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Relationships among Nevada-FIT Camps, High School Grade Point Average, and Gender

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Abstract

College readiness, the level of preparation students need to enroll and succeed without remediation in credit bearing entry level coursework at a two or four-year institution, increasingly is an expectation for all high school students, not just students who have been traditionally considered college-bound. Numerous studies have documented the importance of high school grade point average (HSGPA) in predicting college readiness. However, even with the best of high school preparation, the transition to postsecondary education can be difficult. To facilitate the transition from high school to university level study, the University of Nevada, Reno has developed a Nevada-Freshman Intensive Transition (Nevada-FIT) program. A robust evaluation of the program is being conducted; however, a question not addressed in the evaluation is the academic characteristics of the incoming students. Using existing institutional data of 404 students from the Fall of 2014 Nevada-FIT camp, a quantitative, descriptive analysis with a post-facto design using the one way ANOVA, Kruskal Wallis H test, and an independent t test was conducted. Demographic characteristics of the participating freshmen students were reported. Findings indicated that overall mean HSGPA was high with significant differences between the six groups as well as gender. Implications for recruitment of students to Nevada-FIT are presented.

Dedication

Dedicated to my Parents who were the first teachers of my life, and who continue to be my role models!

And to High Potential children everywhere and to their ‘coming out’ of the limitations of labels like at-risk, socially and economically endangered youth and others.

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CHAPTER 1

Introduction

College readiness, the level of preparation students need to enroll and succeed without remediation in credit bearing entry level coursework at a two or four-year institution, increasingly is an expectation for all high school students, not just students who have been traditionally considered college-bound (ACT, 2006; Conley, 2008). Research has shown that college and career readiness is not something that suddenly happens when a student graduates from high school; rather it is the result of a process extending through all the years of a student's education (ACT, 2008). The trajectory for academic success in college is established long before students matriculate (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006).

There are many factors that contribute to the development of college readiness. Numerous studies have documented the particular importance of high school grade point average (HSGPA) in predicting college readiness (University of Chicago Consortium on Chicago School Research [UCCCSR], 2014). A study by Hiss and Franks (2014), conducted across thirty-three institutions with optional testing policies, addressed the question: if students had an option to have their admissions decisions made without standardized test scores, how well they would succeed as measured by cumulative HSGPAs and graduation rates? It was found that students with strong cumulative HSGPAs, even without having undergone the rigor of standardized testing such as ACT and SAT, were more likely to succeed in college. Students with low cumulative HSGPAs, even with strong test scores, had lower college GPAs and graduation rates. Further, out of the 123,000 students in this study, the differences were trivial between those who submitted test scores and those who did not submit test scores: the differences were as little as

five one-hundredths of a GPA point, and six-tenths of one percent in graduation rates (Hiss & Franks, 2014).

In another study, Bowen, Chingos, and McPherson (2009) analyzed how standardized achievement tests such as ACT and SAT predicted college performance. Findings indicated that the scores from standardized tests had less predictive power than HSGPA (Bowen, et al., 2009). Further, a study conducted with almost 80,000 students from the University of California demonstrated that HSGPA was the best predictor of freshman grades (Geiser & Studley, 2003). Several other studies also reported that HSGPA was consistently the single best predictor of college GPA (Bridgeman, McCamley-Jenkins, & Ervin, 2000; Burton & Ramist, 2001)

Even with the best high school preparation as measured by HSGPA, the transition between secondary and postsecondary education can be difficult (Tinto, 1993; Cuseo, 2003). One particular concern is that the K-12 educational system is often described as passive whereas the postsecondary educational system is described as active (Lynch, 2011; Mascolo, 2009). In essence, during high school, students expect teachers to keep them on track to complete assignments, study for exams, etc. In contrast, instructors at the college level expect students to be responsible for their learning and educational experiences.

Because the retention of students at the college or university level is of increasing importance, postsecondary educational leaders have developed and implemented various transition, orientation, or bridge programs to prepare students for postsecondary level academic challenges (Cuseo, 2003). Many transition programs are general; they are designed for a specific student population, such as first generation, college-going students. It must be noted, however, that although students apply to a college or university, they declare specific majors that have different requirements and expectations. The University of Nevada, Reno, has implemented a

college/department based Nevada-Freshman Intensive Transition (Nevada-FIT) program. This week-long program was modelled after the Biology Intensive Orientation for Students (BIOS) established at Louisiana State University in 2005 (Wischusen & Wischusen, 2007), but has been adapted to reflect the needs of incoming freshmen who have declared majors beyond biology. Specifically, Nevada-FIT consists of eight camps, each reflective of the majors in the following colleges/departments: agriculture, biotechnology and natural resources; business; community health sciences; education; engineering; journalism; psychology; and science. Often called *boot camp* the various Nevada-FIT camps have been designed to provide an intense and transformative introduction to what college life is really like and offers a glimpse into the rigorous academic expectations of the university and specific major, as well as college life. The camps are held prior to the start of the semester. In essence, the academic boot camp has been established to help reduce the learning curve in making the transition from high school to college (Nevada-FIT, 2015).

Statement of the Problem

A robust evaluation of Nevada-FIT is being conducted. Summative measures include the GPA of students at the end of their freshman year, as well as persistence into their second year of college. A question remains about the characteristics of the students who voluntarily enroll in the various Nevada-FIT camps. Because the Nevada-FIT camps reflect specific majors, there is a question about the relationships among the students' HSGPA and the camp or major they declared to study at the university. As university staff make modifications to the various Nevada-FIT camps, an understanding of the characteristics of the incoming freshmen who chose to participate in the camp is needed.

Purpose of the Study

The purpose of this study was to examine the cumulative HSGPA of students enrolled in the various Nevada-FIT camps to identify if differences existed in the means of HSGPA across the various camps the students voluntarily selected for enrollment. An additional purpose was to identify the differences in mean HSGPA between the genders of the students.

Research Design

This was a quantitative descriptive study. Existing institutional data was used for the data analysis. Two research questions guided this study:

1. When groups are established by Nevada-FIT camp membership, are there significant differences in cumulative means of HSGPA among the groups?
2. When groups are established by gender, are there significant differences in cumulative means of HSGPA between the groups?

The existing institutional data used for this study included the following information: the camp which the student attended; gender; and cumulative HSGPA. The data set included a total of 353 freshmen students who voluntarily attended the various Nevada-FIT boot camps in the Fall of 2014 and 55 students who applied, but did not attend a camp. Descriptive statistics were used to report demographic characteristics of these enrolled freshmen students. Quantitative analysis was done to examine the cumulative HSGPA of students enrolled in each of the Nevada-FIT camps and to identify if relationships existed between the HSGPA, gender, and the specific camp the student selected for enrollment. Statistical analysis was done by a one-way analysis of variance (ANOVA) and Kruskal Wallis H test to address the first research question and an independent t-test for addressing the second question. The means, t value and standard deviations along with the Chi square, degrees of freedom, and significance level (p), are

reported. Effect size was calculated. The Statistical Package for Social Sciences (SPSS 16) software program was used for data analysis purposes in this study.

Significance of the Study

An evaluation of Nevada-FIT is being conducted to understand the contribution of this freshman program in addressing student retention into the second year of college. Findings of this study will contribute to providing university staff with data in understanding the characteristics of the incoming freshmen who chose to participate in the camp and thus help them in making any modifications to the various Nevada-FIT camps. Findings of this study may be of value in understanding if students were already predisposed to having higher academic achievement rates from the beginning, based on their cumulative HSGPA. Further, the results could be used to guide the staff efforts and activities in subsequent Nevada-FIT programs. Thus, in the long term, this could contribute towards assisting university staff in understanding and addressing student retention into the second year.

Limitations

This research was limited by the fact that data were collected from one western university; therefore, the findings cannot be generalized to a larger population. A second limitation of this study is that the existing data consisted of undergraduate students enrolled in eight of the Nevada-FIT boot camps; no comparison group was constructed. Further, there was an unequal number of students in the various boot camps. To equalize the number of students for a balanced distribution and a more accurate analysis, the students who belonged in the social science camps (i.e., J-FIT, Health-FIT, Psych-FIT, and FIT4Learning) were collapsed into one group. In addition, there was a group of 55 students who applied to participate in a Nevada-FIT camp, but did not attend; this group was labeled as Other thus bringing down the total number of

Nevada-FIT groups to six. This also prevented the identification of students specific to each of those six camps.

Definitions

For the purpose of this study, the following terms are defined.

College and Career Readiness: The level of preparation a student needs to enroll and succeed without remediation in a credit-bearing course at a postsecondary institution that offers a baccalaureate degree, transfer, or a high-quality certificate program that enables students to enter a career pathway with potential future advancement.

College Readiness: The level of preparation a student needs in order to enroll and succeed without remediation in a credit-bearing course at a postsecondary institutions.

Cumulative GPA: All grade points received at the end of the semester throughout high school are averaged together in order to compute the overall performance of the student.

First-time freshmen: refers to students that are enrolled in college courses for the first time and are classified as first-time college entrants.

Grade Point Average (GPA): It is a number representing the average value of the accumulated final grades earned in courses over time.

High School GPA: The grade point average earned in courses at high school over time.

Social Sciences: a branch of science that deals with the institutions and functioning of human society and with the interpersonal relationships of individuals as members of society.

Transition Program: A program which provides accelerated academic and college knowledge and skills during the students transition from high school to postsecondary institution and can presumably improve students' college readiness.

CHAPTER II

Literature Review

In 1950, approximately 20% of jobs in the United States (U.S.) were classified as skilled; by the beginning of the 21st century, an estimated 85% of jobs were classified as skilled, requiring education beyond high school (Business Higher Education Forum, 2003). While skilled jobs do not necessarily require a four-year college education, some postsecondary, whether in a four-year college, a high-quality technical training program, or a community college is now a necessity on the path to a successful adulthood (Cohen, 2002). According to Rosenbaum, Stephan, and Rosenbaum (2010), 89% of all high school graduates in 2004 planned to pursue higher education and earn a bachelor's degree. Although large numbers of students aspired to go to college only 30% of young adults who attended college earned a bachelor's degree by their mid-twenties (Symonds, Schwartz, & Ferguson, 2011).

The trajectory for academic success in college is established long before students matriculate. There is no substitute for early and rigorous academic preparation at the elementary and secondary levels. If students do not attain grade level proficiencies, particularly in math and reading by the eighth grade, they are much less likely to acquire the needed skills in high school (Kuh et al., 2006). Furthermore, students in high schools are earning diplomas but they are graduating without the knowledge, skills, and metacognitive strategies needed to be successful at postsecondary institutions (Barnes & Slate, 2013; Conley, 2010; Zhao, 2009). College readiness, the level of preparation a student needs in order to enroll and succeed without remediation in a credit-bearing course at a postsecondary institution, is currently inadequate (Conley, 2010; ACT, 2004). To accomplish the important goals of increased high school graduation rates, college

readiness rates, and higher education degree attainment, it is important to identify some of the factors that predict future academic success.

High School Predictors of College Success

There are many factors that contribute to college readiness. One of the most basic requirements included in the concept of college readiness is high school grade point average (HSGPA) which is a calculated average of grades earned in high school. Other predictors are course taking patterns, course rigor, the number of credits earned, and scores in standardized tests like ACT and SAT (Callan, Finney, Kirst, Usdan, & Venezia, 2006). Among these academic indicators, HSGPA and standardized test scores are considered two of the most predictive measures of college readiness (Radunzel & Noble, 2012).

High School Grade Point Average and College Success

In high school, every semester, students receive a grade point average (GPA) based on the grades earned in all their classes during that semester. The GPA is calculated by dividing the total number of accumulated grade points by the total number of credit units, thus measuring an average of the grades earned in school. Traditionally, HSGPA is calculated on an unweighted scale which does not take into account the difficulty of a student's coursework. The grade A represents a 4.0 irrespective of whether it was earned in an Advance Placement (AP) or Honors class or a lower difficulty level class. In contrast, weighted GPA is often employed by high schools to better represent students' academic accomplishments and takes into account course difficulty or challenging classes. In a weighted GPA, grade A usually represents a 5.0. The cumulative HSGPA is an average of all the final course grades of a student throughout high school, beginning with freshman year and is used to measure the overall performance of the student in high school (Fletcher, 2015).

Several studies have documented the importance of HSGPA for predicting college readiness (Belfield & Crosta, 2012; Geiser & Santelices, 2007; UCCCSR, 2014). Maintaining a HSGPA higher than a 3.0 is correlated with enrolling in and successfully completing credit-bearing, entry-level college courses (Hein & Smerdon, 2013). A study conducted with 79,785 freshmen at the University of California tracked four-year college outcomes, including cumulative college grades and graduation, to examine the relative contribution of HSGPA and standardized tests in predicting longer-term college performance. It was found that HSGPA was consistently the strongest predictor of four-year college outcomes for all academic disciplines, campuses, and freshman cohorts (Geiser & Santelices, 2007).

Strong HSGPAs have also been correlated with other high school achievements, such as AP exam scores, SAT scores, and ACT scores (Ewing, Camara, & Millsap, 2006; Noble, Roberts, & Sawyer, 2006). They have further been associated with many postsecondary outcomes, including first year GPA, credits earned, retention, second-year grades, cumulative college GPA, and eventual graduation (Belfield & Crosta, 2012; Geiser & Santelices, 2007; Noble & Sawyer, 2002). According to the findings of a study conducted across thirty-three institutions and a total of 122,916 students, it was found that students with strong cumulative HSGPAs were more likely to succeed in college than students with low cumulative HSGPAs (Hiss & Franks, 2014).

There have also been challenges to using HSGPAs as predictors of college readiness (Hein & Smerdon, 2013). High School GPA’s have been viewed by researchers affiliated with the College Board as an unreliable criterion for college admissions owing to the differences in grading standards across high schools. It must be noted, however, that the College Board is the purveyor of the SAT and AP exams. Researchers affiliated with the College Board have raised

concerns about grade inflation, which is viewed as limiting the reliability of HSGPA as a criterion for college admissions (Camara, Kimmel, Scheuneman, & Sawtell, 2003). High school grades lose some of their value in differentiating students as increasing number of college-bound students report GPAs near or above 4.0. In contrast, standardized tests are seen as methodologically rigorous, providing a more uniform and valid yardstick for assessing student ability and achievement (Camara & Michaelides, 2005). This is resulting in admissions test scores, course rigor, and other information to also become criteria in college admissions (Camara et al., 2003).

In a study examining the predictive weights of ACT scores and high school grades for selected indicators of college success, Noble (2003) suggested that HSGPA should carry greater weight than ACT scores if institutional goals include an acceptable final GPA by their college graduates. However Robbins, Allen, Casillas, Peterson, and Le (2006) suggested that ACT scores should carry greater weight than high school grades if institutional goals prioritize degree attainment.

Gender, Grade Point Average, and Major

In a 2014 research report, female students who graduated from high school in 2013 averaged higher HSGPA than their male counterparts in all subjects, but male graduates earned higher scores on the math and science sections of the ACT (Buddin, 2014). In another study Radunzel and Noble (2012) reported the differential effects of gender groups on ACT and HSGPA for predicting long-term college success. College success rates, including degree completion rates, were typically higher for female students than for male students. For example, the typical six-year bachelor's degree completion rate across four-year institutions was nearly 10% higher for female students than for male students (46% vs. 37%). This was measured using

both ACT score and HSGPA jointly, which improved prediction accuracy and success rates for male and female students for most of the outcomes over those based on HSGPA alone (Radunzel & Noble, 2012).

There also tend to be gender differences in enrollment by major, with male students overrepresented in majors linked to occupations such as law, medicine, and engineering (Pascarella & Terenzini, 2005). In research by Kobrin, Patterson, Shaw, Mattern, and Barguti (2008) the second-year performance data of 39,440 students were used. The study was conducted in 66 colleges, representing regions all over the U.S., and showed differences in the distribution of female and male students in the various academic majors. For example, gender differences were found within the engineering and architecture fields, in which 6% of all female versus 23% of all male students chose to major. It was also found that students with the highest HSGPAs were admitted in the biological and biomedical science majors. Across the majors, there tended to be less error in prediction when the SAT was used alone compared to when the HSGPA was used alone. The SAT, as well as HSGPA, also showed the greatest over prediction of cumulative second-year college GPA for undeclared students, indicating that these students displayed much weaker performance in college than their high school performance would have predicted (Kobrin, Patterson, Shaw, Mattern, & Barguti, 2008).

Ceci, Williams, and Barnett (2009) noted that female and male students tended to take the same number of advanced mathematics and science courses through high school and that female students often received higher grades. Nevertheless, due to personal decisions or social pressures, female students tended to opt out of pursuing more mathematically intensive careers and instead chose more people-oriented careers in medicine or biology (Ceci et al., 2009).

Course-Taking Patterns

The courses students take in high school are important predictors of their success with regard to postsecondary ambitions (Baker, Gratama, Peterson, & Boatright, 2008). Effective guidance and planning is necessary for students to fully understand the courses they need to take in high school for their postsecondary plans. According to Somerville and Yi (2002), the actual alignment between a college-ready curriculum and high school graduation requirements was lacking. There was more agreement on the number of courses than on the types of courses associated with a college-ready curriculum. However this trend is changing; there have been great improvements in alignment between a college ready curriculum and high school graduation since the introduction of the Common Core State Standards (CCSS) (Liebtag, 2013). The CCSS are a set of national K-12 standards which were developed by the National Governors Association and the Council of Chief State School Officers as a nationwide initiative to improve students' college and career readiness. Content experts, teachers, and researchers came together to write a set of K-12 standards in English and mathematics (Gewertz, 2010). These standards help ensure that students in every school acquire the knowledge and skills critical to college and careers in the global economy (Conley, 2010; 2014).

It has been recommended that to be ready for college; students should not only take a minimum number of high school courses, but also take into account the nature and quality of the courses they take. Thus, it is also the level of their rigor that is important and not just the number of courses that determine if students will be ready for college and work (ACT, 2004; 2012). The ACT Assessment results of 2004 high school graduates demonstrated the benefits of taking the core curriculum (i.e., English language arts, math, science, and social studies) over taking less than the core. Students accrued greater benefits when they took more courses than were required

by the core curriculum. The percentage of high school graduates who took the ACT and met the benchmark for college English composition took four years of English plus a speech course. They scored three points higher than students who took only the four years of English. Similarly, taking rigorous coursework beyond the mathematics core greatly increased student success at meeting the ACT Benchmark for College Algebra (ACT, 2004; Hein & Smerdon, 2013).

Dual-Credit and Other Advanced Coursework

Dual credit is a type of course taking pattern that allows secondary students to earn high school and college credit simultaneously for the same course (Hoffman, Varga, & Santos, 2009). Over time, states have increasingly utilized this curricular strategy as a way to bridge the gap between high school and postsecondary for all (Hughes & Rodriguez, 2012). A growing body of literature suggests that dual-credit participants outperform peers who do not participate in dual-credit enrollment with respect to postsecondary outcomes (Speroni, 2011; Giani, Alexander, & Reyes, 2014).

The Advanced Placement (AP) and International Baccalaureate (IB) programs provide advanced-level courses instructed by specially trained teachers; scores earned on exams associated with AP and IB courses determine their eligibility to receive college credit (Callahan & Hertberg, 2008). In schools that offer AP courses, students who are willing to challenge themselves with college-level coursework, may enroll in these classes that are based solely on student performance in their final exams (Klopfenstein, 2004). Research shows scoring a three or higher on AP final exams is positively correlated with college enrollment and persistence (Klopfenstein & Thomas, 2005). However studies have found that rapid growth and openness to all levels of students may explain why AP students were not passing the AP exams (Duffett & Farkas, 2009).

In contrast, IB is a two-year program of study that includes coursework, essay, community service, and exams. Regarding IB as a predictor of college success, a study was conducted on a population of about 100,00 with both IB and non-IB students. The findings indicated that IB students earned higher HSGPAs (4 to 7 % higher) than non-IB groups. They also graduated at higher rates (1-11%) compared to non-IB groups (International Baccalaureate Global Policy & Research, 2010)

Transition-Orientation Programs

More than 50% of students entering two-year colleges and nearly 20% of those entering four-year universities are placed in remedial classes and 40% of students seeking a bachelor's degree will not finish in six years (Complete College America, 2012). A review of college readiness indicators conducted by the UCCCSR suggested that postsecondary performance and persistence depends not only on the academic readiness of the individual student but also on the extent to which there is a fit between a student's needs and the college environment and other noncognitive factors (Sablan, 2014). In particular, students must navigate issues such as financial aid, transitioning and social integration into college, as well as personal situations that may distract them from persisting or succeeding in their college classes (UCCCSR, 2014).

The concern that students rapidly adapt to the college environment and arrive better prepared and more college ready on the first day of college classes has led to the development and implementation of various types of college transition programs. The nature, content, and implementation length of such programs may vary widely. Depending on the goal of whether to offer minimal academic counseling, college information and mentoring, or a more comprehensive program which offers a broad array of intensive college preparatory services, there may be some overlap and different terminology may be used (U.S. Department of

Education, 2011; Texas Course Redesign Project, 2011). The various terms used include bridge, transition, intervention, or orientation programs. Due to the scarcity of research and lack of any standardization, the terms for the programs may differ and be used interchangeably, depending on the institution where the program is implemented. However, the goal of a transition pathway to college remains constant among all of these programs.

Researchers estimate that there are thousands of college transition programs in the U.S. (Gandara & Bial, 2001). A 1994 survey on Precollegiate Programs for Disadvantaged Students at Higher Education Institutions, sponsored by the U.S. Department of Education, found that approximately one-third of the postsecondary institutions sampled operated a transition program (Chaney, Lewis, & Farris, 1995). One national study used the National Education of Longitudinal Study (NELS) data to compare high school students interested in pursuing postsecondary education and who participated in transition programs with interested students who did not participate. The findings revealed that participants in transition programs were nearly twice as likely to enroll in a four-year college as non-participants (Horn & Chen, 1998).

Approaches to Transition-Orientation Programs

Currently, a range of strategies are used in transition programs to attempt to address a wide variety of student needs regarding college readiness (Venezia & Jaeger, 2013). Almost all orientation programs are designed to help entering freshmen in their transition from high school to higher education. According to Sablan (2014), orientation/transition or bridge program approaches could be characterized in three ways: program participants; curriculum; and length.

Program participants. One distinction among various orientation and transition programs is the target population. Some programs may be designed specifically for the first-generation, low-income, or minority students (Kallison & Stader, 2012). Different groups of

incoming students, for example, the academically underprepared, honors students, *at risk*, minorities, or students within a specific major may be targeted with programs reflective of the unique needs of each group (Price, 2005).

Likewise other efforts may be designed specifically for students majoring in fields such as Science, Technology, Engineering, and Mathematics (STEM) or non-STEM fields such as Education, Psychology, Journalism and others. Another focus could be students who are in need of further academic support based on such indicators as placement tests and HSGPA/ACT scores (Kezar, 2000). Because the target population reflects different college readiness needs, programs are designed quite differently.

Program curricula. This approach is based on the type of preparation needed by students to transition to postsecondary institutions. It includes various components like those programs addressing cognitive skills, such as critical analysis, reasoning, and problem-solving skills. Accelerated instruction often addresses identified academic deficiencies, typically in reading, writing, and/or math. College preparation training may also be designed to ease students' emotional and psychological adjustment to the college environment.

Academic behaviors and non-cognitive skills such as time management, study skills, and personal responsibility are all habits for college success and are incorporated in transition program (Conley, 2008; Kezar, 2000). Also included in these programs are contextual skills, such as college knowledge and awareness of higher education processes such as admissions, financial aid, and campus organization.

Length of implementation and activities. There are programs of varying lengths. These include short duration (one week or less) orientation sessions, medium approach multiple-week summer bridge programs, freshman year seminars, and specific course loads. The third approach

is the long duration orientation programs which could be yearlong or include complete undergraduate academic interventions (Sablan, 2014; Wischusen, Wischusen, & Pomarico, 2011).

The types of activities and services within these programs vary across institutions and programs (Strayhorn, 2011). Some programs offer minimal academic counseling while more comprehensive programs offer a broad array of intensive college preparatory services (Gandara & Bial, 2001). There has been limited research on the effectiveness of orientation programs as very few of them have been well evaluated. Many programs do claim success, although these claims are anecdotal and may not be based on research practices. Among those programs that have been independently and rigorously evaluated, there may still be differences in program practices, intensity, and target populations, making it difficult to replicate the program with equal success in a different setting (U.S. Department of Education, 2011). Examples of some well-assessed freshman orientation programs are included below.

Short-term orientation programs. A Biology Intensive Orientation for Students (BIOS), *boot camp* is a week-long program that was established at Louisiana State University in 2005 to help freshmen biology majors successfully transition into college. It is referenced as a boot camp because it provides an intense and transformative introduction to an actual college class. It combines content lectures and examinations for BIOL 1201, Introductory Biology for Science Majors, as well as learning styles assessments and informational sessions to provide the students with a preview of the requirements of biology and the pace of college. Biology Intensive Orientation for Students has received national acclaim from organizations such as the American Association for the Advancement of Science and has been replicated at over 30 universities nationwide (Wischusen & Wischusen, 2007).

Another program similar to BIOS, in that it is short and content-intensive, is the Discover Engineering (DE) Program at the Massachusetts Institute of Technology. This program is four to five days long and, apart from its intensive content, includes faculty and graduate student participation in the program activities as well as social activities. After participation in the program, enrollment in engineering related postsecondary courses in their first year of the university went from 29% to 72% of the entering class (Thompson & Consi, 2007).

A freshman bridge program offered at Arizona State University, included a seminar course format. It was created by the Office of Minority Engineering Programs to increase enrollment and retention of minority engineering students. The retention rates for students in the first year were 66% for program participants and 54% for nonparticipants (Ryes, Anderson, Rowland, & McCartney, 1998).

The University of South Florida FORTRAN Programming Course is a boot camp for undergraduate computer science and engineering majors. It provides a three-day workshop to prepare students for the mandatory first course in the major. Using matched sampling, Fujinoki, Christensen, and Rundus (2001) demonstrated that students who participated in their program were 2.7 times less likely to drop the required course than non-participants.

Medium length orientation programs. The medium length approach generally reflects multiple week summer bridge programs that are more expensive and time-consuming for university faculty and staff. Sablan (2014) contended that very little empirical research exists pertaining to Summer Bridge Programs (SBP), despite their ubiquity. The University of California, Los Angeles Freshman Seminar Program/Transfer Summer Bridge is a six-week program. It includes math, English composition course, a general education course, as well as a

professional development workshop. The purpose is to explore academic, social, and cultural dimensions of university life (Sablan, 2014).

The changing field of technology and online learning presents potential opportunities and challenges to SBPs. A recent example of an SBP that utilizes online technologies is the Early Start Program (ESP) at the California State University system. The goal is to raise students' academic preparation through online courses. This presents another transition option for struggling students (Sablan, 2014).

Long term orientation programs. The long, comprehensive intervention programs tend to be the most *student centered* in the sense that they follow and support students longer because they are embedded into the high school or college academic program itself. A long approach to college readiness has its origin in the 1960s with the development of the Federal TRiO programs, particularly Upward Bound (Kallison & Stader, 2012). The Federal TRiO Programs (TRiO) are administered and funded by the U.S. Department of Education. They are a set of federal educational interventions started during the Lyndon B. Johnson administration to address educational inequality among the impoverished. They include eight programs designed to provide services for individuals from disadvantaged backgrounds. One of them, the Upward Bound program, presently focuses on preparing high school students during their secondary years for college applications (Kallison & Stader, 2012).

Upward Bound, a part of the Federal TRiO programs, started in 1965, has been studied using rigorous evaluation methods (University of Montana, 2003). However, the studies have revealed mixed findings. Participating students earned more high school, math, and social studies credits compared to students not involved in the program. However other findings indicated that Upward Bound did not appear to influence students' in-school behavior, participation in

extracurricular activities, GPA, or high school credits earned in English or science. Further, the students were no more likely to attend a postsecondary institution than a comparison group of students. However if they did attend postsecondary institutions, then they earned more non-remedial credits from four-year colleges and were more actively engaged in college life (Sablan, 2014).

Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) is another federally funded, long-term program that is intended to serve an entire cohort of students, beginning no later than the 7th grade. The program is designed to follow a cohort of students through high school. Program components are designed by local schools and their partners. Several GEAR UP programs are housed on college campuses and include workshops, classes, field trips, tutoring or mentoring, college preparation, and special events that take place during the school year and in the summer months (Lieber, 2009).

Another program, AVID (Advancement via Individual Determination) targets students in the academic middle who are typically the first in their families to go to college, have academic records that may fall short of their high potential, and indicate a willingness to work hard in a more rigorous curriculum. Instead of remediation, AVID students enroll in honors, Advance Placement (AP), and accelerated courses and also learn to organize and strengthen critical thinking skills (Lieber, 2009).

Summary

Research has shown numerous predictors for college success at the high school level. The most frequently noted ones are HSGPA and scores on standardized tests like ACT, SAT, and advanced coursework. Attempts to prioritize among different college readiness indicators have been made. Some steps students could take to improve their college readiness during high school include, maintaining a HSGPA higher than a 3.0 or a B average in relevant standard high school courses. Further, it could involve taking a core curriculum in relevant subject areas in high school, taking more rigorous courses, taking advanced courses in relevant subject areas in high school, and meeting ACT College Readiness Benchmarks in all four subject areas in eighth grade. A specific course-taking pathways or participation in dual enrollment programming is also positively correlated with college enrollment and persistence.

Because the retention of students at the college or university is of increasing importance, postsecondary educational leaders have developed and implemented various transition, orientation, or bridge programs. While each type of program tends to focus on a distinct group of students and to emphasize different aspects of college readiness, there is considerable overlap in the strategies used in helping students have access to, be prepared for, and succeed in postsecondary schooling. Increasing the rate of college or university graduation is essential to the economic success of the students, state, and nation. Transition programs have a crucial part to play in this dynamic. The types of activities and services, the length of time and the ways in which these transition, orientation or bridge programs are administered vary greatly across institutions and programs.

CHAPTER III

Methodology

The purpose of this study was to examine the cumulative high school grade point average (HSGPA) of students enrolled in the various Nevada-Freshman Intensive Transition (Nevada-FIT) camps to identify if differences existed in the means of HSGPA across the various camps the students voluntarily selected for enrollment. An additional purpose was to identify the differences in mean HSGPA between the genders of the students. Two research questions guided the study:

1. When groups are established by Nevada-FIT camp membership, are there significant differences in cumulative means of HSGPA among the groups?
2. When groups are established by gender, are there significant differences in cumulative means of HSGPA between the groups?

The purpose of this chapter is to present the sources of data and the procedures used to respond to the research questions. It includes a description of the Nevada-FIT camps, (Biz-FIT, CABNR-FIT, E-FIT, Science-FIT, Health-FIT, J-FIT, Psych-FIT, and FIT4Learning) the source of the existing data. This is followed by the research design, including the research questions. The next section describes the data source and collection, which is followed by the data analysis which was conducted. Finally, the methodology is summarized.

Description of the Nevada-FIT camps

Eight Nevada-FIT camps were offered in August, 2014. Each camp was designed and implemented by the staff of different departments, colleges, schools, or divisions of the university. A description of the intent of each camp is provided below.

Biz-FIT was available to College of Business freshmen who were pre-business majors, planning to declare a specific business major in one of the following programs: Accounting, Information Systems, Economics, Finance, Business, Management and Marketing. It was designed with several complementary purposes. The first was to help students navigate through their entry into the university, specifically by helping students implement some success education strategies and use campus resources. Making connections with faculty and staff was also a goal. Finally, Biz-FIT was designed to introduce students to the expectations of the business world they would enter after graduation.

CABNR-FIT was offered by the College of Agriculture, Biotechnology, and Natural Resources and was available to students with the following majors: Biochemistry and Molecular Biology, Nutritional Sciences, Agricultural Science, Environmental Science Veterinary Science, Ecology and Management. The challenge in designing CABNR-FIT was that some of the subject majors, like biochemistry and nutrition, place a heavy emphasis on lab work in their programs of study, whereas natural resource majors tend to involve fieldwork. Therefore, it was difficult to create the experience that the smaller representation of natural resources students would have in their academic program. Taking all of this into consideration, the focus of CABNR-FIT was to introduce students to the academic expectations associated with their majors while introducing them to the requirements of working in the laboratory.

E-FIT was offered by the College of Engineering and was available to students with a declared major in the following subjects: Engineering (BioMedical, Chemical, Civil, Environmental, Computer Science, Electrical, and Mechanical), Engineering Physics and Materials Science. It was designed to be college-wide and help students understand postsecondary expectations. There was recognition that some of the students who enroll in

engineering are *smart* but perhaps did not have to work very hard in high school, so do not believe they have to study much to be successful at the university level. The camp provided opportunities for students to take responsibility for their own learning. There was also recognition that the students are dealing with many other things (e.g., living away from home for the first time, more "free" time, large classes, and different expectations), therefore learning to manage their time effectively was also a focus.

Science-FIT was offered by the College of Science and included two tracks. One was a life science track for biology, neuroscience, and molecular microbiology and immunology majors; The other was a physical sciences and engineering track for majors in atmospheric sciences, chemistry, physics, all the earth sciences, and the three engineering programs in the earth sciences. Extensive academic material was delivered in a short period of time. Additionally, they used actual exams so that students would have an idea of the difference between a university-level exam and what they were used to in high school.

Health-FIT was offered by the Division of Health Sciences and was designed to give students a taste of the Community Health Sciences by providing the various academic content areas the students would experience during their first year or two in the program. Additionally, the intent was to introduce students to the various faculty in the department, the resources on campus and demonstrate that college is not grade 13.

J-FIT was available to students with a declared major in journalism. It was designed to address three things: use of data; avoidance of conflict; and the tendency to procrastinate. Journalism majors frequently struggle with math and do not perceive that math is required in journalism and also do not seek assistance. Therefore, part of J-FIT was to encourage students to seek out the help they need to succeed academically. J-FIT was also designed to ensure that

students know at the start of their education what will be expected once they get into the workplace with regard to conflict avoidance. A common theme running through all the Nevada-FIT camps was procrastination which was frequently associated with not prioritizing school work. For journalism students, procrastination also involves the adrenaline rush of having to get something done on *deadline.* An additional goal of J-FIT was to get a jump start on the major curricular restructuring that occurred in various journalism majors. The freshman entering in Fall, 2014 were the first to go through the new curriculum, and J-FIT was designed to launch the redesign.

Psych-FIT was specific to the Department of Psychology, in contrast to the other Nevada-FIT camps which reflected a college-wide emphasis. The underlying principle of Psych-FIT was to build a very intensive experience based on psychology and learning theory, so students became part of the learning process with an all-inclusive relationship between student and the instructor.

FIT4Learning was offered by the College of Education and was available to students with a declared major in Human Development and Family Studies, Integrated Elementary Teaching and Secondary Education. It was designed to provide help for students during their first semester in college and contribute to the *greater good* of the university.

Research Design

The purpose of this study was to determine if there were any differences in mean cumulative HSGPA of students based on their membership in the various Nevada-FIT camps. An additional purpose was to determine if there were differences in mean cumulative HSGPA of students based on their gender.

It was a quantitative descriptive study with a post-facto design, in which existing student data from the voluntary student participation in the five-day boot camp offered in Fall 2014, were used for data analysis. Existing data were utilized to explore differences in relation to the boot camps and grade point average. Descriptive statistics were used to report demographic characteristics of the enrolled freshmen students. Quantitative analysis was done to examine the cumulative HSGPA of students enrolled in each of the Nevada-FIT camps and to identify if relationships existed among the cumulative HSGPA, gender, and the specific camp the student selected for enrollment.

Data Source and Collection

The existing institutional data used for this study included the following information: the camp which the student attended; gender; and cumulative HSGPA. Access to student information was granted for this study after approval by the university Institutional Review Board (IRB) which included the Director of Institutional Research approval. When students apply to the university, they must request that a transcript from their high school be sent directly to the university. For the purpose of this study, the cumulative HSGPA was the overall performance indicator in the high school transcript.

The total number of participating students in the eight Nevada-FIT camps in Fall 2014 was 349. The students included 221 males and 183 females. Out of the 349 students, there were 62 who participated in Biz-FIT; 78 participated in Science-FIT; 42 participated in CABNR-FIT; 96 students participated in E-FIT; 27 participated in J-FIT; 14 students participated in Health-FIT; 20 participated in Psych-FIT and 10 students participated in FIT4Learning. In order to equalize the number of students and form more balanced groups of students in the camps, the data of students participating in J-FIT, Health-FIT, Psych-Fit, and FIT4Learning were re-

grouped together as Social Sciences. The Social Sciences group included a total of 71 students. In addition, there was a group of 55 students who applied to participate in a Nevada-FIT camp, but did not attend; this group was labeled as Other, thus reducing the number of groups from the original eight to a total of six. Thus the six groups were Biz-FIT with 62 students, Science-FIT with 78 students, CABNR-FIT with 42 students, E-FIT with 96 students, Social Sciences with 71 students and Other group with 55 students.

Data Analysis

The Statistical Package for Social Sciences (SPSS 16) software program was used for data analysis in this study. Quantitative analysis was done to examine the cumulative HSGPA of students who participated in the Nevada-FIT camps and to determine if differences existed in their mean cumulative HSGPA as well as to determine the differences in mean cumulative GPA when student membership was based on gender. The study involved two independent variables, which were the Nevada-FIT camps that the students attended and the gender of those students, and one dependent variable, which was the cumulative HSGPA of students.

The first research question, *when groups are established by Nevada-FIT camp membership, are there significant differences in cumulative means of HSGPA among the groups,* was analyzed initially by a one-way analysis of variance (ANOVA). It compared the six Nevada-FIT groups (i.e., Science-FIT, CABNR-FIT, Biz-FIT, E-FIT, Social Sciences and Other) of participating students, with regard to their cumulative HSGPA. Homogeneity of variance, an assumption which must be met for ANOVA whenever cell numbers are unequal, was tested with Levenes test. It was found to be not significant, however, it was borderline ($p = .051$), and cell numbers were unequal. Therefore, the non-parametric Kruskal-Wallis H test which rank orders scores and compares mean ranks to determine differences in performance was used. Since the

data met the assumption of Homogeneity of Variance (HOV), step wise multiple comparison post hoc test were then conducted. Post hoc tests were done for additional exploration of the differences among means, to provide specific information, on which group means were significantly different from each other (Kao & Green, 2008).

The second research question, *when the groups were established by gender, are there significant differences in the means of cumulative HSGPA between the groups* was analyzed using an independent t-test. The t-tests statistical significance, t value, means and standard deviations were the two primary outputs of this SPSS. An effect size was also calculated. Statistical significance indicated that the difference between group means was likely to represent an actual difference between means of corresponding populations. The effect size indicated whether that difference was large enough to be practically meaningful (Fradette, 2003). Since the number of males and females (n's) were not equal and the result showed no homogeneity of variance, the numbers in the SPSS t-test output labeled 'Equal variances not assumed' was used.

Rationale for using ANOVA, Kruskal Wallis H and t-test. The ANOVA was initially used to analyze the first research question. It helped to determine whether the mean of a dependent variable was the same in two or more unrelated, independent groups of an independent variable (Stevens, 1999). In other words, the test compared the mean cumulative HSGPA of students between the six groups of interest, and determined whether any of those means were significantly different from each other. Since Levenes test was found to be not significant and cell numbers were unequal, the non-parametric Kruskal-Wallis H test was used; this test rank orders scores and compares mean ranks to determine differences in performance, with higher subgroup mean ranks denoting better performance. The advantage of using ANOVA and Kruskal Wallis H test over *multiple* t-tests was that the former tests would identify if the

means were significantly different from each other, with a *single* test; they would further determine where those differences lay. Also, the Bonferroni correction for false positive as in the case of multiple t-tests would not be needed (Cohen, Manion, & Morrison, 2007).

The t-test was used because there were two groups. Thus, it was used to analyze the second research question, whether there were any differences in the means of cumulative HSGPA of students when the groups were established by gender (i.e., male and female).

Summary

This study is based on analyzing the existing institutional data of 349 students who participated in the various Nevada-FIT boot camps in the fall of 2014 and 55 students who applied, but did not attend a Nevada-FIT camp. The data included the camp which the student attended, gender, race, and cumulative HSGPA. The purpose was to identify if differences existed among the cumulative means of HSGPA, gender, and the specific camp the student selected for participation. A quantitative, descriptive study with a post-facto design was used. Descriptive statistics were used to report demographic characteristics of the participating freshmen students. Quantitative analysis was conducted using the ANOVA and Kruskal Wallis H test to compare the six Nevada-FIT groups (i.e., Science-FIT, CABNR-FIT, Biz-FIT, E-FIT, Social Sciences, and Other) with regard to their cumulative HSGPA. An independent t test was used to analyze the differences in the means of cumulative HSGPA of students when the groups were established by gender.

CHAPTER IV

Results

The purpose of this study was to examine the cumulative high school grade point average (HSGPA) of students enrolled in the various Nevada-Freshman Intensive Transition (Nevada-FIT) camps to identify if differences existed in the means of HSGPA across the various camps the students voluntarily selected for enrollment. An additional purpose was to identify the differences in mean HSGPA between the genders of the students. The Nevada-FIT academic boot camp is a five days intensive bridge program, which has been established to help reduce the learning curve related to the transition from high school to college. Two research questions guided the study:

1) When groups are established by Nevada-FIT camp membership, are there significant differences in cumulative means of HSGPA among the groups?

2) When groups are established by gender, are there significant differences in cumulative means of HSGPA between the groups?

This chapter is divided into five sections. The first section includes the demographics of the participants. The second section includes a description of the HSGPA. This is followed by the results of the one-way analysis of variance (ANOVA) and Kruskal Wallis H test to address the first research question. The fourth section includes the results of the t-test analysis to address the second research question. Finally, the chapter is summarized.

Demographics of the Participants

Eight Nevada-FIT camps were held in August, 2014. The eight camps were conducted by staff of various colleges at the University of Nevada, Reno. Data regarding the students were

obtained through the Office of Institutional Analysis. De-identified data analyzed included: camp, age, race/ethnicity, and gender.

Camp participation. Eight camps were conducted in August, 2014; each camp was associated with a different school, college, or division of the university. Biz-FIT was offered by the College of Business; E-FIT was offered by the College of Engineering; CABNR-FIT was offered by the College of Agriculture, Biotechnology, and Natural Resources; J-FIT was offered by the School of Journalism; Health-FIT was offered by the Division of Health Sciences; Psych-FIT was offered by the Department of Psychology within the College of Liberal Arts; FIT4Learning was offered by the College of Education; Science-FIT was offered by the College of Science.

A total of 349 students participated in the eight Nevada-FIT camps. There were 62 students (15.35%) enrolled in Biz-FIT. There were 96 students (23.76%) enrolled in E-FIT. There were 42 students (10.40%) enrolled in CABNR-FIT. There were 27 students (6.68%) enrolled in J-FIT. There were 14 students (3.47%) enrolled in Health-FIT. There were 20 students (4.95%) enrolled in Psych-FIT. There were 10 students (2.48% enrolled in FIT4Learning. There were 78 students (19.31%) enrolled in Science-FIT. In addition, there was a group of 55 students who applied to participate in a Nevada-FIT camp, but did not attend; this group was labeled as Other. The data analyzed for this study was based on 349 students who participated in a camp and the 55 students who applied, but did not attend, bringing the total number of participants to 404. See Table 1.

Table 1. Student Participation by Camp

Participation by Camp		
Camp	**Frequency**	**Percent**
Biz-FIT	62	15.35%
E-FIT	96	23.76%
CABNR-FIT	42	10.40%
J-FIT	27	6.68%
Health-FIT	14	3.47%
Psych-FIT	20	4.95%
FIT4learning	10	2.48%
Science-FIT	78	19.31%
Other	55	13.61%
Total	404	100%

For the purpose of analysis, to form more equal groups of students, the data of students participating in J-FIT, Health-FIT, Psych-FIT, and FIT4Learning were grouped together and renamed Social Sciences. The Social Sciences group included a total of 71 students or 17.57%. As a result, the data were analyzed as six groups: Biz-FIT, E-FIT, CABNR-FIT, Social Sciences, Science-FIT, and Other. See Table 2.

Table 2. Student Participation by Group

Participation by Group		
Group	**Frequency**	**Percent**
Biz-FIT	62	15.35%
E-FIT	96	23.76%
CABNR-FIT	42	10.40%
Social Sciences	71	17.57%
Science-FIT	78	19.31%
Other	55	13.61%
Total	404	100 %

Participation by gender. Of the 404 students, 183 (45.3%) were female and 221 (54.7%) were male. See Table 3.

Table 3. Participation by Gender

Participation by Gender		
Gender	**Frequency**	**Percent**
Female	183	45.3%
Male	221	54.7%
Total	404	100%

The participation by gender in each group is found in Table 4. The Biz-FIT group had 26 female and 36 male participants. E-FIT had 15 females and 81 males. CABNR-FIT had 23 females and 19 males. Social Sciences had 55 females and 16 males. Science-FIT had 41 females and 37 males. The Other group had 23 females and 32 males.

Table 4. Group Participation by Gender

Group Participation by Gender		
Group	**F**	**M**
Biz-FIT	26	36
E-FIT	15	81
CABNR-FIT	23	19
Social Sciences	55	16
Science-FIT	41	37
Other	23	32
Total	183	221

Participation by age. As illustrated in Table 5, the students' mean age upon admission ranged from a low of 17 years to a high of 23 years. Because of their small numbers, ages 20 through 23 were combined into one group. There were six students (1.49%) who were 17. The largest group was 18 year of age (70.3%), followed by 111 or 27.48% of 19 year old students.

The smallest age group represented in the data was 20 and above, which included only three students or 0.75%. Because the overwhelming majority of the students were age 18 or 19, the ages of the participants in each group was not noteworthy. See Table 5.

Table 5. Participation by Age

Participation by Age		
Age	**Frequency**	**Percent**
17	6	1.49%
18	284	70.3%
19	111	27.48%
20 & above	3	0.75%
Total	404	100%

Participation by race/ethnicity. Table 6 illustrates that White, non-Hispanic students represented the largest student group at 234 students (57.9 %). Hispanic students constituted the second largest student group with 83 students (20.5%), followed by 61 Asian students (15.1%) and 25 Black students (6.2%).

Table 6. Participation by Race/Ethnicity

Participation by Race		
Race	**Frequency**	**Percent**
White	234	57.9%
Hispa	83	20.5%
Asian	61	15.1%
Black	25	6.2%
Total	403	100%

As seen in Table 7, within each group, the race/ethnicity followed an overall pattern similar to Nevada-FIT as a whole. Specifically, Biz-FIT had a participation of 38 White students,

15 Hispanic students, followed by 7 Asian students and 2 Black students. The E-FIT had a participation of 55 White students, 19 Hispanic students, 15 Asian students, and 7 Black students. CABNR-FIT had a participation of 28 White students, 8 Hispanic students, 5 Asian students, and 1 Black student. Social Sciences had a participation of 43 White students, 12 Hispanic students, 9 Asian students, and 7 Black students. Science-FIT had a participation of 37 White students, 17 Hispanic students, 17 Asian students, and 7 Black students. The Other group had a participation of 33 White students, 12 Hispanic students, 8 Asian students, and 1 Black student.

Table 7. Participation by Group by Race/Ethnicity

Group Participation by Race/Ethnicity					
Group	**White**	**Hispa**	**Asian**	**Black**	**Total**
Biz-FIT	38	15	7	2	62
E-FIT	55	19	15	7	96
CABNR-FIT	28	8	5	1	42
Social Sciences	43	12	9	7	71
Science-FIT	37	17	17	7	78
Other	33	12	8	1	54
Total	234	83	61	25	403

High School Grade Point Average of Participants

In addition to the demographic information, HSGPA was collected for each participant. The mean HSGPA for all participants was 3.37. The mean HSGPA was calculated for each group. Biz-FIT group had a mean HSGPA of 3.16; E-FIT had a mean HSGPA of 3.42; CABNR-FIT had a mean HSGPA of 3.44; Social Sciences had a mean HSGPA of 3.33; Science FIT had a mean HSGPA of 3.51, and the Other group had a mean HSGPA of 3.34. See Table 8.

Table 8. Mean HSGPA by Group

Mean HSGPA by Group	
Group	**Mean HSGPA**
Biz-FIT	3.16
E-FIT	3.42
CABNR-FIT	3.44
Social Sciences	3.33
Science-FIT	3.51
Other	3.34
Mean of Mean HSGPA	3.37

Mean HSGPA by gender. Female students in the Science-FIT group had a mean HSGPA of 3.6. This score was followed by female students in the E-FIT and CABNR-FIT groups at 3.5 each. The next highest mean HSGPA was female students in the Social Sciences and Other groups and male students in the E-FIT and Science-FIT groups at 3.4 each. The male students in the CABNR-FIT, Other, and Social Sciences groups and the female students in the Biz-FIT group had a mean HSGPA of 3.3 each. The lowest mean HSGPA was 3.1 for males in the Biz-FIT group. See Table 9.

Table 9. Mean HSGPA of groups by gender.

Mean HSGPA of Groups by Gender		
Group	**F**	**M**
Biz-FIT	3.3	3.1
E-FIT	3.5	3.4
CABNR-FIT	3.5	3.3
Social Sciences	3.4	3.3
Science-FIT	3.6	3.4
Other	3.4	3.3
Mean of Mean HSGPA	3.4	3.3

Mean HSGPA by age. The largest group was the 18 year olds followed by the 19 year old students. As illustrated in Table 10, the 17 year age group had a mean HSGPA of 3.5. This was followed by the 18 and 19 year olds at 3.4. The 20 year olds had a low mean HSGPA of 3.1.

Table 10. Mean HSGPA by Age

Mean HSGPA by Age		
Age	**Frequency**	**Mean HSGPA**
17	6	3.5
18	284	3.4
19	111	3.4
20 & above	3	3.1
Total	404	3.35

Mean HSGPA by race/ethnicity. Tables 11 illustrates that White, non-Hispanic students, which represented the largest student group, had a mean HSGPA of 3.41. This was followed by the Asian students at 3.40. Hispanic students constituted the second largest student group; they had a mean HSGPA of 3.33 and they were followed by the Black students with a men HSGPA of 3.14.

Table 11. Mean HSGPA by Race/Ethnicity

Mean HSGPA by Race/Ethnicity		
Race	**Frequency**	**HSGPA**
White	234	3.41
Hispa	83	3.33
Asian	61	3.40
Black	25	3.14
Mean of Means	403	3.32

Research Question 1

When groups are established by Nevada-FIT camp membership, are there significant differences in cumulative means of HSGPA among the groups?

One-way analysis of variance (ANOVA) was first conducted to determine if there were statistically significant differences for mean HSGPA between the six Nevada-FIT groups. This involved the independent variable, which was the six Nevada-FIT groups and one dependent variable, which was the cumulative mean HSGPA of students. It compared the six Nevada-FIT groups (i.e., Science-FIT, CABNR-FIT, Biz-FIT, E-FIT, Social Sciences, and Other) of participating students, concerning their cumulative HSGPA.

Homogeneity of variance, an assumption which must be met for ANOVA whenever cell numbers are unequal, was tested with Levenes test. It was found to be not significant; however, it was borderline ($p = .051$), and cell numbers were unequal. Therefore, the non-parametric Kruskal-Wallis H test was used to rank order scores and compare mean ranks to determine differences in performance, with higher subgroup mean ranks denoting better performance. The Kruskall Wallis H (KWH) test was significant with Chi Square ($X^2 = 31.06$, $df = 5$, $N = 404$, $p < .001$). Table 12 presents the results with higher mean ranks indicative of higher HSGPA.

Table 12. Kruskal Wallis H Test for HSGPA for all Groups

Mean HSGPA of Groups by Gender		
Group	**Frequency**	**Mean Rank**
Biz-FIT	62	141.93
E-FIT	96	218.73
CABNR-FIT	42	221.65
Social Sciences	71	184.82
Science-FIT	78	243.06
Other	55	193.14

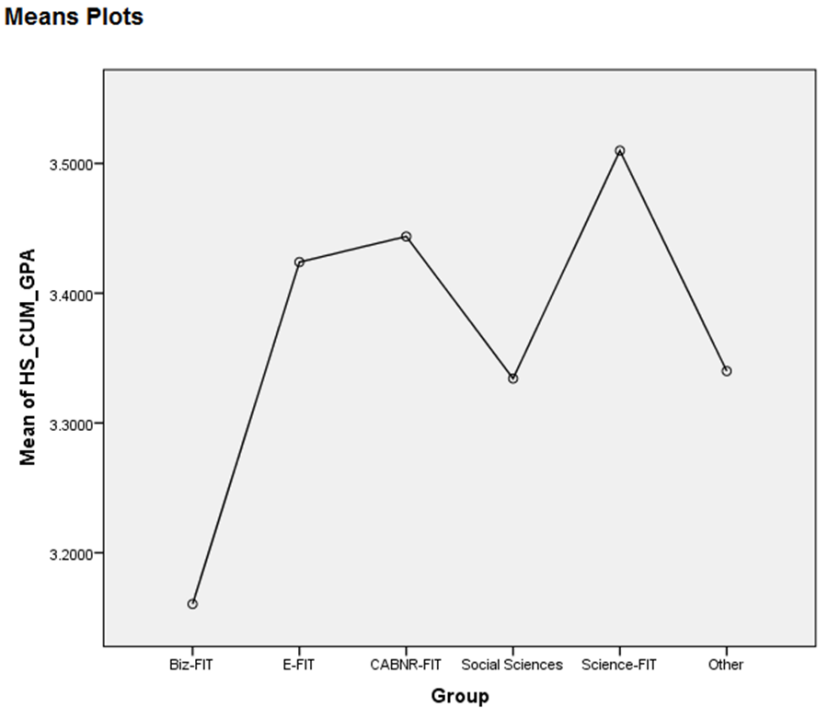
Figure 1 presents the results of a step wise multiple comparison post hoc analysis test to see where the differences occurred. The Biz-FIT group in subset one was significantly lower than the groups Social Sciences, Other, E-FIT and CABNR-FIT in subset 2. Additionally, Science-FIT was significantly higher than the Social Sciences and Biz-FIT groups. Thus there were four groups seen in descending order of their mean HSGPA, with Science-FIT being the highest, followed by CABNR-FIT, which was in turn followed by E-FIT and the Other group. Finally, the Social Sciences and Biz-FIT groups were lower with BIZ-FIT showing the lowest mean HSGPA. Thus the post hoc analysis showed significant differences between the Biz-FIT, Social Sciences and Science-FIT groups with Science-FIT showing a significantly better mean HSGPA than the Biz-FIT and Social Sciences group.

Figure 1. Mean Ranks and Homogeneous Subsets based on HSGPA

		Subset		
		1	2	3
Sample[1]	Biz-FIT	141.927		
	Social Sciences		184.817	
	Other		193.136	193.136
	E-FIT		218.729	218.729
	CABNR-FIT		221.655	221.655
	Science-FIT			243.058

Figure 2 illustrates the differences in the mean HSGPA between all the groups in graph format with the Biz-FIT showing the lowest mean HSGPA of 3.1 and Science-FIT showing the highest mean HSGPA of 3.51.

Figure 2. Mean HSGPA for all groups



Research Question 2

When groups are established by gender, are there significant differences in cumulative means of HSGPA between the groups?

The independent t test was conducted to compare the means of HSGPA by gender. The result, presented in Table 13, showed a statistically significant difference in the mean HSGPA by gender with females showing a significantly higher mean HSGPA than the males (females, n = 183, M = 3.43, SD = .35; males, n = 221, M = 3.33, SD = .42; $t(401.98)$ = 2.76, p = .006, d = .27). Levenes test was significant (p = .02 level). Therefore the output for equal variances not assumed was used. The effect size (Cohens d) was calculated to be .27 using the formula $d = \frac{M_1 - M_2}{SD_{pooled}}$ where $SD_{pooled} = \sqrt{\frac{\sum (X_1 - \bar{X}_1)^2 + \sum (X_2 - \bar{X}_2)^2}{n_1 + n_2 - 2}}$. This represents a small effect size (.2= small; 0.5=medium; 0.8= large).

Table 13. Independent t–test for gender

Independent t–test for gender				
Two-sample t test with equal variances				
Group	N	Mean	SD	Mean differences
F	183	3.43	0.34	0.11
M	221	3.327	0.42	
$t = 2.76$; $df = 401.98$; Levene's test: $p = 0.006$				

Summary of Results

Prior to addressing the main questions of whether there were differences in mean HSGPA according to camp and gender, it was necessary to analyze comparability of the six Nevada-FIT groups in this study to identify any systematic differences in key demographic variables that might influence the outcomes aside from HSGPA. The results showed differences in mean HSGPA between the six groups as well as gender. The largest race/ethnicity group in all the Nevada-FIT groups was White, non-Hispanic. The second largest group was Hispanic. Younger students showed the highest mean HSGPAs**.** Statistical analyses showed that HSGPA for the Science –FIT group was highest and the lowest HSGPA was seen in the Biz-FIT group. The HSGPA across all the groups for females was significantly higher than the males.

CHAPTER V

Discussion and Conclusions

The purpose of this study was to examine the cumulative high school grade point average (HSGPA) of students enrolled in the various Nevada-FIT camps to identify if differences existed in the means of HSGPA across the various camps the students voluntarily selected for enrollment. An additional purpose was to identify the differences in mean HSGPA between the genders of the students. The research questions were:

1) When groups are established by Nevada-FIT camp membership, are there significant differences in cumulative means of HSGPA among the groups?
2) When groups are established by gender, are there significant differences in cumulative means of HSGPA between the groups?

Statistical tests showed that the largest race/ethnicity group in all the Nevada-FIT groups was White, non-Hispanic. The second largest group was Hispanic. Differences in mean HSGPA were found among the six groups as well as groups established by gender. Statistical analyses showed that mean HSGPA for the Science-FIT group was highest. The mean HSGPA across all the groups for females was significantly higher than the males.

There were three notable findings in this study. One of the most notable findings of this study was that the overall mean HSGPA of all the groups was high at 3.37. The second notable finding was that the mean HSGPA for females was found to be higher than males. Another finding was that students participating in the Science FIT group had the highest HSGPA and students of the Biz-FIT, followed by Social Sciences group had the lowest HSGPA. This chapter is divided into four sections. The first is a discussion of the findings in relation to the literature.

The second section consists of the limitations of this study. This is followed by recommendations for future research and, finally, the conclusion of the study.

Discussion

The overall mean HSGPA in this study was 3.37 on a scale of 0.0-4.0; this was considered to be high. Several studies have documented the importance of HSGPA for predicting college readiness (e.g. Belfield & Crosta, 2012; Geiser & Santelices, 2007; UCCCSR, 2014). Studies have shown that maintaining a HSGPA higher than a 3.0 is correlated with enrolling in and successfully completing credit-bearing, entry-level college courses (Hein & Smerdon, 2013). Geiser and Santelices (2007) found that HSGPA was consistently the best predictor not only of freshman grades in college, the outcome indicator most often employed in predictive-validity studies but of four-year college outcomes as well. Strong HSGPAs have also been correlated with other high school achievements, such as SAT and ACT scores (Ewing et al., 2006; Noble et al., 2006). A student's HSGPA has further been associated with many postsecondary outcomes, including first year GPA, credits earned, persistence in college, second-year grades, cumulative college GPA, and eventual graduation (Belfield & Crosta, 2012; Geiser & Santelices, 2007; Noble & Sawyer, 2002). In studies conducted at both two and four-year institutions, it was found that having a higher HSGPA significantly improved chances of persisting, particularly for students from the low socio economic status (SES) / achievement groups. A student in the high SES / achievement groups with a 3.00 to a 3.50 GPA had a 93% chance of persistence. A student in the low SES/achievement group with a 3.50 to a 4.00 GPA had a 94% chance of persistence (Klepfer & Hull, 2012).

Gieser and Santileces (2007) tracked four-year college outcomes at the University of California, Berkley (UC), including cumulative college grades and graduation, to examine the

relative contribution of high-school record and standardized tests in predicting longer term college performance. It was found that HSGPA in college-preparatory subjects were consistently the best indicator of how students were likely to perform in college. The superiority of HSGPA in predicting long-term college outcomes was consistently evident across all academic disciplines, campuses and freshman cohorts in the UC sample. The findings of this study suggest that the students who enrolled in any of the Nevada-FIT camps had a high likelihood of postsecondary success, regardless of participation in a Nevada-FIT camp.

Another notable finding of this study was that the mean HSGPA of female students was higher (3.43) than males (3.33). This was consistent with findings from other studies (e.g. Buddin, 2014; Klepfer & Hull, 2012; Mattern et al., 2008; Young, 2004). In a 2014 research report, female students who graduated from high school in 2013 averaged higher HSGPAs than their male counterparts in all subjects (Buddin, 2014). Further, college success rates, including degree completion rates, were typically higher for female students than for male students. For example, the typical six-year bachelor's degree completion rate across four-year institutions was nearly 10% higher for female students than for male students (46% vs. 37%). This was measured using both ACT score and HSGPA jointly, which improved prediction accuracy and success rates for male and female students for most of the outcomes over those based on HSGPA alone (Radunzel & Noble, 2012). A plausible explanation for female students doing better than male students might be due to differences in noncognitive characteristics between the two gender groups. Potential reasons could include the hypotheses that female students tend to have better study habits, are more conscientious with regard to schoolwork, and attend class more frequently. They also may have greater academic motivation. All of these factors could be positively linked to college performance (Stricker, et.al., 1991; Wainer & Steinberg, 1992).

A third notable finding is this study was that students participating in the Science-FIT group had the highest HSGPA at 3.51; students of the Social Sciences group (3.33) followed by Biz-FIT (3.16) had the lowest HSGPA. It was also found that females, although in lesser numbers compared to males scored better than the male students. This finding was corroborated in a study by Ceci et al., (2009) who noted that female and male students tended to take the same number of advanced mathematics and science courses through high school but female students often received higher grades. Their study further found that due to personal decisions or social pressures, female students tended to opt out of pursuing more mathematically intensive careers and instead chose more people-oriented careers in medicine or biology (Ceci et al., 2009).

There were also gender differences in enrollment by major in our study, with a higher number of male students in E-FIT, Biz-FIT, CABNR-FIT, and Other group. There was an exception in the Science-FIT and Social Sciences group, both of which showed a higher participation by females compared to males. This was somewhat corroborated by other studies where males were overrepresented in majors linked to occupations such as law, medicine, and engineering (Pascarella & Terenzini, 2005), although Science-FIT was the exception in that there was a higher participation by females compared to males in this group. Another study which had a somewhat similar finding to our findings was conducted by Kobrin et al., (2008) in which the second-year performance data of 39,440 students were used. This study was conducted in 66 colleges, representing regions throughout the U.S., and showed a lower distribution of female students compared to male students in the various academic majors such as engineering and architecture fields, in which 6% of all female versus 23% of all male students chose to major. It is likely that the differences in the HSGPA relationships by major field are due to such factors as

the academic *culture* (e.g., male-dominated or highly competitive nature) of the different majors (Shaw, et al., 2012).

The findings by major and race/ethnicity showed that there was some variation in enrollment by the different racial/ethnic groups by major. Although not tested for statistical significance, White students showed the highest enrollment numbers across all the groups, followed by the Hispanic students, then Asian students and the lowest, Black students. This was not consistent with other studies where Asian students tended to cluster around the STEM-focused disciplines. White students were most concentrated in business, management, and marketing; engineering/architecture; while Black students showed a larger distribution in the humanities, liberal arts, and social sciences (Shaw et al., 2012).

Limitations of this study

There are a few limitations of this study that warrant mention. First, the data for this study involved one western university. Using more than one college/university would have strengthened this study's potential for research generalizability. At the time of the study, no other transition program comparable to Nevada-FIT was found, thus preventing attaining data from more institutions or for more students.

A second limitation of this study was that the existing data consisted of undergraduate students enrolled in eight of the Nevada-FIT boot camps; no comparison group was constructed. Thirdly, while many of the groups studied had a sufficient number of students to examine and from which to draw conclusions, some camps (majors) did not have enough students to draw broad conclusions. Due to this unequal number of students in the various boot camps, in order to equalize the student distribution for a more accurate analysis, the students who belonged in the social science category (i.e., J-FIT, Health-FIT, Psych-FIT, and FIT4Learning) were collapsed

into one group, thus bringing down the total number of Nevada-FIT groups to six from the original eight. This also prevented the identification of students specific to each of the majors represented in the social science group. Additionally, it would have been useful to study student gender and race/ethnicity by major simultaneously; however, small sample sizes in many of these groups by major prevented this fine-grained level of analysis.

Implications and Recommendations for Further Research

Future research should replicate the analyses in this study with a different or broader sample of students to determine the reliability and generalizability of the results. Also, it would be useful to have a control group as well as include data regarding students first year and second year college GPA to be able to analyze the findings of the Nevada-FIT program with regard to student retention and college persistence. In the long term, it would be valuable to investigate the relationships of students HSGPA to timely graduation to determine if there were any differences in timely graduation according to the major/camp in which students enrolled. It would also be valuable to determine the differences in the graduation rates between the students in the 2.0-3.0 cumulative HSGPA ranges and those in the 3.01-4.0 cumulative HSGPA ranges to better understand anticipated academic performance or progression to timely graduation.

Conclusion

Findings from this study provide an important contribution to the more robust Nevada-FIT evaluation underway. Overall, the students who voluntarily participated in one of the Nevada-FIT camps entered the university with a HSGPA that suggested the students would be successful in university level studies. This was particularly found for the freshmen students in the Science-FIT group who had the highest mean HSGPA of all of the camps. Likewise, the mean HSGPA of females was significantly higher than those of males. Although the male

students enrolled in Biz-FIT had the lowest HSGPA, they still were above the 3.0 HSGPA associated with postsecondary success. Of note, the students who applied for, but did not participate in a Nevada-FIT camp (i.e., the Other group) were not significantly different from the students who participated in a camp.

Nevada-FIT was designed to reduce the learning curve in making the transition from high school to college. This purpose is applicable to all students as they move from a relatively passive secondary educational system to a more active educational environment associated with colleges and universities. However, it would be particularly important to ensure that students who may not be as prepared for postsecondary education, as measured by a HSGPA closer to or below 3.0, experience an academic boot camp. Therefore, findings of this study suggest that recruitment students with a broader range of academic preparation be undertaken.

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