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The Relationship of High School Size, Gender and First-Year Retention Rates at South Dakota State University

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ABSTRACT

This study examines selected demographic characteristics of six South Dakota State University 2008 – 2013 cohorts of first-time, full-time students who graduated from South Dakota public high schools. The purpose of our study is to explore the relationship between high school size, gender and student retention at South Dakota State University (SDSU).

Information that was both gathered and analyzed about these students includes their high school size and gender. Our examination of this data uses descriptive statistics to identify characteristics of students who were retained after their first year at SDSU. This study identifies two findings of interest: first, students graduating from high schools with populations of 200-399 students were retained at the highest level; second, gender matters for retention as females were more likely to return than males.

Key words: high school size, gender, postsecondary education, postsecondary retention, higher education

INTRODUCTION

University retention rates are currently garnering considerable attention. According to a 2008 study by ACT, only 40.3% of college students complete their degree (ACT, 2008). A review of the literature shows an increased emphasis coming from the public and the government on the efficiencies and efficacy of the higher education system to graduate students. Selingo (2015) explains, “After years of focusing on increasing access to higher education, federal and state higher-education policymakers recently have begun to shine a spotlight much more on the results of those efforts” (p. 8). Federal mandates and proposed legislation require that universities significantly improve retention and graduation rates. In a report published in the *Chronicle of Higher Education* (Selingo, 2015), higher educational systems identify the need for decision-making to be driven by big data as a powerful tool; they even consider modeling university systematic and programmatic efforts after leading corporate entities, much like Netflix and Amazon promote videos and books specific to an individual consumer’s interests. This approach is known as predictive analytics. The data retrieved can be used to “steer students to more appropriate courses and majors,” thereby reducing resources expended in university systems (Selingo, 2015, p. 27).

In studying retention at universities, educational leaders explore PK-12 school effectiveness. A commissioned report for the National Symposium on Postsecondary Student Success emphasizes the importance of a student’s academic preparation in high school: “The quality of the academic experience and intensity of the high school curriculum affects almost *every dimension* of success in postsecondary education” (Kuh, Kinzie, Buckey, Bridges, & Hayek, 2006, p.19). Further, Hayali (2013) concludes that academic preparation at the high school level is “one of the most – if not the single most – important predictors” of enrollment and retention in college, even more so than socioeconomic factors (p. 40-41). Thus, the quality and depth of curriculum provided at the high school level becomes a significant factor in future academic success for many students.

State departments of education also work to validate the effectiveness of their schools by collecting information on college graduation rates. Considerable research exists on the relationship between high school size and variable factors, such as academic achievement (Fetler, 1989; Walberg & Walberg, 1994) and dropout rates (Fetler, 1989; Pittman &

Haughwout, 1987). However, the results from research on high school size and academic gains are inconsistent. For example, a study of a nationwide population of approximately 9,000 students found that students from moderate-sized high schools (enrollments between 600 and 900) had, on average, higher academic achievement advances in reading and mathematics than their student peers from small or large high schools (Lee & Smith, 1997). However, a study of a national representative population of almost 14,000 secondary students found little to no relationship between secondary academic achievement and high school size (Lindsay, 1984). Looking specifically at dropout rates, a 1989 study examining all public high schools in California found higher dropout rates correlated with higher school enrollments (Felter, 1989). A national study by Pittman and Haughwout (1987) found similar results. Out of a representative sample of 744 high schools across the nation, higher dropout rates were associated with larger school size. This study estimated that for every additional 400 students, the dropout rate increased by one percent (Pittman & Haughwout, 1987).

Many universities have studied and continue to study student retention by examining characteristics of students who were retained and those who were not retained. According to a Winona State University study in 2011, the “most significant predictor” of a student’s post-secondary retention is his or her high school class size; the larger the size of a student’s high school, the more likely the student will be retained (Yu, Lin, Chen, & Kaufman, 2011, p. 26). When examining gender, Yu et al. (2011) found that females are less likely to be retained.

Colleges employ student affairs and admissions staff to track student retention as a way to measure the effectiveness of university programs and recruiting efforts. In *Impact 2018*, a strategic vision for South Dakota State University, the Division of Student Affairs indicates a retention rate target for first-time, full-time students of 80% (Division of Student Affairs, SDSU, 2013). *Impact 2018* more narrowly indicates a fall-to-spring academic semester target retention rate of 94%. In the Fall 2013 Bachelor’s degree cohort, the university reported a retention rate of 77% (South Dakota State University, 2013). It is of utmost importance to more closely examine the factors that impact retention, because “retention can affect every aspect of higher education” (Stillman, 2009, p. 2).

This descriptive research study looks at retention by examining selected demographics of students who were retained after their first year at South Dakota State University. We identified two research questions: (1) What is the relationship of high school size and first-year retention at South Dakota State University? (2) What is the relationship of gender and retention at South Dakota State University?

Higher education administrators who explore retention research will be able to use the results of this study to develop programmatic efforts to increase retention rates.

METHODS

This study uses descriptive statistics to examine specific characteristics of students who were retained after their first year at South Dakota State University. Specifically, we looked at two variables: the high school size and the gender of students who were retained and of students who did not return after their first year of college. We wanted to see if there was a pattern in student retention based on these two variables.

After completing the Institutional Review Board requirements, we requested and received data from the Office of Administrative Information Services for six first-time, full-time, Bachelor's degree seeking fall cohorts from the years 2008 to 2013, which includes 6,714 student data observations. The data set includes only students graduating from public school districts in the state of South Dakota. Due to the lack of available data consistent with the South Dakota Department of Education reports, we decided to exclude freshmen from private, parochial and tribal schools.

Using Excel spreadsheets we tabulated the data to determine the total number of students retained and not retained. We also calculated the total number of males and females in the population.

To identify any pattern with the variable of high school size, we categorized the freshmen in our data into five high schools groups, according to school sizes. We determined the size of the high schools according to South Dakota Department of Education School District Profiles (SD DOE, 2014). To select the ranges and grouping of the schools, we compared the school populations to the groups defined by the South Dakota High School Activities

Association (SDHSAA, n.d.). In addition, the range in numbers appeared to have naturally occurring divisions in the Excel spreadsheet.

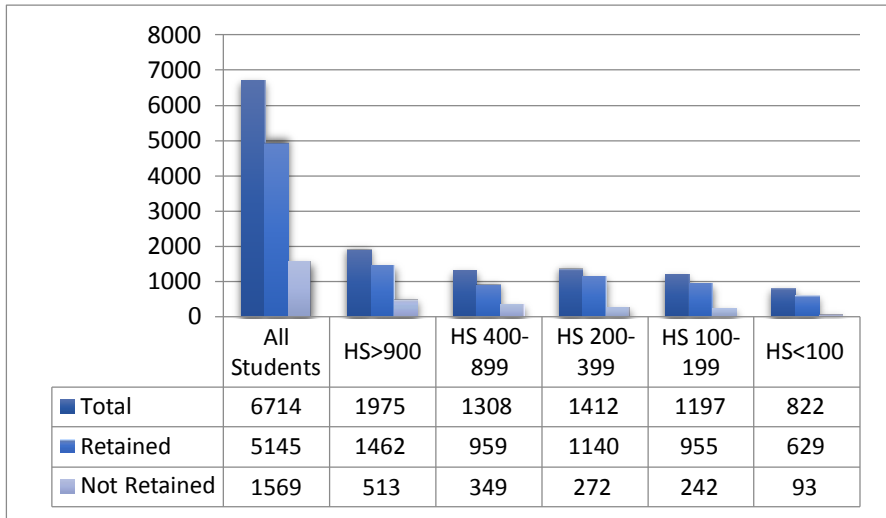
- Group 1 High Schools: > 899 students
- Group 2 High Schools: 400 to 899 students
- Group 3 High Schools: 200 to 399 students
- Group 4 High Schools: 100 to 199 students
- Group 5 High Schools: < 100 students

RESULTS

This study yields interesting results. In examining selected demographic characteristics of six South Dakota State University 2008 – 2013 cohorts of first-time, full-time students who graduated from South Dakota public high schools, we discovered several patterns in regard to high school size, gender and student retention at South Dakota State University. We found that out of 6,714 total freshmen in the six cohorts studied, 1,975 freshmen graduated from high schools of less than 900 students; 1,308 freshmen graduated from high schools with between 400 and 899 students; 1,412 freshmen graduated from high schools with between 200 and 399 students; 1,197 freshmen graduated from high schools with between 100 and 199 students; and 822 freshmen graduated from high schools of less than 100 students. Of the 6,174 students studied, 76.6% of the freshmen returned for their sophomore year; 23.4% of the freshmen did not return. In total, 5,145 students were retained and 1,569 were not retained.

Table 1 illustrates these numbers and percentages. It also shows the numbers of students retained and not retained in each of the high school size categories.

Table 1: School Size Comparison of Retention Rates



We also disaggregated the data according to gender. With an equal distribution of 3,357 males and 3,357 females, males have a retention rate 3.7% lower than their female counterparts. Males have a retention rate of 74.8% with 2,511 being retained and 846 not retained. Females have a retention rate of 78.6% with 2,634 being retained and 723 not retained. Table 2 illustrates these numbers and percentages.

Table 2: Total Number of Students Retained with Gender Breakdown

| CATEGORY | DESCRIPTION | NUMBERS | PERCENTAGE |
|---------------------|----------------------|----------------|-------------------|
| All Students | Total | 6714 | |
| | Retained | 5145 | 76.6% |
| | Not Retained | 1569 | 23.4% |
| | Males | 3357 | |
| | Males Retained | 2511 | 74.8% |
| | Males Not Retained | 846 | 25.2% |
| | Females | 3357 | |
| | Females Retained | 2634 | 78.5% |
| | Females Not Retained | 723 | 21.5% |

For the 1,975 total students from high schools with populations above 899, a retention rate of 74% is reported with 1,462 students being retained and 513 not retained. Males have a retention rate of 71.4% with 720 retained and 289 not retained. Females have a retention rate of 76.8% with 742 retained and 224 not retained. Table 3 illustrates these numbers and percentages.

Table 3: Number of Students Retained According to >899 School Size with Gender Breakdowns

| CATEGORY | DESCRIPTION | NUMBERS | PERCENTAGE |
|------------------------|----------------------|----------------|-------------------|
| Group 0 Schools | Total | 1975 | |
| HS >899 | Retained | 1462 | 74.0% |
| | Not Retained | 513 | 26.0% |
| | Males | 1009 | |
| | Males Retained | 720 | 71.4% |
| | Males Not Retained | 289 | 28.6% |
| | Females | 966 | |
| | Females Retained | 742 | 76.8% |
| | Females Not Retained | 224 | 23.2% |

For the 1,308 total students from high schools with populations of 400 to 899, a retention rate of 73.3% is reported with 959 retained and 349 not retained. Males have a retention rate of 73.4% with 485 retained and 176 not retained. Females have a retention rate of 73.3% with 474 retained and 173 not retained. Students from high schools with populations of 400 to 899 have the lowest retention rate at 73.3% being retained and 26.7% not retained. Table 4 below illustrates these numbers and percentages.

Table 4: Number of Students Retained According to 400-899 School Size with Gender Breakdowns

| CATEGORY | DESCRIPTION | NUMBERS | PERCENTAGE |
|------------------------|----------------------|----------------|-------------------|
| Group 1 Schools | Total | 1308 | |
| HS 400 to 899 | Retained | 959 | 73.3% |
| | Not Retained | 349 | 26.7% |
| | Males | 661 | |
| | Males Retained | 485 | 73.4% |
| | Males Not Retained | 176 | 26.6% |
| | Females | 647 | |
| | Females Retained | 474 | 73.3% |
| | Females Not Retained | 173 | 26.7% |

For the 1,412 total students from high schools with populations of 200 to 399, a retention rate of 80.7% is reported with 1,140 retained and 272 not retained. Males have a retention rate of 79.2% with 549 retained and 144 not retained. Females have a retention rate of 82.2% with 591 retained and 128 not retained. Students from high schools with populations of 200 to 399 have the highest retention rate of all categories at 80.7% being retained and 19.3% not retained. Table 5 below illustrates these numbers and percentages.

Table 5: Number of Students Retained According to 200-399 School Size with Gender Breakdowns

| CATEGORY | DESCRIPTION | NUMBERS | PERCENTAGE |
|------------------------|----------------------|----------------|-------------------|
| Group 2 Schools | Total | 1412 | |
| 200 to 399 | Retained | 1140 | 80.7% |
| | Not Retained | 272 | 19.3% |
| | Males | 693 | |
| | Males Retained | 549 | 79.2% |
| | Males Not Retained | 144 | 20.8% |
| | Females | 719 | |
| | Females Retained | 591 | 82.2% |
| | Females Not Retained | 128 | 17.8% |

For the 1,197 total students from high schools with populations of 100 to 199, a retention rate of 79.8% is reported with 955 retained and 242 not retained. Males have a retention rate of 78.7% with 470 retained and 127 not retained. Females have a retention rate of 80.8% with 485 retained and 115 not retained. Table 6 below illustrates these results.

Table 6: Number of Student Retained According to 100-199 School Size with Gender Breakdowns

| CATEGORY | DESCRIPTION | NUMBERS | PERCENTAGE |
|------------------------|----------------------|----------------|-------------------|
| Group 3 Schools | Total | 1197 | |
| 100 to 199 | Retained | 955 | 79.8% |
| | Not Retained | 242 | 20.2% |
| | Males | 597 | |
| | Males Retained | 470 | 78.7% |
| | Males Not Retained | 127 | 21.3% |
| | Females | 600 | |
| | Females Retained | 485 | 80.8% |
| | Females Not Retained | 115 | 19.2% |

For the 822 total students from high schools with populations less than 100, a retention rate of 76.5% is reported with 629 retained and 193 not retained. Males have a retention rate of 72.3% with 287 retained and 110 not retained. Females have a retention rate of 80.5% with 342 retained and 83 not retained. Interestingly, students from high schools with populations less than 100 have the highest retention percentage difference between males (72.3) and females (80.5). Table 7 below illustrates these numbers and percentages.

Table 7: Number of Students Retained According to <100 School Size with Gender Breakdowns

| CATEGORY | DESCRIPTION | NUMBERS | PERCENTAGE |
|------------------------------------|----------------------|----------------|-------------------|
| Group 4 Schools <100 | Total | 822 | |
| | Retained | 629 | 76.5% |
| | Not Retained | 193 | 23.5% |
| | Males | 397 | |
| | Males Retained | 287 | 72.3% |
| | Males Not Retained | 110 | 27.7% |
| | Females | 425 | |
| | Females Retained | 342 | 80.5% |
| | Females Not Retained | 83 | 19.5% |

DISCUSSION AND CONCLUSION

In this study, we examined the relationship of high school size, gender and student retention of six 2008-2013 cohorts of first-time, full-time students at South Dakota State University. Of the 6,174 students studied, 76.6% of the students returned for their sophomore year; 23.4% of the students did not return. In total, 5,145 students were retained and 1,569 were not retained. Students from high schools with populations of 200 to 399 have the highest retention rate of all categories at 80.7% being retained and 19.3% not retained.

In regard to gender, with an natural equal distribution of 3,357 males and 3,357 females, males have a retention rate 3.7% lower than their female counterparts. Males have a retention rate of 74.8% with 2,511 being retained and 846 not retained. Females have a retention rate of 78.6% with 2634 being retained and 723 not retained.

Within this section, we will first discuss the relationship of high school size and retention and briefly compare our findings with other studies. We then consider possible explanations and considerations to explain the variances. Next, we will discuss the relationship of gender and retention and briefly compare our findings to other studies. We then consider possible explanations for the variances.

HIGH SCHOOL SIZE AND RETENTION

Our findings show that the highest retention rate for university first-time, full-time students in South Dakota comes from students who graduated from high schools whose size ranges from 200 to 399. In this size category, a retention rate of 80.7% is reported with 1,140 retained and 272 not retained. Students graduating from high schools with enrollments of 400 to 899 had the lowest retention rate of all the sizes, which was a rate of only 73.3% retained and 26.7% not retained. This result does not support our review of the literature, which reveals a wide range of findings related to the ideal high school size. Considerable research identifies high schools with enrollments of 500 and above as ideal for student achievement (Conant, 1967; Lee & Smith, 1997; Yu et al., 2011). A renowned 1976 study by Conant claims that high schools with populations lower than 750 are unable to deliver an inclusive educational program. Further, a study by Lee and Smith (1997) characterizes high schools with populations ranging from 600 to 900 students as most effective in helping student achieve academic success.

Our results contradict these studies in light of university retention rates because students graduating from high schools with populations between 200 to 399 were retained at the highest rates at South Dakota State University. This size is smaller than the ideal numbers cited by others (Conant, 1967; Lee & Smith, 1997; Yu et al., 2011). With this contradiction in mind, we seek to further explore the specific theoretical and conceptual occurrences that differentiate high schools with populations from 200 to 399 students from their peer institutions. The next section examines three possible areas that may directly or indirectly influence postsecondary retention: 1) Curriculum Quality, 2) Academic Achievement, and 3) Student Engagement.

CURRICULUM QUALITY

Curriculum quality affects retention because the quality and rigor of a student's academic experience in high school affects success in the postsecondary environment (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). Some experts argue that larger schools can offer a more diverse, comprehensive curriculum than smaller schools. However, Cotton's extensive analysis of over 69 documents that identify a relationship between school size and student success concludes that the research does not show a reliable and justifiable relationship

between that of curriculum quality and school size (Cotton, 1996). Slate (2010) argued that although larger schools are able to offer more diversity in their curriculum, this fact does not necessarily transfer into higher curriculum quality. According to Howley (1994), as cited by Slate (2010), “The value of offering a wide range of specialized courses might be overstated, and that small school with a strong required core curriculum could produce student achievement at high levels” (p. 5).

STUDENT ACHIEVEMENT

Students who are most prepared coming out of high school have a higher chance of succeeding in the post-secondary environment “regardless of who they are, how much money they have, or where they go” (Kuh et al., 2006, p. 19). Multiple studies have found a positive correlation between student achievement and school size (Howley, Smith, & Bickel, 2000; Binger et al., 2002). Further, Cotton (1996) contends, “the states with the largest schools and school districts have the worst student achievement, affective, and social outcomes” (p. 13).

According to Howley et al. (2000), as cited in Darling-Hammond (2006), “recent literature relating district size to school performance rests almost entirely on an indirect relationship in which socioeconomic status and size work jointly to influence school performance” (p. 30). Fowler and Walberg’s (1991) comprehensive study, controlling for factors like socioeconomic status and school expenditures, found that smaller secondary schools in New Jersey “produced higher achievement and higher passing rates on several state tests” (as cited in Darling-Hammond, Milliken, & Ross, 2006, p. 9).

STUDENT ENGAGEMENT

Astin (1997), as cited by Noel-Levitz (2008), states that the “keys to success or graduation are involvement and connection. Involvement refers to both formal academic as well as co-curricular activities” (p. 7). A study by Wehlage and Smith (1992), as cited in Weiss et al. (2010), found that smaller high schools are more likely than larger ones to promote conditions that support and foster student engagement. Similarly, a 2003 study by the National Research Council states that small-school settings foster higher student engagement experience, which can improve achievement academically, reduce disaffection and dropout rates. The benefits of student engagement are diverse: higher

grades (Finn & Rock, 1997), lower dropouts rates before completing degrees (Crosnoe et al., 2002), fewer disciplinary issues (Gutman & Midgley, 2000), higher scores on standardized tests (Roeser et al., 1996).

The expectancy theory provides a possible explanation by suggesting students are predisposed to seek out certain kinds of activities during college (Kuh et al., 2006). Perhaps students who are familiar with being engaged within their secondary environment are more apt to pursue similar activities (such as extra-curricular involvement, connection with faculty and advising) on the post-secondary level, thereby improving their overall success and retention. We suggest that expectancy theory plays a role in student engagement in the postsecondary environment and recommend exploring the expectancy theory and student engagement as an area for future study.

Although we found extensive research related to high school size showing an intensive interest in this factor from 1967 to 1992, there appears to be a lack of recent study in this area. Our findings demonstrate that education officials would benefit from a renewed focus on the high school pipeline moving students into the university system. We conclude that a fresh examination of high school size, as well as other relevant demographic factors, would contribute to the current discussion on university retention rates. In addition, researchers should further examine student persistence and retention through the lens of high school size, focusing on curriculum quality, academic achievement, and student engagement. Is the high school's quality of its curriculum an intervening variable related to size? How does student persistence relate to school size and academic achievement? Is student engagement an intervening variable related to school size? Further research should also explore the relationship of these factors in student retention as possible confounding factors (Weirisma, 2000).

GENDER AND RETENTION

Our study contradicts some existing research in regard to the relationship of gender and retention. Alarcon and Edwards (2013) report "females were 1.59% more likely to leave than males" (p. 135). Today, however, the demographics of college populations have changed and most campuses have larger populations of females than males. Our study finds females were 1.049% more likely to be retained in comparison to their male counterparts.

A study published by the National Center for Education Statistics found that females enrolled in a post-secondary institution had completed their program at a rate of 52% in comparison to their male counterparts at a rate of 46% (Ross, Lauver, Le, Davis, Langley, Carlstrom, 2004). The most influential background variables that influence postsecondary retention, as cited in Clark (2015, p. 87), are “high school grades, the rigor of the high school curriculum, and class rank (Conger & Long, 2010; Buchmann, 2009; Ewert, 2012). Clark (2015, p. 87) continues: “Generally speaking, girls have higher grades and rank, and are more likely to take rigorous courses, particularly in math and science” (Buchmann, 2009; DiPrete & Buchmann, 2013; Peter & Horn, 2005; Reynolds & Burge, 2008; Sax, L.J. 2008).

The findings of our study have implications for higher education administrators who study, oversee, and implement retention practices and programs. Educational leaders at the high school level should also consider how factors such as student engagement and persistence could improve preparation of high school students for post-secondary success.

LIMITATIONS

As with any study, limitations exist. First, this study sought to discover how high school size and gender affected retention specifically at South Dakota State University. Our data reflects whether or not students enrolled in a second year at SDSU. We do not have data to indicate if the students who were not retained had transferred to another institution or if they dropped out of postsecondary education entirely. Secondly, we examine retention only through high school size and gender. Our study does not include relational factors, such as socioeconomic status, parental educational attainment levels, extracurricular engagement, and so forth.

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