constructs, student characteristics, and intervention strategies designed for the purpose of encouraging retention. Both Astin and Tinto’s theories for retention were supported in part by the findings. The analyses found that each of the areas had statistically significant values for predicting retention. The data used for analysis consisted of 1,346 students. Of these, 851 were retained to the fourth year or received degrees. This is a 62% rate of retention. Although this is an improvement over Tinto’s assertion that, “more students leave their college or university prior to degree completion than stay (Tinto, 1993, p. 1) much should be done to improve outcomes for students for the benefit of themselves and society as a whole.
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