ELL STUDENTS' SUCCESS IN HAWAIʻI:

IDENTIFYING FACTORS RELATED TO UNDERGRADUATE DEGREE ATTAINMENT

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ABSTRACT

In the United States, English Language Learner (ELL) students, defined as having limited English proficiency, are required to take remedial education during their college years. The current research studied the factors that affect ELL students' post-secondary graduation success rates in the State of Hawai'i. Graduation success was measured in terms of completing the requirements within three years or six years for an associate or bachelor's degree, respectively. This study covered students' last two years of high school and primarily their first year of college. Three logistic regression models were developed with variables included from high school and college in order to predict students' readiness for college study and graduation success rates. Results indicated that HSA test scores, number of years enrolled in AP classes, credits earned beyond 25 credits, first English course enrolled in during freshman year, and whether or not a student received Pell grant support were statistically significant predictors. The findings primarily reflected the importance of English proficiency and Pell grant support in students' graduation success. Moreover, the effect of ELL status on students' graduation success rates was not the same at different levels of students' socioeconomic background. These findings are discussed in terms of their theoretical and practical importance.

TABLE OF CONTENT

CHAPTER I
OVERVIEW OF THE RESEARCH PROBLEM

Introduction

The United States has a culture of diversified ethnicity and languages. This diversification provides abundant human capital to the society. In 2012, *USA Today* reported that the U.S. was ranked in top 10 of most educated countries in the world. These countries have the highest proportions of residents aged 25 to 64 with a graduate education (Frohlich, 2014). Economically, the U.S. has been ranked in top 5 economies in the world for 2013 and 2014 (Serenbetz & Frohlich, 2014). Serenbetz and Frohlich (2014) also mentioned that the United States ranked a fourth place in terms of its very competitive labor market and sophisticated business settings. There is a close relationship between the education and the economy. In order to stay competitive in the world in terms of living environment, academic outcomes, and economic prosperity, it is important to invest time and effort in human capital. Educating and preparing the younger generation to be good citizens and have better communication skills can develop strong leadership and an educated workforce for the country. In early 2009, President Obama set a goal to increase the number of college graduates, so the U.S. would once again have the highest proportion of graduates in the world by 2020. The targeted age group falls between 25 and 34 years old, which is often used for key international comparisons. In order to achieve this goal, the number of graduates in the U.S. holding an associate's or bachelor's degree is expected to increase by 50 percent, or eight million young adults, in a decade (U.S. DOE, 2011).

Decrease in completion rates. During the 1960s and 1970s, there were also increases in community college enrollments, as people who born during the baby boomer period reached college age (Brock, 2010). In addition to this, the wage premium increased during the 1980s and early 1990s from 40 percent to 70 percent. The wage premium is a ratio of the earnings between those individuals holding a bachelor's degree and those individuals with no degree. This encouraged many more high school graduates to enroll in higher education. However, Bound, Lovenheim, and Turner (2009) commented that attainment of bachelor's degrees has decreased, for example, from 45% in the 1970s to 40% in 1990s. Similarly, Brock (2010) noted, "Although access to higher education has increased substantially over the past forty years, student success in college – as measured by persistence and degree attainment – has not improved at all" (p.109). As the degree completion rates has been decreasing in the United

States over the past decades, the completion rates became a growing concern for the nation ("Decreasing graduation", n.d.).

Increase in remedial education. Remedial education has been identified as one of the reasons for low degree attainment. An analysis from the Department of Education's National Education Longitudinal Study suggested that "… remedial education delays time-to-degree for students in two-year colleges" (Brock, 2010). Brock also noted remedial education is a gatekeeper course which either delays graduation time or decreases the college completion rate.

In recent decades more academically unprepared students have been admitted into postsecondary schools for a variety of reasons to be discussed in later section. Even if students were eligible for admission and enrollment, many were not academically ready for postsecondary studies. In order to help equip students for postsecondary study after admission, remedial education was introduced in higher education settings (Bound, Lovenheim, & Turner, 2009; Brock, 2010; National Center for Public Policy and Higher Education [NCPPHE], 2010). In general, remedial and developmental education refers to courses that are below college level and bear no college credits. When students came to campus underprepared, they were required to take remedial and developmental courses to improve their basic learning skills. Approximately 60% of students admitted to public two-year colleges, and 25% of admitted students at four-year universities were required to take at least one year of remedial coursework (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006).

By the mid-1990s, nearly all public two-year institutions and almost 80% of public four-year institutions offered remedial education. According to Parsad and Lewis (2003), in 2000, 28% of entering freshmen enrolled in one or more remedial reading, writing, or mathematics courses. Within a decade, a 2009 report conducted by Community College Research Center showed approximately 60% of community-college students were required to take at least one remedial course in reading, writing, or mathematics (Gonzalez, 2013). Among the students in these remedial courses were high school honors students, at-risk students, non-traditional students returning to college or entering college at older ages, immigrant and foreign students whose mother tongue was not English, and students who were the first generation in their families to attend college (Huse, Wright, Cark, & Hacker, 2005).

Students who needed remedial education were more likely to have higher dropout rates or delayed time in obtaining a college degree. More than 25% of 4-year college students who were required to take three or more remedial classes left college after the first year (Kuh et al.,

2006). As the number of remedial courses increased, so did the dropout rate. Regarding the time to degree, Bautsch (2013) found the percentage earning a certificate and degree at a community college within eight years was less than 25%. He also reported that the chances of success for the students required to take remedial education courses was small. The completion rate in earning a bachelor's degree was 58% of students without remedial education, but only 17% for students needing remedial English, and only 27% for students needing remedial math. Brock (2010) commented that completion rates in the United States could be improved when greater numbers of students break through the remedial barrier in their academic careers.

ELL students. According to the National Council of Teachers of English and the SERVE publication, the term English language learner (ELL) refers to the students who do not have a native-English-speaking background and have limited proficiency in linguistic and academic achievement. It usually describes K-12 students or those up to age twenty-one (Mikow-Porto, Humphries, Egelson, O'connell, & Teague, 2004; National Council of Teachers of English, 2008). Limited English proficient (LEP) has often used interchangeably with ELL, but today ELL is increasingly used in place of LEP. The term of ELL will be used throughout the paper.

Numerous governmental and institutional research studies in the U.S. have provided statistics on the composition and academic attainment of students with different language backgrounds and remedial needs in English and mathematics. For example, a 2010 study conducted in Texas for the 2006-07 and 2007-08 school years examined the college readiness of students classified as LEP or ELL. The study showed these students scored lower in reading and math compared to other students (Bustamante, Slate, Edmonson, Combs, Moore, & Onwuegbuzie, 2010). In another study, Bautsch (2013) found certain groups of students within California were more likely to need college remediation courses. More specifically, he noted that 42% of African Americans and 41% of Hispanic students required remediation education compared to 31% of White students. Moreover, only 5 percent of African Americans and 13% of Hispanic met the readiness benchmarks in all four subjects (English, reading, math, and science) in 2012. In addition, only six out of ten who entered high schools actually graduated and fewer than 25% of those graduates were qualified for a four-year public university in California. Remedial coursework and ELL status played an important role in students' likelihood of success.

Purpose of the Research

ELL students have native language backgrounds other than English. With such disadvantage and limited English proficiency, ELL students often are not sufficiently prepared for the college-level reading, critical thinking, and writing required for their first semester in college. Examining how well ELL students perform in comparison with their native English speaking counterparts and the factors that may contribute to their postsecondary success in an English context environment is an important topic for further study.

The first purpose of this study was to gain a better understanding regarding the performance of ELL students in Hawai‘i by comparing their college success rate to their non-ELL counterparts. In this study, success rate was defined as the probability of students graduating with either an associate's degree within three years or a bachelor's degree within six years respectively (i.e., using the common federal guideline of completing a degree within 150% of the standard time to graduation/completion). The second purpose was to gain better understanding regarding students' high school preparation for college study. The third purpose was to provide a better understanding regarding how remedial education and related non-academic and academic factors affect students' graduation success rate. Finally, the study explored how ELL status may interact with other significant predictors from students' pre-college and college years in determining their likelihood of earning a degree within 150% of standard graduation time.

Background of the Research

In the United States, the term "postsecondary remediation" was first introduced in mid-1900s, with specific courses initially designed to address the academic skills of local students. Since 1960s, however, the United States has undergone several social and demographic changes. These changes have led to an increase in needed remedial education for local and immigrant students. The next section will explore several social changes which gave way to the change in student compositions and the growth of remedial education.

Change in admission policy. In 1960s, there was influx of college students resulting from civil rights activities and legislation, as well as the maturing of the "baby boom" generation. The Civil Rights Movement promoted broad increase in representation of women, African Americans, and Hispanic in K-12 and higher education. Renfro and Armour-Grad (1999) noted that Congress began to pass legislation supporting equality of opportunity by providing federal education funds toward the goals of increasing student access and remediation. When the

federal and state aid dollars were made available to the New York State, this action increased the access of the students in poverty to enroll in college.

Furthermore, with greater funding available, in order to accommodate the increase of underrepresented students, the City University of New York (CUNY) started an "open admission" policy to expand access to higher education. The open-admission policy greatly decreased the selectivity regarding student admission, resulting in the admission of high school graduates with lower academic skills; that is, students were admitted if they had a high school diploma, regardless of grades. As part of this open-admissions policy, greater numbers of women and students with diverse ethnic backgrounds were admitted. These populations usually were characterized as having low incomes and academic disadvantages. Most of them were not ready for the college courses. Therefore, the admitting schools offered remedial classes in order to help them develop the skill needed for success in college (Renfro & Armour-Grad, 1999; Brock, 2009).

Change in immigration policy. The Civil Rights Movement focused on equal treatment regardless of race. As a result, the movement also produced changes in immigration policy. The Immigration and Naturalization Act of 1965 provided priority to those who were relatives of U.S. citizens or permanent residents, refugees of violence or unrest ("U.S. Immigration", 2010). Some immigrants fled from the war-torn areas in Southeast Asia or the poverty of communist regimes in Cuba, Eastern Europe, and elsewhere. Based on data from the Census Bureau (Camarota, 2011), 2000-2010 was a record-setting decade of immigration, the total number of immigrants reached 40 million in 2010. The immigrant population in 2010 quadrupled that of the 1970s.

Over the last four decades, the number of people coming from Asia, Africa, and Latin America jumped significantly. In 2010, Latin American was the dominant location, which accounted for about 53% of the overall individuals coming to the U.S, or approximately 21 million people (Camarota, 2011). The next top seven countries sending more than one million immigrants to the United States were China, Hong Kong, and Taiwan, India, Philippines, Vietnam, El Salvador, Cuba, and Korea (Camarota, 2011). The new incoming population greatly changed the demographics within the United States.

As of 2010, the states of California, New York, Texas, Florida, New Jersey, and Illinois had more than one million foreign-born residents. California had the largest foreign-born population, a little more than 10 million (10,150,429), taking in more than 25% of the national immigrants. In Hawai'i, although the foreign-born population is only about a quarter of the

foreign-born population in California, the growth rate was 52.6% between 1990 and 2010. More specifically, the immigrant population in Hawai‘i went from 162,704 to 248,213 individuals (Camarota, 2011).

With the growth of the population, there were considerable changes in the size and composition of the United States with respect to age groups, gender, workforce labor, and education level. The characteristics of this new immigrant population are low income, one or both parents with less than a college degree, and limited ability to speak English. As a result, they all tend to face the same language challenges as English is the essential medium of communication, whether verbal or written.

Change in school compositions. In 2010, the National Center on Immigrant Integration Policy (Batalova & McHugh, 2010, No.2) indicated that over 5.3 million ELL students were admitted to U.S. public schools during the 2007-2008 academic year, which accounted for about 10.7 percent of the total pre-K–12 population. In same academic year, Hawai‘i was one of top 10 states in terms of percentage of ELL students among all Pre-K through Grade 12. It ranked ninth among the states, with 17,868 or 9.9 percent of students being classified as receiving ELL services. More specifically, there was a 38.8% growth in ELL students over the decade from 1998 to 2008.

Generally, a variety of other languages were spoken at home by ELL students. Nationally, Spanish was the most commonly used at home, with 73.1% of the ELL students speaking this language at home. There were thirteen states with at least 80% of the ELL students speaking Spanish, including Wyoming, Texas, Arkansas, and Nevada. In Hawai‘i, the top five languages spoken at home were Ilokano, Chunkese, Marshallese, Tagalog, and Spanish (Batalova & McHugh, 2010, No.3).

When these students first came to this country, they had limited proficiency in English. This affected their ability to fully participate in educational services without language support. Zehler, Yin, and Donovan (2012) noted that ELL students who spoke another language at home had inadequate level of English proficiency. In order to fully participation in all-English instruction, additional language–related instructional services were needed.

Proficiency includes basic interpersonal communication skill (BICS) and cognitive academic language proficiency (CALP). BICS can be developed within two years of their arrival and any participation of English speaking setting. On the other hand, however, CALP requires an abstract use of language (e.g., metaphor, symbolism), which requires a long and gradual learning process (Roessingh & Douglas, 2012). At the same time, university learning settings

required these skills for advanced reading, independent library research, group discussion, and writing assignments including lab reports, journal writings.

Being able to master a new language is a challenge faced by all the ELL students. Their proficiency in understanding English plays a critical role in their academic career and success. Therefore, ELL students need considerable support and assistance in order to keep up with their studies, graduate from high school, and pursue a college degree.

Change in government policy. In the United States, there were few resources targeted for the non-native English speakers before 1960s (Mikow-Porto et al., 2004). During the 1960s, there were federal legislation and policies to protect students' rights and make sure they received equal learning opportunities. Several major legislative acts granted non-native English speakers access to educational services. These included The Civil Rights Act of 1964 and Title VII of the Elementary and Secondary Education Act (ESEA) in 1968 (referred to as The Bilingual Education Act). The aim of the first act was to stop discrimination on the basis of race, color, or national origin in any programs assisted by the federal government. The second legislation set up federal policy and allocated funding for bilingual education for language minority students who were economically disadvantaged and faced challenges often encountered by non-native speakers (Mikow-Porto et al., 2004). Under the Civil Rights Act of 1964, the Supreme Court Lau v. Nichols decision in 1974 (414 U.S. 563) ensured the rights of students speaking a different language to receive needed educational services to fully participate in learning activities within their schools.

Later in 2002, Congress passed Title III of the No Child Left Behind Act (NCLB). This section of the mandate consolidated the 13 bilingual and immigrant education programs. It provided funding for use in ELL classrooms and provided guidance to those who work with ELL students. It also required the districts to provide professional development for classroom teachers, administrators, and other personnel. Moreover, one of the requirements also promoted parental involvement. NCLB reports provided one source of information about the academic progress of ELL students in various parts of the nation over time (Mikow-Porto et al., 2004).

As these legislative efforts suggested, over time the federal government has been actively involved in implementing different policies and programs to help ELL students ease into an "English-speaking" culture, so they could obtain equal educational opportunities. As students needing ELL services represent the fastest growing population in US schools, all these

programs were designed to help ELL students receive sufficient academic support needed to succeed in obtaining education comparable to their native English-speaking peers.

Increase in local government involvement. In order to stay as a global leader, the U.S. needs to produce a pool of graduates with high education level and well prepared skills to the workforce. Before the national goal set by President Obama in 2009, Hawai'i P-20 Council, a group of leaders from education, business, labor, government and the community, set a goal for the state of Hawai'i in 2007. The goal named "55 by 25" was to have 55% of working-age adults (age 25-64) earn a two- or four-year degree by the year 2025. Hawai'i P-20 encouraged students from elementary, middle, and high school students to build a stronger college-going culture; more importantly, its goal was to encourage the students to make commitment to strive for higher education. A year after this, University of Hawai'i (UH) President Greenwood launched a system-wide program to increase the number of UH graduates by 25% by 2015 (University of Hawai'i, 2013). With these growing expectations, completion rate becomes more important. It leads to the awareness of college readiness and the eagerness to equip the students from early years to learn and advance to next proficiency level.

Research Focus

With a fast growing rate of ELL students coming through immigration processes, increasing concern with students' college readiness and the concern with decreasing college graduation rate, the current study focuses on the relationship between demographic factors (e.g., ELL status, race/ethnicity), students' academic backgrounds (e.g., high school preparation, first English course level taken in the college), and their likelihood of attaining a degree in 150% of standard graduation time.

Wolniak and Engbert (2010) suggested that high school context played an important role in students' college preparation which in turn influenced the educational choices and academic success. Secondary education provides the foundation on which the college academic development is built. So, this study will focus on students' 11th and 12th grade years through their postsecondary academic careers. It will utilize the variables from students' pre-college period, their first English course, and other relevant college variables to predict graduation success rates.

The current study will provide retrospective insight into the relationship between high school preparation and college readiness, as defined by success in their first English course level taken during freshman year. This should provide further understanding regarding what (and to what extent) high school factors affect success in students' first English course taken in

college, which may, in turn, also impact students' academic career during their subsequent college years. This is key, since studies have found that almost 50 percent of all first-time students assessed as underprepared for postsecondary studies did not return to college for their second year of study (Kuh et al., 2006). Retaining students during their first year in college is essential to their future success in obtaining a degree. Next, the study will focus on the possible effect of students' first English course on their probability of attaining a degree in a specific time frame. This part of study will involve student characteristics, for example, ethnicity and other academic factors, in order to predict whether students can graduate on time, or whether some factors stop them from graduating within the English-language college environment.

The study is anticipated to provide further insight into high school variables and college variables that contribute to the success rate among ELL students and other students in Hawai‘i. Moreover, it should lead to greater insight regarding the interaction between ELL status and other variables with respect to college success rates.

Research Questions

The study will focus on the following research questions:

1. What are the success rates of ELL and non-ELL students in terms of attainment of associate or bachelor's degrees within a commonly-specified time?
2. How do students' high school factors affect the likelihood of taking remedial or college-level English course during the first year of college?
3. How do students' initial English course level and other related factors influence their likelihood of obtaining a degree?
4. Is there an interaction between students' ELL status or other academic or background variables and their likelihood of completing a degree within a specific time period?

CHAPTER 2
LITERATURE REVIEW

This chapter highlights some of the important research underling the importance of college readiness and their dominant language for success during students' postsecondary educational years. For well over a decade, the gap between college eligibility and college readiness has caught educators' attention (National Center for Public Policy and Higher Education [NCPPHE], 2010). Many challenges arose as students arrived on campus unprepared, students were placed in remedial courses and took an extended period of time to graduate or transfer to a four-year institution. The National Center for Public Policy and Higher Education (NCPPHE, 2010) also commented the gap is "… tremendous obstacle to increasing the nation's college degree-attainment levels" (p.3). Numerous studies were conducted to identify factors that influenced declining college completion rates, as well as what academic or non-academic variables accounted for student success.

Education has been viewed as a pipeline extending from kindergarten through college. In order to understand college preparation and college completion, researchers extended the studies to students' pre-college years and developed an interest in determining whether there was a relationship between the students' pre-college preparation, their transition to college, and their corresponding performance while pursuing various degree programs.

Two factors were identified with relevance to this current study. College readiness was one of the factors. As Brock (2010) found, if students had to begin their college years by enrolling in remedial courses, this would either prevent or delay students' eventual degree attainment. The second factor was students' home language. O'Conner, Abedi, and Tung (2012) noted that, the population of students needing English language services was the fastest growing proportion in the U.S. student population during preK - Grade12 educational years. They found ELL students' performance in reading, writing, science, and social studies was considerably lower than the performance of non-ELL students. The average achievement gap was larger in reading and writing than in math.

The literature in this chapter is organized into variables affecting student success during two different periods of students' educational careers. The first section summarizes research relevant to students' elementary and secondary educational years, and the second section summarizes research relevant to students' postsecondary years. Both academic and non-academic variables are examined for each educational period. Academic variables include achievement indicators such as grade point average (GPA) and standardized test scores (e.g.,

ACT, SAT), as well as types of coursework and major (e.g., STEM majors), and student enrollment patterns. Non-academic variables include student demographics (e.g., gender, race/ethnicity, socioeconomic status) and parental educational background. The variables, methods, and results from previous studies for each period are summarized in the next sections followed by the common limitations and present research focus.

Identifying Variables During Students' K-12 Years

During students' K-12 years, previous research has examined how high school academic and non-academic variables affect student high school dropout rates, their first-year performance in college in terms of their GPA, whether they took remedial courses, and their likelihood of graduating within eight years. High school GPA, SAT/ACT scores, and course taking patterns were widely used in previous studies (Finkelstein, Huang, & Fong, 2009; Howell, 2011; Nagaoka, Roderick, & Coca, 2009; Wolniak & Engberg, 2010). The findings of these studies show positive relationships between high school GPA, student standardized test scores, and GPA at the end of the first year of college. In particular, high school GPA and SAT/ACT scores were important predictors of students' first-year college performance as measured by student GPA. Among them, high school GPA had strongest correlation on performance. In addition, high school GPA was found to be stronger predictor of college enrollment than the standardized test scores. With similar ACT scores, students who earned higher GPAs had a significantly higher probability to enroll in college (Nagaoka et al., 2009; Wolniak & Engberg, 2010). Hoyt and Sorensen's (2001) research provided another view using students' ACT scores and high school English and mathematics course placements to examine student placement in remedial courses in college. Their study showed that most college students were placed in the same level of English already taken in the high school or even a lower English level. Taken together, these studies identify the discrepancy between students' high school preparation and their readiness for completing college course work.

Such studies indicated that in order to make sure students were on track to college entrance requirements by the end of 12th grade, schools needed to make sure students' access to college preparatory coursework in English and mathematics were granted and to provide early academic preparation for rigorous coursework encountered during college years. Early academic preparation meant for students to complete the core subjects such as English at grade level and mathematics beyond basic level by end of freshman year (Brock, 2010).

In addition, variables related to students' high school environments (i.e., exposure to school violence), and the quality of their teachers have been found to be related to students'

remediation needs and college performance (e.g., Howell, 2011; Wolniak & Engberg, 2010). Within the high school environment, Wolniak and Engberg (2010) found that high school facilities such as having a library, computers, guidance counselors, and a safe campus were significant predictors of first-year grades in college. Howell (2011) also reported that teachers' years of teaching experience, their educational attainment, and credentials contributed to students' remediation needs in college. Their influence, however, was somewhat varied in terms of students' math and English remediation needs. For example, the study reported that having more teachers with master's degrees was related to lower rates of math remediation needed in college. However, master's degrees and additional coursework were also found to be negatively associated with English remediation. Importantly, however, students whose high school teachers had emergency teaching credentials or who were teaching with waivers were found to be more likely to need math and English remediation in college.

Regarding demographics, variables such as race/ethnicity, home language, gender, mother's educational level, and household income have been identified as affecting later success in college (Finkelstein et al., 2009; Gwynne, Pareja, Ehrlich, & Allensworth, 2012; Howell, 2011; Roessingh & Douglas, 2012; Wolniak & Engberg, 2010). For example, Howell (2011) concluded that African American and Hispanic had greater math and English remediation needs compared to other groups. In contrast, Asian students had a higher need in English remediation but less need for math remediation.

Regarding students receiving English language services, studies reported that students who arrived earlier in the United States or were identified as requiring ELL services earlier (ninth grade or earlier) were able to adapt to English learning environments more quickly. For example, younger ELL students had a higher likelihood of graduating high school with a GPA greater than 3.0, and they took less time to graduate. Also, they were found to do better in English courses at end of ninth grade (e.g., Finkelstein et al., 2009; Roessingh & Douglas, 2012). Other information includes age on arrival in the United States and length of time receiving English language services were also found to be important indicators of college readiness and performance. (Finkelstein et al., 2009; Roessingh & Douglas, 2012). In another study, for example, Hispanic students entering in sixth grade as ELL students were found to perform better in their ninth grade courses than their counterparts who entered ELL programs later (Gwynne et al., 2012). As a result, students entering ELL status earlier had better retention rates and graduated with stronger high school GPAs. Having stronger GPAs during high school, therefore, created a higher likelihood of staying on track to postsecondary education.

Studies have also determined that higher mother's educational attainment and higher household income had positive impact on the students' first-year college grades (Wolniak & Engberg, 2010).

Identifying Variables During Students' College Years

For the college period, similar demographic variables and college related academic variables were used to predict students' retention rate and graduation rate. In addition to these, there were other personal and institution-related variables incorporated into the college success rate equation. In general, relevant variables were divided into three groups: personal/student characteristics, academic factors, and school context variables. Personal characteristics included SES status, medical issues, transportation, or family obligations. Previous research claimed these personal factors attributed to the decline in success and retention rate (Fowler & Boylan, 2010).

Academic factors included English proficiency, major type (e.g., STEM/non-STEM major), and enrollment in remedial education during the first year of college (Brock, 2010; Cho & Karp, 2013; Crews & Aragon, 2004; Fike & Fike, 2008; Whalen & Shelley, 2010). Fike and Fike (2008) indicated that passing a developmental reading course was a strong indicator predicting retention rates during the subsequent Spring and Fall semesters. This finding illustrated the fact that possessing college-level reading skills were fundamental for college-level learning. The sequence in taking remediation courses and other regular courses significantly affected students' cumulative GPAs. When remedial courses were completed before taking any college level courses, students had a greater advantage than when they took remedial courses in later semesters. Students did benefit from taking remedial education offered by the college, however.

When talking about STEM majors, Whalen and Shelley (2010) reported student graduation rates were also affected by the initial major type they chose and whether they may have shifted majors during their college years. More specifically, students with STEM majors in their first semester of college had significantly higher retention/graduation rates than students with non-STEM majors. For students starting out in a STEM major, there was no positive or negative impact on the graduation rate by choosing to remain with STEM or switch to a non-STEM major. Moreover, for students who started with a non-STEM major and subsequently switched to a STEM major, graduation rates were two times greater than for those students who remained in non-STEM major.

In terms of school variables, previous research focused on institutional resources provided for student success. For example, the institution may provide various types of support services to subgroups of students expressing a need for assistance. These programs were to assist students with disadvantaged backgrounds, such as first-generation students, students with low family incomes, and students having physical or learning disabilities. Such services could include counseling services, academic advising, information regarding guidelines and expectations for students, as well as remedial support services. Examples for remediation supporting services included College Survival Skills, TRIO programs, and Student Support Services funded by the federal government. Previous studies mentioned these services could positively influence retention rates and completion rates (Bound et al., 2009; Brock, 2010; Cho & Karp, 2013; Fike & Fike, 2008; Fowler & Boylan, 2010).

It was clear that receiving financial aid was one of the important predictors of students' persistence and retention rates. More specifically, students who were financial aid recipients were more likely to persist and to graduate (Fike & Fike, 2008). However, Fike and Fike noted that there were no sufficient data or models developed to precisely explain the association between financial need and student persistence. Further research on financial aid and the persistent rate is needed.

A prior review of college students also indicated that non-native speaking or first-generation students had lower persistence rates than their native tongue counterparts. ELL students usually had limited English proficiency and required remedial education. ELL students as a general group were described as having several disadvantages including low socioeconomic status, lack of access to school resources, low academic performance and high dropout rates, as well as low retention rates, regardless of whether they were in high school or college status (Finkelstein et al., 2009; Kim, 2001; Roessingh, 2012). Considerable qualitative and quantitative research on ELL students was conducted to find out how remedial education together with other academic and non-academic factors contributed to students' college careers and performance. With their special characteristics and disadvantages, the study topics ranged from students' performance in remedial courses to occupational paths; from their extra curriculum involvement to strategies on learning and improving English reading, writing, and verbal skills; and from parents' educational background and income to students' cognitive condition (Bifu-Ambe, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Tseng, 2006).

With respect to participating in college experiences such as socializing with colleagues or advisors, hanging out on campus, attending any discussion groups, studies have noted that

ELL students tended to participate less often compared to their non-ELL peers (Bifuh-Ambe, 2009; Pascarella et al., 2004). With regard to occupational paths, Tseng (2006) found two interesting relationships between first-generation students' (usually identified as ELL students) standardized English test scores versus their self-perceptions of their English skills and their pursuit of a major in math or science. First, ELL students with high SAT-Verbal test scores were more likely to major in math and science than ELL students with lower SAT-Verbal scores. Second, ELL students with low self-perceived scores regarding their English skills were more likely to major in math and science, as these majors required less verbal and written English skills.

There were several limitations regarding prior studies, however, one of them being the number of institutions or student sample sizes involved in the studies and their lack of adequate representation of an identifiable population (e.g., by using some type of random sample). When the sample was size was small (e.g., only 18 four-year institutions across the United States) or not randomly selected, it would not be possible to generalize the results to other institutions in the country. Data integrity was another issue when data, such as students' parent education level or race/ethnicity, were self-reported. Moreover, missing data could affect the quality and quantity of data to be analyzed.

Research Focus / Contribution

In the ELL Information Center Fact Sheet Series No. 3 (Batalova & McHugh, 2010), it mentioned that in 28 states, more than two-thirds of ELL students spoke Spanish as their home language. In 13 of these states, more than 80 percent of ELL students primarily communicated in Spanish. Regarding the ELL population in the U.S. mainland, Hispanic and Black students represent the biggest portions, and Spanish is the dominant language spoken at home. Because of such a large population, many previous research studies naturally concentrate on the needs of Hispanic students, including their academic performance, degree attainment, and so forth.

Previous research has identified several sets of variables relevant to students' need for remedial courses upon entering university settings, as well as variables during students' college experience that helped indicate their likelihood to receive a degree. The current research study will focus exclusively on students within the State of Hawai‘i, the most ethnically diverse state in the nation. Hawai‘i has a high portion of multiracial individuals, compared to states in the mainland, and its population is comprised of Hawaiian and Pacific Islander, Asian, Caucasian, Hispanic, and various other ethnicities. The study attempts to establish a link between college

preparation during high school years, the need for enrollment of remedial courses during the first year of college, as well as the success rate of undergraduate students, focusing primarily on ELL versus non-ELL status in contributing to future student success.

CHAPTER 3
METHOD

This study focuses on students' academic performance from their high school and college years. Data were provided by the Hawai'i Data eXchange Partnership (Hawai'i dXp) from Hawai'i P-20. Hawai'i dXp is a statewide longitudinal data system which links data from infancy through early learning, K-12, and higher education. The data are from two different state agencies, the Hawai'i Department of Education (DOE) and the University of Hawai'i System office (UH). The Hawai'i DOE provides data on students' K-12 years, and UH provides data on students' postsecondary years. Before the data were released for research purposes, the students' names were masked for confidential reasons related to the Family Education Rights and Privacy Act (FERPA).

Design

The current research utilized a non-experimental research design (i.e., no treatment variable was manipulated) which covered two different stages in students' educational careers: the high school and post-secondary stage. The high school stage described students' academic experiences during their 11th and 12th grade years. This period was included since students' high school experiences have been noted to play an important role in contributing to college readiness and degree completion rates (Wolniak & Engberg, 2010). The study examined how the experience and preparation students received from high school influenced their likelihood to enroll in a college-level (versus remedial) English class. The postsecondary stage covered primarily students' first year academic experiences.

Participants and Sample

The data set consisted first-time enrolled students from Fall 2007 (N = 3,809) who graduated from the public high schools in the same year. It represented a 35.6% college-going rate for public high school graduates attending at University of Hawai'i locally. The participants were first-time freshmen enrolled in one of the ten UH campuses as either degree seeking (classified) or non-degree seeking (unclassified) students. The non-degree seeking students would become degree seeking students as they moved on. The sample consisted of student data on postsecondary education and coursework during their high school years, in particular during their 11th and 12th grade years.

As data were originally collected from two different agencies, there were discrepancies in gender, ethnicity, and high school name fields. Some ethnicity data input from the DOE high

school data were different from the data input from UH, more specifically, 948 (or 24.8%) records did not match. For ease of analysis, data were adjusted as follows: If data were not the same, the UH data were used. Second, if the data were missing in either set, the existing data were used. If there was no entry, the individual was excluded from the sample, which left the final sample size as 3,777 (from 3,809) records (99.2% complete).

Table 1 provides descriptive data on the study. Regarding participants, 53% were female and 47% male. Students of Asian background comprised about 51% of the students, Hawaiian or Pacific Islander background was 23%, Caucasian and Mixed were about 9% and 14%, respectively, and Hispanic and African American or Black accounted for a little less than 2% and less than 1%, respectively. In terms of where they attended high school, about 70% of local students attended high school on Oahu and 30% from the neighbor islands. Unclassified students accounted for 2% for Fall, 2007. Students were usually identified as ELL students when they first entered the public school system. Within the student sample, about 22% were identified as ELL students when they graduated from high school. They were either still actively participating ELL programs or were once in ELL programs but were no longer receiving direct ELL services and were under monitor for two full school years after exiting.

Variables in the Models

Table 1 also provides a list of dependent and independent variables used in the logistic regression models. Under the variables column, the variables prefixed with a '0' were the reference groups in the logistic regression models.

Dependent variables. The dependent variables in this research were dichotomous (i.e., remedial versus college-level English course; completed on time versus did not complete on time). The dependent variable for first model was the level of the first English course enrolled in during freshman year and for the second and third models, the dependent variable was the completion rate at 150% of required graduation time.

Table 1. Descriptive Data Regarding Variables Included in the Analyses (N=3,777)

Variables	Explanations	N	%	M	SD
Non Academic Variables					
0 NELL	Non-ELL Students	2,941	77.9		
1 ELL	ELL Students	836	22.1		
0 M	Gender (Male)	1,790	47.4		
1 F	Gender (Female)	1,987	52.6		
0 CAU	Ethnicity (Caucasian)	342	9.1		
1 AAI	Ethnicity (AA/BL/AI/AN)[a]	39	1.0		
2 ASI	Ethnicity (Asian)	1,936	51.3		
3 HPI	Ethnicity (Hawaiian or Pacific Islander)[b]	867	23.0		
4 HIS	Ethnicity (Hispanic)	62	1.6		
5 MIX	Ethnicity (Mixed)	531	14.1		
0 ETH_NO_CHG	No Change in Ethnic Identity between HS and College	2,837	75.1		
1 ETH_CHG	Change in Ethnic Identity between HS and College	940	24.9		
0 FRLN	Free or Reduced Lunch (No)	2,949	78.1		
1 FRLY	Free or Reduced Lunch (Yes)	828	21.9		
0 PELL N	PELL Recipient (N)	2,564	67.9		
1 PELL Y	PELL Recipient (Y)	1,213	32.1		
Academic Variables (High School)					
NYAP	Number of Years Enrolled in AP Classes			0.27	0.697
0 WBP	HSA Scores (Way Below Proficiency)	154	4.1		
1 AP	HSA Scores (Approaching Proficiency)	1,364	36.1		
2 MP	HSA Scores (Meet Proficiency)	1,952	51.7		
3 EP	HSA Scores (Exceed Proficiency)	32	0.8		
4 NT	HSA Scores (Not Tested)	275	7.3		
0 NISL	HS District (Neighbor Islands)	1,148	30.4		
1 OAH	HS District (Oahu)	2,629	69.6		
0 Below	Highest English Course Level (Below)	432	11.4		
1 Meet	Highest English Course Level (Meet)	2,761	73.1		
2 Above	Highest English Course Level (Above)	284	7.5		
3 NR	Highest English Course Level (No Regs)	300	7.9		

Note. [a]African American/Black/American Indian/Alaskan Native.

[b]Includes Guamanian or Chamorro, Native Hawaiian or Part-Hawaiian, Micronesian (not GC), Mixed Pacific Islander, Pacific Islander, Samoan, and Tongan.

(continued)

Table 1. Descriptive Data Regarding Variables Included in the Analyses (continued)

Variables	Explanations	N	%	M	SD
Academic Variables (College)					
0 REM	First English Course Level (Remedial)	1,424	37.7		
1 COLL	First English Course Level (College)	2,353	62.3		
0 CA L24	Credits Attempted in First Year (Less than 24)	1,939	51.3		
1 CA M25	Credits Attempted in First Year (Btw 25 and 30)	1,263	33.4		
2 CA M30	Credits Attempted in First Year (More Than 30)	575	15.2		
CR_ATT_1YR	Number of Credits Attempted in First Year			23.3	
0 CE L24	Credits Earned in First Year (Less than 24)	2,569	68.0		
1 CE M25	Credits Earned in First Year (Between 25 and 30)	811	21.5		
2 CE M30	Credits Earned in First Year (More Than 30)	397	10.5		
CR_ER_1YR	Number of Credits Earned in First Year			20.0	
0 CIP	Major Type at Entry (Non-STEM)	3,297	87.3		
1 CIP	Major Type at Entry (STEM)	480	12.7		
0 N	No Change in Major Type by End of Third Year	3,423	90.6		
1 SNS	Change in Major Type by End of Third Year (STEM to Non STEM)	150	4.0		
2 NSS	Change in Major Type by End of Third Year (Non STEM to STEM)	204	5.4		
150N	Degree Earned at 150% Graduation Time (N)	2,544	67.4		
150Y	Degree Earned at 150% Graduation Time (Y)	1,233	32.6		

Independent variables. The independent variables were slightly different in each period/model examined; however, they all fell into either (1) academic or (2) non-academic categories. For students' high school period, the independent variables included the number of years enrolled in AP classes during high school, the highest level of English class during 11th and 12th grade, and HSA test scores. Total number of years enrolled in AP classes counted the years students enrolled and received a 'D' or above. This variable counted the years instead of classes since most of the classes were one-year programs or else two one-semester classes were required during one academic year. Highest English course level (0 = Below, 1 = Met, 2 = Above, 3 = NR) indicated the highest English course level the students reached. As students were required to meet school board diploma requirements for 12th grade English, this variable indicated if students' English course level was lower, met, or higher than the board requirement. "Above" level included students who went beyond the diploma requirement and took AP English or "Running Start" at the community colleges or the four-year campuses. Running Start is a

statewide dual-credit program for high school students to attend college classes and earn credit toward high school graduation and a college degree. 'NR' illustrated there were no registrations found in the 11th and 12th grade dataset provided.

Non-academic factors were race/ethnicity, ELL status, high-school district, and socioeconomic status (as measured by participation in the federally-funded free or reduced lunch program). The Hawai'i DOE uses two codes to identify students who participate in ELL programs and students who once participated, but were no longer in the ELL programs (but still under DOE monitoring). Because the study focused on all ELL students' performance, the two types of ELL students were consolidated into one group. High school districts were placed in two groups for purposes of these analyses: Oahu and neighbor islands (which represented all schools outside the island of Oahu).

In a college setting, academic variables included first English course level taken (remedial vs. college), type of major declared (STEM vs. Non-STEM) when the student was first admitted to college, and any change in major by the end of third year (i.e., from STEM to non-STEM or vice versa, or no change), and credits attempted/earned in the first year. Credits attempted/earned were divided into three levels: less than 24 credits (L24), between 25 and 30 credits (M25), and more than 30 credits (M30). The first category was defined as no more than 12 credits per semester; the second represented a medium course-taking load with between 12 credits but less than 15 credits per semester, and the third category included students with 15 or more credits per semester.

Non-academic variables for the college period were similar to high school period, and they included ELL status, race/ethnicity, change in race/ethnicity identity (ethnic identification) between high school and college, and whether or not the student was a Pell recipient at time of entry to college. Change in ethnic identification was a result of comparing the ethnicity input in high school and college.

Data Analysis

Data were examined several stages to answer the research questions. The first part used descriptive statistics to summarize the success rates of ELL students and non-ELL students. The second part consisted of a series of three predictive models to predict the variables that affected students' graduation rates. The first model was examined the connection between student's high school preparation and their first English course in college, defined as either a remedial-level course or college-level (non-remedial) course. The second model focused on the relationship between students' first English course taken, as well as other

academic and non-academic related factors during the first year of college, and the graduation rate of the students. The third model included any statistically significant interaction effects between ELL status and factors from both high school and college years to predict success rates. It should be noted that the study concentrated on the relevance of students' first year, since this year has been identified as essential in terms of student retention. Students' experiences during subsequent years in college (e.g., completing additional courses, having required funds to keep enrolling, major selected) also would be expected to contribute to their likelihood of persisting to obtain an undergraduate degree.

Preliminary descriptive statistics were examined to provide the demographics of the Fall 2007 cohort. Completion rates of associate and bachelor's degrees earned in three and six years (150% graduation time) were broken down by ELL status, gender, and ethnicity (see Table 2).

In order to examine students' likelihood of being successful in earning degree at 150% graduation time, a series of logistic regression models was estimated. Given the dichotomous nature of the dependent variables, logistic regression was the appropriate tool for estimating the models. Five test models were designed, and the best fit model was selected to answer each research question. Three values were used to assess the model validity, Nagelkerke's pseudo-R^2, the model classification rate, and the model deviance, or -2 log-likelihood (-2LL). The value of Nagelkerke's pseudo-R^2 and the classification rate are related to identifying the best fitting models among several models examined (with larger values being more desirable than smaller values). Model deviance (or -2LL) is a measure of how much unexplained variation exists in the logistic regression model; that is, the lower the deviance, the better the model fits the data. This value is useful in determining whether adding or removing certain independent variables would improve the model's predictive power. If the value decreases after variables added to the model, the accuracy in predicting the outcome is improved.

The first set of models was estimated to examine the high school factors that were related to the level of students' first English course level (i.e. remedial versus college level) taken during their first college year. A logistic regression model used ELL status together with other high school factors such as receiving free or reduced lunch (FRL), total number of years spent in AP classes, high school district, highest level of English course taken before graduating from high school, and HSA test scores from 10^{th} grade. Then, second set of logistic regression models was examined to determine how students' first English class, combined with other academic factors in the first year and personal characteristics, might affect student graduation

rates. The academic-related variables were credits attempted and earned during the first year, type of major first declared upon entry (STEM / non-STEM), and change in major type (STEM / non-STEM) by the end of the third year. Personal characteristics were ELL status, PELL indicator, and race/ethnicity. Finally, those significant predictors from both the high school and college period were entered into the last logistic regression model to examine if there is an interaction between students' ELL status or other academic or background variables and their likelihood of completing a degree in a specific time period.

The success rates of ELL and non-ELL students. Table 2 provides a comparison regarding completing an associate or bachelor's degree at 150% graduation time between ELL students and non-ELL students. Within the ELL and non-ELL groups, the *All*, *Graduated*, and *Grad %* columns represented the whole population, frequency of graduating on time, and the row percentage, respectively, within each gender and ethnicity. Percentages in parentheses represented the column percentage within each column.

In general, Asian and Hawaiian or Pacific Islander represented approximately one half and a quarter of the Fall 2007 cohort, respectively (see Table 1). They were also the two largest portions within the ELL and non-ELL groups. As for race and ethnicity, Asians represented about 96% of the ELL students and 41% of the non-ELL students who graduated within the allotted time. In the ELL group, the remaining 4% was comprised of Caucasian, Hawaiian or Pacific Islander, Hispanic, and other mixed-race students. The results indicated there were no African American, Black, Alaskan, or Native Americans within the ELL group who received English language services. In non-ELL group, next higher portion went to mixed race, Hawaiian or Pacific Islander, then Caucasian.

In Table 2, the column *Grad %* (graduation percentage) calculated the fraction of students who graduated with respect to gender and ethnicity. The *Grad %* columns reported the performance level, indicating how well of each group was doing. When comparing the graduation percentages, one third of ELL students (35%) and non-ELL (32%) students earned a degree at 150% graduation time. There was almost an equal share for males and females who graduated on time within each group. Asian had the highest graduate rates, 39% and 42%, in both groups. On the other hand, the second largest ethnicity group, Hawaiian or Pacific Islander, had a lowest graduation rates, 5% and 19%, in both groups.

Table 2.

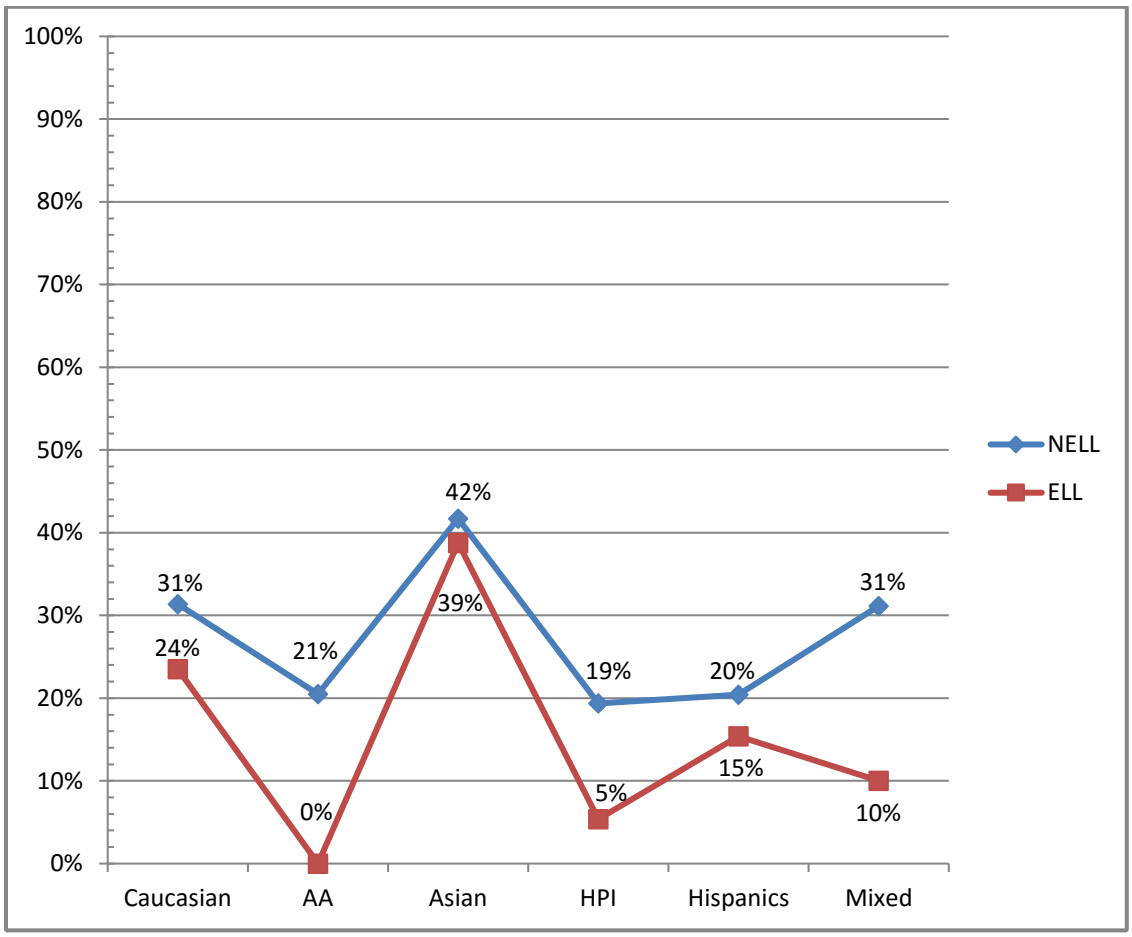
Descriptive Statistics for Fall 2007 Cohort by ELL Status, Gender, and Ethnicity (N=3,777)

	ELL Students			Non-ELL Students		
	All	Graduated	Grad %[c]	All	Graduated	Grad %[c]
Total	**836**	**294**	**35%**	**2,941**	**939**	**32%**
Gender						
Male	396 (47.4%)	147 (50%)	37%	1,394 (47.4%)	417 (44.4%)	30%
Female	440 (52.6%)	147 (50%)	33%	1,547 (42.6%)	522 (55.6%)	34%
Race / Ethnicity						
Caucasian	17 (2.0%)	DS[d]	24%	325 (11.1%)	102 (10.9%)	31%
AA/BL/AI/AN[a]	DS[d]	DS	0%	39 (1.3%)	DS	21%
Asian	730 (87.3%)	283 (96.3%)	39%	1,206 (41%)	503 (53.6%)	42%
Hawaiian or Pacific Islander[b]	56[e] (6.7%)	DS	5%	811 (27.6%)	157 (16.7%)	19%
Hispanic	DS	DS	15%	49 (1.7%)	DS	20%
Mixed	20 (2.4%)	DS	10%	511 (17.4%)	159 (16.9%)	31%

Note. [a]African American/Black/American Indian/Alaskan Native. [b]Includes Guamanian or Chamorro, Native Hawaiian or Part-Hawaiian, Micronesian (not GC), Mixed Pacific Islander, Pacific Islander, Samoan, and Tongan. [c]Ratio of number of graduated to the total within gender and race/ethnicity by ELL status. [d]DS: Data Suppressed for student less than 15. [e] Typically, Hawaiian students would speak English since they were born locally (Even if they were to list Hawaiian as their language, it would be different from someone coming from another country who spoke another language and could not understand English). However, they could receive ELL services if their literacy skill was not up to the levels required in public schools. Of 56 students, 11 were Hawaiian or Part-Hawaiian, the rest of them were Pacific Islanders.

Figure 1 used the line chart to display the difference of graduation percentage between the ELL and non-ELL groups. Hawaiian or Pacific Islander had the biggest gap, whereas Asians had very similar performance across two groups.

Figure 1. Graduation Percentage by ELL Status and Race/Ethnicity



CHAPTER 4
RESULTS

Chapter 4 presents the results of the study summarized in a series of tables to answer the research questions.

First English Course Enrolled in College

Table 3 shows results from five logistic regression analyses. The results indicated that ethnicity, HSA scores, and years enrolled in AP classes were important predictors of the likelihood of taking a college-level English course during the first year of college. Model 1 (Table 3, M1) includes race/ethnicity, gender, and free or reduced lunch (FRL) as predictors in addition to ELL status. Regarding ethnicity, all groups except one (AA/BL/AI/AN) were statistically significant. Asian, Hawaiian or Pacific Islander, and Hispanic were significantly less likely than Caucasian to take a college-level English class. Female and low socioeconomic students [i.e., students identified as receiving free or reduced lunch (FRL)] were less likely to have college level English course as their first English course. Model 1 also indicated ELL status was statistically significant.

In Model 2 (Table 3, M2), number of years enrolled in AP classes and HSA scores (meeting proficiency and exceed proficiency) were added to the model. Both predictors were statistically significant in predicting the likelihood of taking a college-level of English class. On the contrary, however, ELL status, gender, and socioeconomic status (FRL) became statistically insignificant once the high school academic variables were added to Model 1, even if the odds of ELL status and FRL increased slightly.

In Model 3 (Table 3, M3), high school districts were added; however, the result was similar to that in Model 2.

Model 4 (Table 3, M4) included students' highest English course in addition to the Model 3 variables. After controlling for highest English course, the coefficients for most race/ethnicity groups (except AA/BL/AI/AN) slightly increased compared to Model 3. The rest of variables were similar to the previous model.

Model 5 (Table 3, M5) added the high school grade of the highest English course to the regression, but dropped the highest English course level. None of the grade variables was significant. The coefficient of number of years enrolled in AP class increased slightly (with the estimated odd ratio increasing from 2.717 to 2.984). Hispanic was no longer statistically significant, and the coefficient of HSA scores decreased a little bit but still remained statistically

significant. Finally, the number of years enrolled in AP class variables appeared to pick up some of the association from the highest English course level.

Table 3 also suggests that as more predictors were added, the value of Nagelkerke R^2 increased, while the value of -2LL decreased. With a similar classification rate, 71.5%, the values of Nagelkerke R^2 (.273) and -2LL (4159.549) all suggested that Model 5 was the best-fitting model among this series of models under investigation. Holding constant all the other variables in Model 5, the odds of Asian, Hawaiian or Pacific Islander, and mixed ethnicity enrolling in a college-level English class were significantly lower than the odds of Caucasian students. Student test scores were also found to be important predictors of first college English course. More specifically, the odds of enrolling in a college-level English class for students having HSA scores meeting proficiency and exceeding proficiency were about 4.6 and 18.5 times higher, respectively, compared with the reference group of students who were considerably below proficiency. The students who took AP classes were about three times higher in taking college-level English class than no AP class registration (holding other variables constant). Although ELL status was not a significant predictor of enrolling in college-level English class, it was noteworthy that the ELL students were about 15.3% lower than the non-ELL students in taking college-level English as their initial course (holding other variables constant).

Table 3. Logistic Regression Model of Level of First English Course Enrolled in College (N = 3,777)

	Model 1			Model 2			Model 3		
Variables	**B**		**Exp(B)**	**B**		**Exp(B)**	**B**		**Exp(B)**
ELL Students	-0.338	***	0.713	-0.160		0.852	-0.154		0.857
Ethnicity (AA/BL/AI/AN)[a]	-0.457		0.633	-0.435		0.647	-0.402		0.669
Ethnicity (Asian)	-0.551	***	0.577	-0.651	***	0.521	-0.623	***	0.536
Ethnicity (Hawaiian or Pacific Islander)[b]	-1.177	***	0.308	-0.863	***	0.422	-0.843	***	0.430
Ethnicity (Hispanic)	-0.790	*	0.454	-0.675	*	0.509	-0.646	*	0.524
Ethnicity (Mixed)	-0.722	***	0.486	-0.706	***	0.494	-0.686	***	0.504
Gender (Female)	0.176	**	1.193	0.037		1.038	0.036		1.036
Free or Reduced Lunch (Y)	-0.166	*	0.847	-0.025		0.975	-0.028		0.973
HSA[c] Scores (Approach Proficiency)				0.112		1.118	0.114		1.120
HSA Scores (Meet Proficiency)				1.616	***	5.034	1.627	***	5.087
HSA Scores (Exceed Proficiency)				3.056	***	21.234	3.085	***	21.871
HSA Scores (Not Tested)				0.857	***	2.357	0.881	***	2.413
Number of Years Enrolled in AP Classes				1.102	***	3.009	1.101	***	3.006
HS District (Oahu)							-0.110		0.896
Highest English Crs Level (Meet)									
Highest English Crs Level (Above)									
Highest English Crs Level (No Regs)									
Grade (D)									
Grade (C)									
Grade (B)									
Grade (A)									
Nagelkerke R2	.04			.258			.259		
Classification Rate	62.7			71.5			71.5		
-2LL	4893.571			4211.192			4209.451		

Note. [a]African American/Black/American Indian/Alaskan Native. [b]Includes Guamanian or Chamorro, Native Hawaiian or Part-Hawaiian, Micronesian (not GC), Mixed Pacific Islander, Pacific Islander, Samoan, and Tongan. [c]HSA= Hawai'i State Assessment.

*p < 0.05. **p < 0.01. ***p < 0.001.

(continued)

Table 3. Logistic Regression Model of Level of First English Course Enrolled in College (continued)

	Model 4			Model 5		
Variables	**B**		**Exp(B)**	**B**		**Exp(B)**
ELL Students	-0.155		0.856	-0.166		0.847
Ethnicity (AA/BL/AI/AN)[a]	-0.411		0.663	-0.367		0.693
Ethnicity (Asian)	-0.611	***	0.543	-0.626	***	0.535
Ethnicity (Hawaiian or Pacific Islander)[b]	-0.838	***	0.432	-0.809	***	0.445
Ethnicity (Hispanic)	-0.622	*	0.537	-0.587		0.556
Ethnicity (Mixed)	-0.674	***	0.509	-0.641	***	0.527
Gender (Female)	0.035		1.036	-0.033		0.967
Free or Reduced Lunch (Y)	-0.030		0.970	-0.030		0.970
HSA[c] Scores (Approach Proficiency)	0.125		1.133	0.082		1.086
HSA Scores (Meet Proficiency)	1.637	***	5.141	1.534	***	4.635
HSA Scores (Exceed Proficiency)	3.085	***	21.876	2.918	**	18.500
HSA Scores (Not Tested)	0.862	***	2.369	0.836	***	2.307
Number of Years Enrolled in AP Classes	0.999	***	2.717	1.093	***	2.984
HS District (Oahu)	-0.084		0.919	-0.059		0.942
Highest English Crs Level (Meet)	0.134		1.143			
Highest English Crs Level (Above)	0.569		1.767			
Highest English Crs Level (No Regs)	0.507	***	1.660			
Grade (D)				-0.415		0.660
Grade (C)				-0.347		0.707
Grade (B)				0.066		1.068
Grade (A)				0.246		1.279
Nagelkerke R2	.262			.273		
Classification Rate	71.3			71.5		
-2LL	4198.446			4159.549		

Note. [a]African American/Black/American Indian/Alaskan Native. [b]Includes Guamanian or Chamorro, Native Hawaiian or Part-Hawaiian, Micronesian (not GC), Mixed Pacific Islander, Pacific Islander, Samoan, and Tongan. [c]HSA= Hawai'i State Assessment.
*p < 0.05. **p < 0.01. ***p < 0.001.

Degree Attainment at 150% of Graduation Time

For post-secondary phrase, Table 4 illustrates five regression models on the third research question regarding the likelihood to earn a degree at 150% graduation time. In this analysis, the dependent variable from Table 3, first English course level, was used as one of the independent variables. In general, ELL status was not statistically significant, except regarding the last model.

Model 1 (Table 4, M1) included ELL students, as well as other academic related variables such as first English course level, major type at the entry, change in major type, credit earned in first year. First English course level, change in major type, and credit earned were significant factors in predicting the degree attainment.

Model 2 (Table 4, M2), added credits attempted in first year but dropped credits earned in first year. All the odds increased except for ELL status. The newly added variable was significant in the regression model. However, the values of Nagelkerke R^2 and -2LL were not as strong as Model 1. Credits earned in first year was kept as a predictor in subsequent regression models.

Model 3 (Table 4, M3) added personal characteristics such as race/ethnicity. When adding race/ethnicity, the results suggested Asian and Hawaiian or Pacific Islander were statistically significant; however, the coefficients of all academic variables and ELL status in Model 3 decreased compared to Model 1. Race/ethnicity explained some of the variance in degree attainment.

On the contrary, when Pell recipient replaced race/ethnicity in Model 4 (Table 4, M4), the coefficients of all academic variables and ELL status increased compared to Model 3. At the same time, the significant factors still remained statistically significant and Pell recipient variable was significant for Model 4. This implied receiving financial aid is an important variable in predicting graduation.

When combining all factors in Model 5 (Table 4, M5), ELL status became statistically significant, in addition to the existing significant variables. Based on the values of Nagelkerke R^2 (.378) and -2LL (3584.094), Model 5 in Table 4 had the largest Nagelkerke R^2 among the set of regression models. There were six statistically significant variables in predicting student success. They were ELL status, first English course level, change in major type particularly from STEM to non-STEM major, credits earned more than 25 credits in first year, race/ethnicity, and Pell recipient.

More specifically, ELL students had odds of graduating on time nearly 25% lower than the non-ELL students, holding other variables constant. Students who were able to enroll in college-level English classes were about 1.7 times more likely to obtain a degree than students who enrolled in remedial level, holding other variables constant. Changes in major type, especially from STEM to non-STEM, increased the odds in graduation by 1.6 times, holding other variables constant. Regarding degree attainment, for those students who earned more than 30 credits in the first year, the odds of completing a degree were about 15.1 times higher than those who earned less than 24 credits, controlling for the other variables in the model. Asian students had almost 50% higher odds of graduating than White students, whereas the Hawaiian or Pacific Islander's odds of graduating were 41% lower than White students. Pell recipients were almost two times more likely than non-Pell recipients to graduate on time.

For major type at entry, the odds of receiving a degree was about 3% lower for those who first declared STEM major compared with those who did not declare that major, holding other variables in the model constant.

Finally, there was also a predictor, change in ethnic identification between high school and college, which was used to examine if the inconsistency of identifying one's ethnicity would somehow affect their graduation rates. However, the percentage of students who changed ethnic identity was only 25% and it did not significantly affect the odds of earning a degree within the specific time frame. Therefore, this variable was left out of the final regression models.

Table 4. Logistic Regression Model for Degree Attainment at 150% of Graduation Time with College Variables (N=3,777)

	Model 1		Model 2		Model 3	
Variables	**B**	**Exp(B)**	**B**	**Exp(B)**	**B**	**Exp(B)**
ELL Students	0.037	1.038	0.032	1.032	-0.112	0.894
First English Course Level (College)	0.572 ***	1.772	0.697 ***	2.009	0.543 ***	1.720
Major Type at Entry (STEM)	-0.004	0.996	0.106	1.112	-0.046	0.955
Change in Major Type (STEM to Non STEM)					0.536 *	1.708
Change in Major Type (Non STEM to STEM)					0.275	1.317
Credits Attempted in 1st Year (between 25 and 30)			1.350 ***	3.857		
Credits Attempted in 1st Year (more than 30)			2.228 ***	9.282		
Credits Earned in 1st Year (between 25 and 30)	2.006 ***	7.435			1.984 ***	7.723
Credits Earned in 1st Year (more than 30)	2.799 ***	16.434			2.720 ***	15.177
Ethnicity (AA/BL/AI/AN)[a]					-0.604	0.547
Ethnicity (Asian)					0.300 *	1.350
Ethnicity (Hawaiian or Pacific Islander)[b]					-0.430 **	0.651
Ethnicity (Hispanic)					-0.558	0.572
Ethnicity (Mixed)					0.078	1.081
PELL Recipient (Y)						
Nagelkerke R2	.348		.263		.365	
Classification	79.2		73.3		79.2	
-2LL	3686.410		3980.401		3632.935	

Note. [a]African American/Black/American Indian/Alaskan Native. [b]Includes Guamanian or Chamorro, Native Hawaiian or Part-Hawaiian, Micronesian (not GC), Mixed Pacific Islander, Pacific Islander, Samoan, and Tongan.

*p < 0.05. **p < 0.01. ***p < 0.001.

(continued)

Table 4. Logistic Regression Model for Degree Attainment at 150% of Graduation Time with College Variables (continued)

	Model 4		Model 5	
Variable	**B**	**Exp(B)**	**B**	**Exp(B)**
ELL Students	0.002	1.002	-0.279 *	0.757
First English Course Level (College)	0.554 ***	1.741	0.516 ***	1.657
Major Type at Entry (STEM)	0.018	1.018	-0.034	0.967
Change in Major Type (STEM to Non STEM)	0.494 *	1.638	0.498 *	1.646
Change in Major Type (Non STEM to STEM)	0.282	1.326	0.229	1.258
Credits Attempted in 1st Year (between 25 and 30)				
Credits Attempted in 1st Year (more than 30)				
Credits Earned in 1st Year (between 25 and 30)	2.022 ***	7.557	1.957 ***	7.081
Credits Earned in 1st Year (more than 30)	2.799 ***	16.427	2.715 ***	15.100
Ethnicity (AA/BL/AI/AN)[a]			-0.614	0.541
Ethnicity (Asian)			0.362 *	1.437
Ethnicity (Hawaiian or Pacific Islander)[b]			-0.528 **	0.590
Ethnicity (Hispanic)			-0.479	0.619
Ethnicity (Mixed)			0.063	1.065
PELL Recipient (Y)	0.506 ***	1.659	0.634 ***	1.886
Nagelkerke R2	.361		.378	
Classification	79.5		79.0	
-2LL	3645.465		3584.094	

Note. [a]African American/Black/American Indian/Alaskan Native. [b]Includes Guamanian or Chamorro, Native Hawaiian or Part-Hawaiian, Micronesian (not GC), Mixed Pacific Islander, Pacific Islander, Samoan, and Tongan.

*p < 0.05. **p < 0.01. ***p < 0.001.

Examining Interaction Effects Regarding ELL Status

Based on the previous regression models, the significant predictors from Model 5 in Table 3 and Model 5 in Table 4 were selected to test for the presence of any significant interactions between variables. The independent variables again fell into non-academic and academic measures. Non-academic or personal characteristics included race/ethnicity and Pell indicator; academic measures included HSA scores, number of years enrolled in AP class, change in major type, credit earned in the first year, first English course level.

In order to verify if the predictors of earning a degree at specific time frame were different by levels of ELL status, seven 2-way interactions were added to the regression model. These interactions were *ELL*ethnicity*, *ELL*Pell*, *ELL*HSA scores*, *ELL*number of years enrolled in AP class*, *ELL*change in major type*, *ELL*credit earned in the first year*, and *ELL*first English course level*. After adding the interactions to the logistic regression model, the study provided an answer for the fourth research question regarding how ELL status impacted students' success rates differently with respect to any other statistically significant variables. Among the seven interaction terms added, only the *ELL*PELL* term was statistically significant in this model. The rest of the interactions were then eliminated from the final regression model. Table 5 displays the significant interaction.

Table 5. Logistic Regression Model for Interaction Effects of ELL Status (N=3,777)

	Model 1		
Variables	**B**		**Exp(B)**
ELL Students	-0.359	**	0.699
PELL Recipient (Y)	0.310	***	1.363
ELL Students * PELL Recipient	0.950	***	2.585
Nagelkerke R2	.033		
Classification	67.5		
-2LL	4689.889		

*p < 0.05. **p < 0.01. ***p < 0.001.

More specifically, in Table 5 the odds ratio for the ELL students (0.70) suggests that among non-Pell recipients (baseline category), the ELL students were about 70% less likely to graduate on time than non-ELL students. At the same time, the odds ratio for the Pell recipients

(1.363) suggests that among non-ELL students (baseline category), Pell recipients where 1.36 times more likely to graduate in time than non-Pell recipients.

In order to find the odd ratios with interaction effects, some extra steps to the calculation were needed. First, the log odds coefficients (column B) can be added and, second, the result is exponentiated to obtain the new odds ratio. When interpreting the Pell recipient situation for different ELL status (i.e. the ELL students, non-baseline category), first add the coefficients for Pell Recipient (main effect) and the corresponding coefficient for the interaction between ELL and Pell (*ELL* PELL*) as follows:

0.310 + 0.950 = 1.26
Exp(1.26) = 3.53

The odd ratio, 3.53, implies that among the ELL group, Pell recipients were 3.53 times more likely than non-Pell recipients to earn a degree within the allotted timeframe.

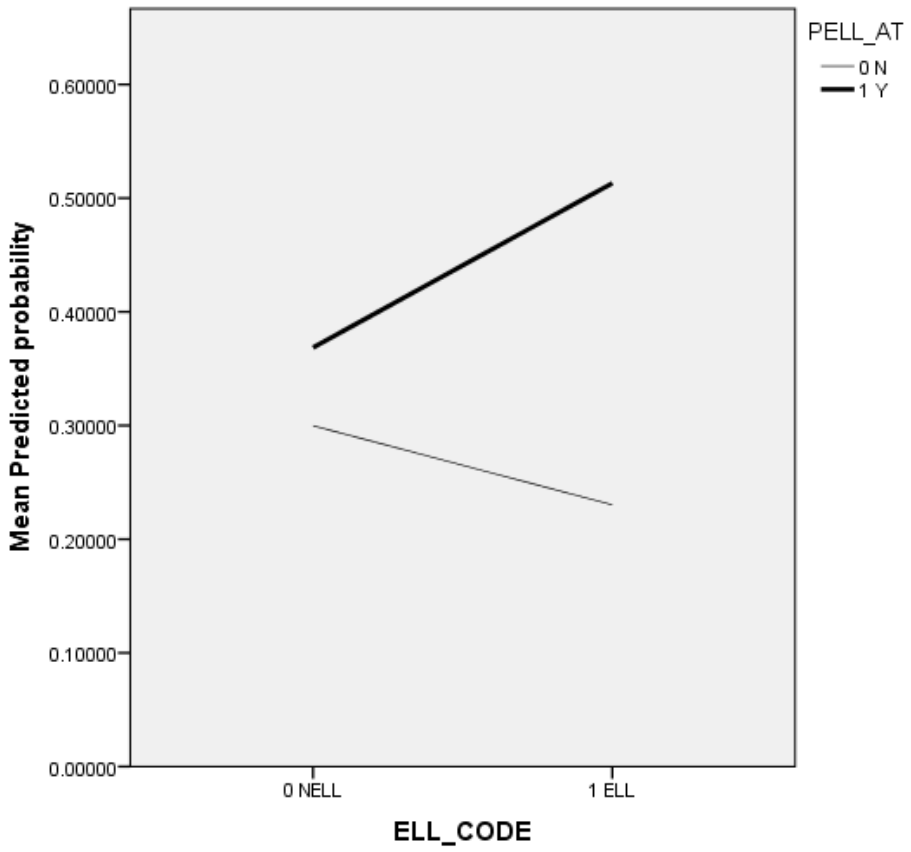
Moreover, when interpreting the ELL situation for different Pell recipients status (i.e. the Pell recipients, non-baseline category), first add the coefficient for ELL (main effect) and the coefficient for the interaction between ELL and Pell (*ELL*PELL*) as follows:

-0.359 + 0.950 = 0.591
Exp(0.591) = 1.81

The odd ratio, 1.81, suggests that among Pell recipients, ELL students were 1.81 times more likely than non-ELL students to earn a degree at a specific time.

The interaction between the ELL status and Pell recipient is illustrated graphically in Figure 2. If the two variables (ELL * PELL) did not interact, the slopes of the lines would be parallel to each other. The lines in Figure 2 clearly indicate that the impact of ELL status on the likelihood of graduating on time was not the same at different level of the PELL recipient variable. With regard to ELL status, among the non-ELL students, the difference in likelihood of attaining a degree between Pell recipients and non-recipients was smaller than the difference between ELL Pell recipients and ELL non-recipients. ELL Pell recipients were more likely to graduate within the specific time frame, whereas ELL non-recipients were less likely to attain a degree within the specific time.

Figure 2. Logistic Regression Model for Interaction Effects between ELL Status and Pell Recipient.



CHAPTER 5

DISCCUSSION, IMPLICATIONS, AND CONCLUSIONS

The Civil Rights Movement and new immigration acts in the United States during the last five decades have increased educational opportunities for underrepresented populations such as low-income individuals, women, individuals of diverse ethnic and cultural backgrounds, as well as individuals requiring English language services. These students were often characterized as having low socioeconomic status, poor educational achievement, and limited English proficiency. When they were admitted and enrolled in a postsecondary institution, these students were not ready for the postsecondary studies. Even though access to college increased in the decades following the Civil Rights Movement, student graduation success rates did not increase as expected. Seeing this phenomena, many governmental agencies and institutional research offices conducted studies using various statistical methods to identify factors that led to observed problems such as low retention rates, low learning readiness among entering students, or low graduation rates.

This research study examined the college success of students in the State of Hawai‘i, using academic and non-academic variables similar to the previous research and focusing primarily on ELL students. The question of how or whether ELL students performed differently from non-ELL students within the English instructional environment was the essential reason behind this research. With remedial education utilized as one of the key variables in the three models developed to predict student success rates, this study provided a clearer understanding regarding how ELL students do in higher education compared to their counterparts. More specifically, it identified variables from pre-college and college periods that affect students' subsequent success rate through utilizing descriptive statistics and predictive models. In general, the results from the logistic regression models were consistent with previous research. Several findings were noteworthy in the Hawai‘i postsecondary context.

Discussion of the Findings

First, descriptive statistics indicated that about one third of ELL students and non-ELL students obtained two- or four-year degrees within the allocated timeframe. Even they had some disadvantages, ELL students were not very different from their native-English speaking counterparts in terms of earning degrees. There was almost an equal share of degrees earned by males and females within the two groups. When looking at the results more closely, graduation rates for Asian were similar in both ELL and non-ELL groups but were much lower for Hawaiians and Pacific Islanders in both groups. It is worth emphasizing, however, that the

overall completion rates of ELL and non-ELL students in Hawai‘i were quite low for the period studied. This will require extra attention from the institutions, however, to address their academic needs.

Second, regarding first-year English course enrollment, the last, and best fitting, model suggested Asian and Hawaiian or Pacific Islander were only about 50% as likely as Caucasian students to enroll in a college-level English course. However, students' socioeconomic background (i.e., as identified by their high school free/reduced lunch status) did not play a significant role in predicting the level of first English course enrolled in the college. On the other hand, students' HSA scores and the number of years enrolled in AP classes were also significant predictors of college-level course enrollment. When students had HSA scores that met or exceeded proficiency, their odds of enrolling in a college-level English class were almost five times and 18 times higher, respectively, than those having scores considerably below proficiency. The odds of enrolling in college-level English class for students who enrolled in an AP class during high school were about three times higher than students who did not enroll in an AP class. This finding was consistent with prior research that higher test scores and taking rigorous courses would help prepare students' college skills (Kuh et al., 2006; Wolniak & Engberg, 2010).

Third, the next set of models added students' first English course taken to a set of predictor variables to predict students' success in obtaining a degree. The results suggested that ELL students and Hawaiian or Pacific Islander were less likely to obtain degrees compared with Caucasian students. ELL students were about 25% less likely to obtain a degree than non-ELL students; whereas Hawaiian or Pacific Islander where about 40% less likely to graduate than Caucasian students. On the other hand, Asian were about 1.5 times more likely than Caucasian students to obtain a degree. Pell recipients were almost two times more likely than non-Pell recipients to graduate on time. Other predictors such as the level of first English class taken, credits earned during the first year, and change in major type were significant predictors of student graduation success.

Students who were able to enroll in college level English class had 1.7 times higher odds of completing a degree than students who enrolled in remedial level courses. In terms of credit earned in the first year, the students earning more than 30 credits and students earning between 25 and 30 credits were 15 times and two times, respectively, more likely to earn a degree than students earning less than 12 credits. The more credits earned in a semester, higher rate in student retention and graduation. This finding supported previous research

suggesting the number of semester hours enrolled in the first fall semester positively affected students' retention rates in the following semester (Fike & Fike, 2008). The result on earning more 30 credits fully affirmed the purpose of the "15 to Finish" strategy, which originated from University of Hawai'i in Fall, 2012. This strategy focuses on institutional help in enrolling students in 15 credits per semester. Earning between 25 and 30 credits or more than 30 credits per year represented full-time enrollment status.

Changes in major type, especially from STEM to non-STEM, increased the odds in graduating by 1.6 times. This findings was opposite to previous research in which switching from a non-STEM major to STEM major yielded increased odds of graduating (Whalen & Shelly, 2010). Because STEM majors usually follow a structured course requirements, having clear guidelines would generally allow students better planning in their academic career. This resulted in higher graduation rates. Besides the nature of the STEM major, there were a few other differences between the studies. They were the composition of ethnicity in the sample, the definition of dependent variable, as well as the definition of major change. The majority ethnicity in Whalen and Shelly's study was White students, while it was Asian students in the current study. Whalen and Shelly looked at both retention rate and graduation through the six years, whereas the current study focused on graduated at 150% of graduation time. Their study collected students' majors at their last registered term, whereas the current study looked at change by the end of third year, which, notably, was the 150% time frame in earning an associate degree. Given these differences in the samples, additional research exploring the underlying reasons for the association of graduation rate and change in major should be pursued.

Finally, follow-up examination indicated students who were PELL recipient were more likely to graduate; more specifically, the third regression analysis illustrated the likelihood of earning a degree for ELL students varied across different levels of the PELL recipient variable. This confirmed two important facts from previous research (Kim, 2011; Kuh et al., 2006; Nagaoka et al., 2009; Pascarella et al., 2004; Whalen & Shelley, 2010). First, ELL students tend to be more disadvantaged in terms of socioeconomic background. Second, receiving PELL/financial aid is an important predictor regarding students' success in the higher education environment, particularly for ELL students. The study showed among the non-financial aid recipients, the likelihood of graduating in a specific time for ELL students was lower than for non-ELL students. The good news is that as long as financial aid resources are available, ELL

students can do as well or better than their native English-speaking counterparts. In this study, ELL Pell recipients were more likely to earn a degree than are non-ELL Pell recipients.

Within the same financial situation, ELL students were found to be more likely to graduate than non-ELL counterparts. Tseng (2006) commented immigrant children usually expressed higher aspirations and educational motivation than did their peers born in the U.S. It could be attributed partly or totally to parents or children's social and economic upward movement desire. Parents' aspirations for the children were to have better future living situations than what they currently had. When the aspirations were channeled to their children, the children were motivated to study well in order to have more advanced academic achievement, greater job opportunities, more highly-paying job, and a better life than did their parents (Tseng, 2006).

Implications

The results of the first two sets of models (i.e., predictors of course enrollment and degree success) suggest the importance of both high school and college variables in explaining student degree attainment. The last model indicates the importance of financial assistance to ELL students.

The role of high schools is important, since they prepare students to be academically ready for postsecondary study and to be able to enroll in college-level English classes. Schools can achieve this goal by helping students reach the meet and exceed proficiency levels in district or state achievement tests and by encouraging students to take more rigorous and advanced course loads such as AP courses and Running Start programs at higher education institutions. While students are preparing for these tests and advanced course work, ideally, their skills in mastering English will be improved. As a result, high school graduates will be more ready for postsecondary study.

High school administrators should be cautioned about focusing on achieving high HSA scores. The goal of state high school tests was to examine the proficiency, rather than merely getting a high score on the tests. The schools could educate and teach the students to learn more than what would be tested in the state achievement test. Schools need to provide a broad curriculum covering a variety of topics and skills development. As for AP classes, the schools could encourage the students to take the official tests instead of depending on the grades given by teachers to evaluate their proficiency. When achieving a minimum score on an AP exam, students will be awarded college credits.

In general, high schools play a role in providing better connection and understanding of subject matter content, learning skills, and study materials between the two educational stages. The learning skills required at the college setting may include note taking, listening, research skills to name a few. Schools can concentrate on teaching or improving these skills before the students' transit to the different learning environment.

Results also confirm English proficiency is critical to students' success in obtaining degrees. Its importance is indirectly reflected through the ability to enroll in college-level English class and to handle more course workload. As English skill is the learning medium for all other subjects, when students receive adequate English skills, they have the ability to enroll in the college-level courses and will be able to take up more credits. The more credits the students earn in a semester, the higher the chances they will remain in school, and the more likely they will be to earn a degree (Fike & Fike, 2008).

In order to improve the English proficiency, institutions could set up policies to make sure students finish remedial education, if needed, during the summer or before the first college term starts. The course will help lay down a good foundation for further studies. The policy could either restrict taking the remedial courses with other courses at the same time for better concentration, or it could facilitate a "corequisite" approach, which enrolls students in remedial and college-level courses in the same subject concurrently. Allowing the student to enroll in a college-level course when first admitted in the college is one way to illustrate the need for students to handle their college studies. Institutions can also carry out more academic strategic planning such as '15 to Finish' to help students focus on their academic progress. Personnel can also encourage students to participate in programs to keep up their workloads and maintain their full time status.

The current research not only showed whether or not students changed major type within the first three years, it also specified what direction in terms of change in major type occurred. In fact, students were required to declare a major when they first entered the school. When time moves on, they might gain better understand regarding what they would like to pursue. Change in major indicated students had a clearer picture regarding their academic career. In order to help students in selecting a major, institutions can provide more information on the nature of majors, academic paths toward earning a degree, and potential occupations related by the majors.

As for differences in success due to race/ethnicity background, high schools and institutions can provide more educational resources for targeted groups such as Hawaiian or

Pacific Islander. High school policy can focus on providing more educational resources which include in-class learning aids, English learning strategy, and after-school tutoring. The goals of providing additional aids are to better prepare and equip the students to study in postsecondary setting which requires many advance study skills. It is also better to help students exit the ELL program as early as possible. On the colleges' side, they can provide a variety of student services and support before and during the semester, as well as after the semester ends. Student orientation could mentally prepare them for transition from high school to college or from home town culture to a new culture (i.e., in this case, the State of Hawai'i). Frequent advising services during the semester can also monitor students' progress and provide interventions if needed.

This study found that Pell recipients were more likely to complete a degree. Usually Pell recipients represent students with low socioeconomic status. They were required to work part-time to cover the school expense or be a source of family income. With financial assistance, students will release some of their financial burdens and focus their efforts on studying. The study also emphasized that financial aid is particularly important to ELL students. If ELL students receive PELL grants, their likelihood of earning a degree is higher than those of ELL non-PELL recipients and non-ELL PELL recipients. Institutions can put ELL status into consideration when calculating how much loan or grant money is awarded to students. Also, colleges can provide more resources on loans, scholarships to minority or special group of students (i.e. ELL students).

Limitations

This research was bounded by a number of limitations. First, data integrity was one of them. Multiple sources (DOE and UH) using different coding systems created data inconsistency. Some of data, such as student race, gender, high school name were self-reported, so they could not be separately validated. Free and reduced lunch status was only self-reported when students applied to receive free or reduced lunch during high school. If they did not submit applications for any reason, social economic situation might not be accurately described.

Second, some variables from students' high school year were either not available in the database or not collected at all. GPA was not available in the old system but will be collected in the new student information system. Parents' education level and income level were not collected by DOE. That information was available through student surveys collected through the ACT exam. This information would only be available through ACT test takers or those who took

the survey only. The very first grade/year enrolled in the ELL program or the number of years in ELL programs was not available at all. The ELL indicator provided only indicated students' ELL status at graduation. It therefore eliminated information on the age of arrival and the length of staying in the program. Due to the change in the high school course code structure, the academic courses data in ninth and 10th grades were missing. The course enrollments would provide more insight about students' academic progress and retention rate.

Third, it is possible there are other variables after the first-year information collected in this study (e.g., cumulative GPA, cumulative credits completed, more complete information on majors, and two-year preparation programs) that might also affect students' likelihood to obtain a degree.

Fourth, according to the trend reported in *More of Hawaii's Graduates are Going to College* (Hawai'i P-20, 2015), the total college-going rate reported in 2009 was 50%. The figure for 2007 would be presumably close to 50%. The going rate to the University of Hawai'i in 2007, however, was only 35.6% (University of Hawai'i, 2007). The sample for current study contained only those who attended the University of Hawai'i. High school graduates who may have left for mainland institutions, or attended some other type of institution in Hawai'i, were not included and might represent a missing link on certain characteristics.

Finally, as the data were mainly from the State of Hawai'i, Asian and Hawaiian or Pacific Islander accounted for 74% of the population. This student demographic background implies that the research findings may not generalize to other states.

Future Research

In order to have a better picture of the latest development and variety of predictors of student completion rate, there are a couple of things that can be improved and added in future research. These additions include data integrity, more in-depth analysis of the predictors, more predictors, an extension on the study period from 150% to 200%, or even continuing after their graduation into the workforce for long term success in the ELL and non-ELL students, data collection method, and additional analysis after policy change.

As the Hawai'i DOE has transitioned to a consolidated student information system, data will be more complete. Future graduating cohorts from the DOE will have more complete data on course enrollment and GPA. Data integrity could be improved through a new data input system or data validation processes. As a result, missing or unmatched data will be reduced and a more complete model can be built.

Future research might also collect data on parent education level or parents' extent of participation in the schools. Their education level and participation are positively related to the students' academic performance. In a high school environment, the administrators can survey parents regarding the school's infrastructure and facilities available to the students, as well as teachers' qualifications, length in teaching the subjects, work experiences. All of the information can be used in building predictive models of student success, as many research studies have demonstrated a positive link between these and students' academic performance in college years (Kuh et al., 2006; Wolniak & Engberg, 2010).

On the academic side, change in major type from STEM to non-STEM played a part in graduation rate. English proficiency may somehow relate to their selections in STEM and non-STEM related subjects. Studying the relationship between English proficiency and their choices in STEM/non-STEM AP classes might provide an insight to high school teachers on how to help students in equipping skills needed for college and major selections. At the same time, STEM and non-STEM related study can be done in the college area by comparing the STEM and non-STEM credits taken by ELL and non-ELL students. The results might give a hint regarding student learning abilities to the institution and what interventions might be provided by the advising sessions. An AP "pass" indicator, which would accurately indicate if students officially earned a college credit from taking AP classes or not, can also be collected in the future. This information will be helpful in studying the pre-college academic preparation of the students.

Other than academic factors, ethnicity is another interesting variable, as Asian and Hawaiian or Pacific Islander make up the majority in the state. A differentiation measure can be constructed between Asian and Hawaiian or Pacific Islander in terms of the parents' background, students demographics, culture, thinking processes to name a few. Their similarity and differences might allow the educators to understand these two groups of population and address their needs to improve the academic performance. Asian can be broken down in to Japanese, Korean, Chinese, Filipinos, and so forth, for further comparisons and analysis.

Future research may consider stretching the graduation time to 200% which is six years for two-year and eight years for four-year institutions. Or future research can include student data from National Student Clearinghouse, a national systematic collection of enrollment and degree data, to include if students transferred to other institutions outside UH system before the degrees were earned. Both of these extended data source will provide a more completed picture on degree attainment for the cohort in Hawai‘i. Even more is to extend the research in

the workforce, the type of occupation after college or salary earned upon earning a degree would be a different measure of being ‘success’.

Qualitative research can be conducted through personal interview on high school students’ participation in extra-curricular activities, learning style, or studying habits. These non-instructional activities would reflect the way they utilize the language, and adaption to the new environment. Instead of just multiple choices or Yes/No questions, research questions can be designed to measure students’ language skills development, cognitive way of using English, critical thinking skill. When these questions can be analyzed to illustrate their extent of pre-college preparation, this will be very helpful to prepare the students before transition to a new learning environment.

Follow up on policy change is also recommended. Policy change applied to high schools in order to improve the college readiness and college success rate should be analyzed with caution. According to total college going rate reported by Hawai‘i P-20 and the going rate provided by IRAO at University of Hawai‘i annually, a portion of public high school graduates would leave for mainland to further their college study, analysis on the impact should put that into consideration for complete and accurate results.

The University of Hawai‘i Community Colleges (UHCC) have been trying to improve the remedial education, in order to increase the course completion rate and achieve the goal of having students graduate on time. While this research was still in progress, the UHCC was in the process of adopting a new policy regarding a “corequisite” model to be effective in Fall 2016. This model is to enroll students in remedial and college-level courses in the same subject at the same time. As there are positive results when other institutions implemented corequisite remediation models, future research can conduct follow-up research and data comparison after implementing the policy to gain more insight in the impact of the policy change.

Conclusions

Several conclusions can be drawn from this study. First, student background variables do account for some differences in degree completion; however, these are likely proxy variables for more complex processes such as students’ socioeconomic backgrounds and financial needs, and their need to work during college, to name a few.

Second, preparation during high school is important in order to be able to enroll in college-level courses upon entry. This provides a considerable advantage in obtaining a degree.

Third, English proficiency is an important factor, especially for ELL students to earn a degree. Being English proficient provides students with access to strong predictors of success

including taking college level English and handling a workload of more than 15 credits per semester. When students are admitted and enrolled in college, it would be better to require them to complete a remedial course ahead of time instead of deferring enrollment after the first year. When the fundamental skills are well acquired, it should be easier for students to understand the subject matter. All in all, English is the most important tool and medium for learning, English proficiency is the critical point for ELL-students to earn a degree on time.

Fourth, school resources and supports will indirectly enhance students' success rate. These resources include, but are not limited to, student services in advising, tutorial support, as well as access to school facilities such as the library, research tools, student life communities, and financial aid. With easy access to academic resources and financial assistance, being in a safe environment and healthy school life style, students feel more engaged in learning and equipped with necessary knowledge. As a result, student can live up with the college lives.

Finally, Hawai'i's demographics are different from those of U.S. mainland. Asian and Hawaiian or Pacific Islander backgrounds comprise more than 90% of the population in Hawai'i. In contrast, Hispanic and the Black comprise more than 70% in the U.S. mainland. The differences in race/ethnicity distribution have been and continue to provide great educational research opportunities in students from Hawai'i and mainland.

With more awareness in high schools' role, in English proficiency, and in availability of school resources and support, government and institutions can explore more options to improve the existing practice in order to address students' academic concern. Further research on these topics will broaden the view of government and educators regarding students' readiness and college success as well as stimulate them to adjust their practices in order to better serve this diversified population in the USA. This, in turn, should lead to greater success of postsecondary students in terms of receiving desired degrees and more educated labor in the workforce.

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