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The influence of self-efficacy on degree aspiration among domestic and international community college students

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**The influence of self-efficacy on degree aspiration among domestic and international
community college students**

by

Yu Chen

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education (Educational Leadership)

Program of Study Committee:
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Iowa State University

Ames, Iowa

2014

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DEDICATION

To my daughter, Chloe, and my husband, Senlin.

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ABSTRACT

The global economy requires the U.S. higher education develop a well-educated workforce with international perspective. One way to accomplish this goal is to focus on community colleges' role in expanding the pool of domestic and international graduates with college degrees. This study aimed at investigating how self-efficacy interacts with other key factors to function as a psychosocial mechanism that affects community college students' degree aspiration and how such a mechanism functions differently for international and domestic students. The purpose of this study can be specified in two aspects: a) to examine how self-efficacy influences community college students' degree aspiration with the consideration of its interaction with other key factors, and b) to investigate whether there are any differences between domestic and international community college students in the psychosocial mechanism of how self-efficacy influences degree aspiration.

This research developed a conceptual framework based on Bandura's (1973; 1986) self-efficacy theory, Lent's (1994) social cognitive career theory, social capital theory (Bourdieu, 1986; Coleman, 1988), and status attainment theory (Blau & Duncan, 1967). The hypothesized conceptual model emphasized the role of self-efficacy as well as its interaction with other key factors such as social capital, personal input, high school experiences, transfer readiness, and community college supports and barriers. The conceptual model was designed to test how self-efficacy and the other key factors functioned interactively and influenced community college students' degree aspiration.

The Sunshine College (pseudonym), a multi-campus community college located in Florida, was selected as the participating college in this study. An on-line survey, STEM Student Success Literacy (SSSL) Survey, was implicated to Sunshine College in order to

collect data about community college students' self-efficacy, degree aspiration, and other key factors included in the conceptual model. Structural Equation Modeling (SEM) techniques were adopted to examine the fit of the conceptual model with the entire sample as well as two sub-samples, international and domestic community college students. In addition, descriptive analysis, comparative analysis, and factor analysis were also conducted for answering the research questions.

Results of this study indicated that high self-efficacy students comprised of more females, older students, students with higher social capital level and higher degree aspiration, and those with higher GPA in college. No significant differences in self-efficacy level were found between international and domestic students. Based on factor analysis, three general self-efficacy constructs: effort, initiative, and time management were included in the measurement model for testing. The SEM analysis finalized a statistical model that explains the psychosocial mechanism of how self-efficacy influences degree aspiration. In particular, self-efficacy was found both directly and indirectly (via transfer readiness) impacting degree aspiration. Other key factors such as high school experiences, age, native language and ethnicity were found indirectly influencing degree aspiration through the mediation of self-efficacy.

Findings of this study contributed to the existing literatures and added knowledge by a) focusing on community college students, b) utilizing general self-efficacy constructs, and c) emphasizing international students' psychosocial formation of degree aspiration. The psychosocial mechanism revealed by this study can help community college educators better understand community college students' (both domestic and international students) psychological world, and eventually facilitate their academic and career success.

CHAPTER ONE. INTRODUCTION

Overview

The competitive edge of the U.S. economic leadership in the world is slipping due to the challenges from global marketplace. Developing a well-educated workforce with international perspectives has been a major focus for sustaining the leadership position in the innovative global economy (National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 2007). One way of constructing such workforce is to focus on the role of community colleges. Community colleges in the U.S. have been serving as an alternative option of post-secondary education and a pathway towards Bachelor's degrees. The most effective ways for community college to contribute to the growth of the innovative and global workforce are a) continuously serving as a pathway towards Bachelor's degree by helping more underrepresented minority students and underprepared high school graduates, and b) enlarging the pool of international students and assist them to achieve their academic goals.

Community College as a Pathway to Bachelor's Degree

During the past two decades, obtaining a college degree became increasingly important for being economically self-sufficient (U.S. Department of Education, 2012a; 2012b). Young adults who gained a bachelor degree earn \$17,000 (male) or \$15,000 (female) more than high school graduates (U.S. Department of Education, 2012a). However, not all high school students can smoothly and directly enter a four-year institution after their graduation. The rate of American high school graduates who made the immediate transition to 4-year colleges is 41% in 2010 (U.S. Department of Education, 2012b). In order to facilitate young adults' success, the U.S. college education needs to open doors to more

diverse population and seek effective strategies that may help them achieve academic goals. Community Colleges have been contributing to higher education equity through helping underrepresented minority students in college preparation, college access, and achieving college goals (Bailey & Morest, 2006). Specifically, community colleges in the U.S. are helping students from diverse backgrounds regarding race, gender, nationality, and college preparedness. Functioning as an “access bridge” to 4-year institutions, relatively low tuition, and less stringent college entry requirement are three critical factors that direct degree-seeking students to community colleges (Hagedorn, 2004a; Hagedorn & Lee, 2005; Morest, 2013). Community colleges have been providing these students with accessible and affordable education as well as pathways to receive a Bachelor’s or higher degree. It was found that community college students generally show high transfer and degree aspirations (Hagedorn, 2004b). In some recent studies, it was found that demographics, social capital, institutional support and student engagement have critical influence on community college students’ educational aspiration (Laanan, 2003; Byun, Meece, Irvin & Hutchins, 2012; Alexander, Bozic, & Entwisle, 2008; Conway, 2010).

International Students in Community Colleges

As part of the diverse community college student group, international students enrolled at community colleges also gained increasing attention from both practitioners and researchers. In 2013, 86,778 international students enrolled in American Associate’s institutions, which represented 10.6% of the overall international student enrollment in American post-secondary institutions (Institute of International Education, 2013a). The increase of international enrollment added a new layer of diversity into the community college campus; and at the same time, extended the mission of community colleges.

Encouraging more international students to enter U.S. higher education system benefits the U.S. prosperity. Many international graduates with at least a Bachelor's degree will stay and contribute greatly to the U.S. economy. Other international students return to their home country and become the best ambassadors for the U.S.

To some extent, international students shared the same passion and goals as domestic community college students enrolled in academic programs. Studies on international community college students indicated that most of these students are considering transfer to four-year institutions (Bevis & Lucas, 2007; Hagedorn & Lee, 2005; Bohman, 2010). However, the unique characteristics of international students (e.g., language ability, cultural adjustment, etc.) made it possible to find differences between international and domestic students in how certain factors may affect their educational aspiration. For example, in some countries, test scores were the only or the most determinant criterion of college admission. Students from these countries may develop their educational aspiration fully based on their previous test scores or beliefs of their ability of achieving high-test scores in standardized test. To add another layer of complication, international students may also have their main goal of studying abroad as to obtain at least a Bachelor degree, since many countries do not have community college system and/or do not recognize the full value of associate degrees obtained in the U.S. Thus, although international students still represent a small proportion of the entire community college student population, we need to distinguish them from domestic students when studying their educational aspiration and academic experiences.

A plethora of studies have been focused on international community college students' educational aspiration (Hagedorn & Lee, 2005; Mamiseishvili, 2011; Bohman, 2010). However, there are still areas that remained under-explored. One of these areas is the

influence of students' psychological factors. This study attempted to examine a certain psychological factor, namely, self-efficacy, and its' influence on domestic and international community college students' educational aspiration. This study viewed self-efficacy not only as a single variable, but also as a construct that could interact with other key factors. Through studying self-efficacy, this study aimed at building new knowledge on the psychosocial mechanism of how community college students form and develop their educational aspiration. For international student group, studying how such mechanism is different from domestic students adds more layers of knowledge to the extant literature. Both researchers and practitioners might benefit from the research findings and eventually help more domestic and international students to achieve success.

Statement of the Problem

According to the social cognitive theory, psychological indicators such as perceived self-efficacy, self-concept, and self-regulation played a great part in students' academic development and success. For example, the positive relationships between self-regulatory efficacy and academic achievement as well as those between academic self-efficacy and academic achievement have been identified by numerous studies (Carroll, et al., 2009; Caprara, et al., 2008; Zimmerman, 1995; Ferla, et al., 2009; Zajacova, et al., 2005, Lent, Brown, & Larkin, 1984). On the other hand, social self-efficacy was found negatively related to the academic achievement and be linked to a sense of loneliness (Carroll, et al., 2009; Wei, & Zakalik, 2005). In addition, a series of self-concept study revealed that the institutional characteristics (both secondary schools and colleges) contributed to the gender differences on students' self-concept (Sax, 1994; Sax, 1996; Sax, Shapiro, & Eagan, 2011).

Although a variety of informative findings were derived from previous studies, most of these studies were conducted in K-12 or 4-year college/university settings. In these studies, the educational aspiration, if has been focused, was mainly represented by high school students' aspiration of attending college, or undergraduate students' aspiration to persist in a certain major. Only a few studies have focused on community college students' psychological indicators and its relationship to aspiration (Starobin, 2004; Starobin & Laanan, 2005). Considering the critical influence of psychological indicators, especially self-efficacy, on students' aspiration and academic success, it is important to conduct further studies to study self-efficacy in a community college context. One way to do this is to examine self-efficacy's role in community college through a more comprehensive perspective. As a psychological indicator, self-efficacy may exert influence that is affected or interacted by other critical factors such as students' personal input, social capital level, high school experiences, institutional support, etc. To better serve community college students and fulfill community colleges' missions, higher education leaders, community college educators and administrators will need to know a) how self-efficacy affects students' educational aspiration by its own, b) how self-efficacy relates to other key factors that proved to be critical to students' experiences, and c) how self-efficacy functions as a piece of a comprehensive mechanism that affects community college students' educational aspiration.

Further, for community college educators and administrators who primarily serve international students, it will be beneficial to understand the differences between international and domestic students regarding the influence of self-efficacy on educational aspiration. Specifically, some factors such as language ability and length of being in U.S. may only interact with self-efficacy for international student group. Also, international

students may be influenced by different culture backgrounds and have a unique process of self-efficacy development. In this study, students' educational aspiration was measured by degree aspiration. This is because a) degree aspiration is one of the most important indicators that relate to community college students' success, b) degree aspiration is one of the most used measures for not only community college students, but also four-year institution students and high school students, and c) compared to aspiration to obtain a Bachelor degree or transfer aspiration, degree aspiration allows researchers to collect more comprehensive and in-depth information about community college students' educational aspiration.

The Sunshine College and Florida Community College System

The Sunshine College (pseudonym) was selected as the participating community college in this study. This is a multi-campus, predominantly two-year institution located in Florida. It was accredited to award not only the associate degrees, but also bachelor degree. Sunshine college has been recognized by its students' excellent academic outcomes such as completion rates, employment rate, and a great record of transfer rate (Florida College System, 2012). It was also the winner of Aspen Prize for community college excellence in 2011. The Aspen Prize for community college excellence recognizes award winners' exceptional achievement and performance for student outcomes among community colleges across the country. Specifically, winners are recognized for its success in students learning, certificate and degree completion, employment and earnings, and high levels of success and success for minority and low-income students.

According to the enrollment data released by IPEDS, there are 42,915 student enrolled in Sunshine College in fall 2012. More than half of them are female, younger adults (18-24 years old) or part-time students. Hispanic (31%) and Black (17%) are the two biggest

minority student groups (National Center for Education Statistics, 2013). The international enrollment size, though not substantial, made Sunshine College one of the top 40 leading Associate Institutions enrolling international students across the country (Institute of International Education, 2013). Sunshine College was selected to this study because it had a) excellent academic record regarding students' academic outcomes; b) a diverse campus environment that may represent many other community college campuses in this country; and c) a nationally leading position in international enrollment among community colleges.

As mentioned above, Sunshine College is a member of the Florida College System. In Florida, 55% of the undergraduate enrollment in public institutions was in Florida College System. Also, 65% of Florida high school graduates were seeking a degree at one of the 28 community colleges in the Florida College system (Wellman, 2002). A unique feature of the Florida College System is that it allows community colleges to offer bachelor degrees. Sunshine college, although identified as an associate's degree granting institution by many federal agencies (e.g., in IPEDS data), does offer students the option to acquire a bachelor's degree. In particular, the bachelor's degree programs require students to complete an associate's degree two plus two program prior to apply or transfer to the bachelor's degree programs. This assured students to go through a traditional process of transferring to a four-year institution, even though they can obtain both the associate and bachelor degrees in the same college. Therefore, there were limited differences of the transfer process between Sunshine College students and community college students across the country.

Purpose of the Study

This study aimed at investigating how self-efficacy interacts with other key factors (e.g., social capital, personal input, high school experiences, transfer readiness, etc.) to

function as a comprehensive psychosocial mechanism that affects community college students' degree aspiration. This study also focused on how such a mechanism functions differently for international and domestic students. The purpose of this study can be specified in two aspects: a) to examine how self-efficacy influences community college students' degree aspiration with the consideration of its interaction with other key factors, and b) to investigate whether or not there are differences regarding self-efficacy's influence between domestic and international community college students.

Research Questions

This study attempted to address the following questions:

1. What are the demographic characteristics of Sunshine College students who participated in this study?
2. Are there any statistically significant differences in variables such as age, gender, ethnicity, native language, college preparedness and social capital between students who have high self-efficacy levels and those who have low self-efficacy levels?
3. Are there any statistically significant differences in self-efficacy level between international and domestic community college students?
4. How does self-efficacy interact with the factors that were proved to be critical in affecting community college students' degree aspiration?
5. How does self-efficacy level, with the interaction of other critical factors affecting degree aspiration, influence community college students' degree aspiration?

6. Are there any differences between international and domestic students regarding the psychosocial mechanism of how self-efficacy levels influence their degree aspiration?

Methodological Approach

This study adopted a quantitative research methodology. The STEM Student Success Literacy (SSSL) survey was used to measure community college students' self-efficacy level and other related variables. Through an extensive literature review, this study aimed at constructing a statistical model that involved not only self-efficacy variables, but also other critical factors (such as social capital, transfer readiness, personal input, high school experiences, etc.) that may influence the outcome variable, degree aspiration. The data analysis procedures included descriptive analysis, comparative analysis, factor analysis, structural equation modeling techniques, and multi-group analysis.

Theoretical Framework

The theoretical framework of this study consisted of four elements. The first element refers to the self-efficacy concept from social cognitive theory. Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to manage prospective situations” (Bandura, 1995). Self-efficacy influences the types of activity people choose to engage in, the effort level people would spend, and the way people would act when having difficulties (Bandura, 1977, 1986, 1995). Bandura proposed four information sources where self-efficacy derives from, a) performance accomplishments/mastery experiences, b) vicarious experience, c) verbal persuasion, and d) physiological states (Bandura, 1977, 1995). In a broader setting, self-efficacy plays a key role in influencing thought patterns, actions, as well as emotional arousal (Bandura, 1995). Under

educational settings, self-efficacy was found positively impact students' academic outcomes in various types of institutions and populations (Zimmerman, 1995; Caprara, et al., 2008; Klassen, Krawchuk, & Rajani, 2008; Zajacova, et al., 2005; Lent, 1984).

Based on Bandura's self-efficacy theory, Lent (1994) developed a Social Cognitive Career Theory (SCCT) to illustrate the psychosocial mechanism of how self-efficacy influence individual's career development. The SCCT model emphasizes three general social cognitive factors: self-efficacy, outcome expectations, and personal goals. It illustrates how these social cognitive factors, personal inputs, as well as environmental supports and barriers are linked together to guide individuals' career development. The SCCT model consists of a three-fold framework that relates to individuals' a) academic and career interests, b) educational and vocational plans, and c) performance of their chosen academic and career fields (Lent et al., 2003). A number of recent studies have adopted this framework to study how students developed their STEM related aspiration and career choice (Navarro et al., 2007; Porter & Umbach, 2006; Wang, 2013b). This present study modified and employed a part of the SCCT model to investigate the psychosocial mechanism of how self-efficacy and other factors influence community college students' degree aspiration.

The third element of theoretical framework refers to the social capital theory. Bourdieu (1986) defined social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition." Bourdieu's critical perspective views social capital as a mechanism used by domain class to promote social reproduction (Bourdieu, 1973; 1986). In comparison, Coleman (1988) conceptualized social capital as a positive social control that can help generate norms and change children's life chances.

Based on Coleman's conceptualization, a number of educational studies measured social capital by family structure and parent-child/ teacher-student interactions (Dika & Singh, 2002). In this study, Coleman's conceptualization was utilized as a guide to generate correspondent social capital measures.

Last but not least, the final theoretical framework element is the status attainment theory established by Blau and Ducan (1967). The status attainment theory focuses on the process of how social origin and socialization/encouragement from significant others can influence one's educational aspiration and eventually social position. Based on their proposed model, Blau and Ducan (1967) found that children from higher social origins had higher occupational goals than those from working class (Blau & Ducan, 1967). The status attainment theory emphasizes both social origin and social capital that students possessed before entering the education system. In some recent higher education articles, status attainment theory was proved to be applicable to examine community college students' educational aspiration (Laanan, 2003; Wang, 2013a).

Significance of the Study

The significance of this study can be summarized through the following three aspects. First, it is very important and necessary to examine self-efficacy's influences in a community college context. It can help community college leaders, educators and administrators to better understand the psychological aspects of their students and hence provide better services to foster their success. This study may provide a foundation for future exploration on community college students' self-efficacy. For example, future research may be inspired by this study and investigate the self-efficacy levels of students who are enrolled in career and vocational training program.

Second, since the SSSL survey was designed for and implemented with community college students, this study measured students' self-efficacy level after they entered community colleges. This approach provides the possibility to consider how self-efficacy is influenced by students' input variables (such as demographics, social capital) as well as high school learning experiences. Researchers can obtain a more holistic picture of how self-efficacy transforms from secondary schools to post-secondary institutions, and continuously affects students' future learning experiences. Both secondary and post-secondary educators can obtain inspirations of how their efforts may influence students in a long term.

Third, international students in postsecondary institutions were mainly studied in relation to their adjustment to the academic and cultural environment. Very few studies have examined their self-efficacy levels and the possible influence from self-efficacy. By comparing the results of self-efficacy model between domestic and international students, this study can build more knowledge on international students' academic success and provide critical implications to international office administrators and staff.

Forth, this study adopted statistical techniques including factor analysis, structural equation modeling, and multi-group analysis. This methodological approach contributed to the literature about utilizing advanced statistical techniques to study the psychosocial mechanism of community college students. The findings and implications of this study can serve as a base for further methodological exploration on studying related issues.

Definition of Terms

Self-efficacy. Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to manage prospective situations (Bandura, 1995).”

General Self-efficacy. The general self-efficacy is distinguished from domain-specific or task-specific self-efficacy such as math self-efficacy, computer self-efficacy, social self-efficacy, etc. It is resulted from people's experiences in a variety of situation; and will influence people's initiative, effort and persistence. Sherer and colleagues (1982) firstly established the general self-efficacy scale.

Academic self-efficacy. Academic self-efficacy is defined as "personal judgments of one's capability to organize and execute courses of action to attain designated types of educational performance" (Zimmerman, 1995).

Self-regulatory efficacy. Self-regulatory efficacy is people's beliefs and perceptions for relating their actions in accord with personal norms when facing pressure for engaging antisocial activities. In an academic setting, self-regulatory efficacy refers to one's belief of his/her capability of managing academic demands (Caprara, Barbaranelli, Pastorelli, & Cervone, 2004; Zimmerman, 1995).

Degree Aspiration. Degree aspiration is a student's expectation of the academic degree he or her will achieve by the time of completing postsecondary education.

International students: international students are defined by citizenship status in this study. In particular, participants who are non-U.S. citizen (hold a temporary visa or a green card) were identified as international students.

Organization of the Study

The main purpose of this study was to examine the influence of self-efficacy levels on community college students' degree aspiration. This study fulfilled this purpose with a special focus on the differences of the self-efficacy's influence between international and domestic community college students. Following by this initial chapter, this study presented

a review of literature, methodology, results, discussion and implications. In particular, Chapter Two provided an extensive literature review on self-efficacy studies, community college students' educational aspiration studies, studies related to international students in community colleges, and studies that inspired this study with their methodological approaches. Chapter Three outlined the methodological design of this study. Specifically, this chapter included a description of the research design, variables used in this study, data analysis methods, ethnical issues, and the expected limitations. Chapter Four presented the main findings of this study. It included the results from descriptive analysis, comparative analysis, factor analysis, and structural equation modeling. And finally, in Chapter Five, a discussion of findings was provided. And, the implications generated from the findings and discussions were summarized for practitioners and future studies.

CHAPTER TWO. LITERATURE REVIEW

The chapter two included an extensive literature review regarding the main topics of this study. The literatures were summarized in the following four aspects: 1) self-efficacy theory and empirical studies that examined the theory, 2) studies that inform the issue of community college students' degree aspiration, 3) international students in community colleges, and 4) methodological approach in previous literatures that inform this study.

Self-efficacy Theory

General Concept

Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to manage prospective situations.” (Bandura, 1995) Bandura developed a series of theoretical and practical works about self-efficacy in a broad psychological and societal setting. He proposed four information sources where self-efficacy derives from, 1) performance accomplishments/mastery experiences, 2) vicarious experience, 3) verbal persuasion, and 4) physiological states (Bandura, 1977, 1995). In a broader setting, it was found that self-efficacy played its role in influencing thought patterns, actions, as well as emotional arousal (Bandura, 1995).

The nature of self-efficacy shares both similarities and dissimilarities with another psychological concept, self-concept. Self-concept involves a comprehensive cognition of one’s attribute and affective evaluation of these attributes through comparing oneself with others (Bong & Clark, 1999). As indicated in the definition, self-concept is heavily affected by the comparison with others, while self-efficacy is more based on the comparison with one’s past experiences (Bong & Clark, 1999).

General Self-efficacy Scales

Self-efficacy is primarily discussed as domain-specific sets of self-beliefs. However, evidences show that general self-efficacy existed and is tied to human's behaviors. Bandura and colleagues proved that mastery-based experiences would lead to stronger, higher and more generalized self-efficacy (Bandura, 1977). Inspired by this finding, Sherer and colleagues (1982) developed a general self-efficacy and a social self-efficacy scale. The general self-efficacy scale is a 23-item measure assessed by 5-point Likert scale, with two subscales (general and social). It was found reliable and valid in various domains (Choi, 2003; Bosscher & Smit, 1998). In a study that examined general self-efficacy as a predictor of college students' academic grades, Choi (2005) concluded that general self-efficacy may not be a significant predictor to a task-specific criterion variable such as term grades. Rather, general self-efficacy may have its influence through its relation with other personality traits (Choi, 2005).

This study utilized the general self-efficacy scales to measure community college students' self-efficacy level and investigate the influence on both international and domestic students' educational aspiration. A structural equation model (General Self-efficacy Model for Community College students) was established to include related personality traits and other external factors.

Self-efficacy and Academic Success

In educational settings, self-efficacy was repeatedly used to prove its influence on students' academic success (Zimmerman, 1995; Edman & Brazil, 2007; Carroll, et al., 2009; Ferla, Valcke & Cai, 2009). Bandura (1995) indicated that there are three aspects that self-efficacy contributes to academic development: 1) students' self-efficacy about self-regulation

learning and master academic subjects; 2) teachers' self-efficacy about their ability to motivate and promote students' learning; 3) faculty's collective efficacy about that their school can promote significant academic progress. Also, based on a review of multiple studies, Zimmerman (1995) summarized that self-efficacy was found influencing three types of academic achievement, which are basic cognitive skills, performance in academic course work, and standardized achievement tests.

A number of related studies also focused on the influence of self-efficacy on academic success. First, self-regulatory efficacy refers to one's belief of his/her capability of managing academic demands. Low self-regulatory efficacy may produce academic anxiety and as a consequence lead to low learning motivation (Zimmerman, 1990, 1995). Many studies proved the positive influence of self-regulatory efficacy on academic achievement in various educational levels. (Caprara et al., 2008; Carroll et al., 2009; Klassen, Krawchuk, & Rajani, 2008; Yusuf, 2011). For example, Caprara and colleagues collected data from 412 Italian students aged from 12-22 years old. They found that the lower the decline in self-regulatory efficacy, the higher were students' high school grades and the greater was the likelihood of their retention in high school (Caprara et. al, 2008). This finding was verified by Carroll and colleagues (Carroll et al., 2009) based on the data of 935 Australian high school students. Furthermore, Klassen and colleagues reached a similar conclusion among college students. They obtained and examined data from a total of 456 undergraduate students to show that self-regulatory efficacy was the most predictive variable of lower procrastination tendencies among other self-variables (Klassen, Krawchuk, & Rajani, 2008).

Second, academic self-efficacy was also found to impact students' college life significantly. Zimmerman (1995) defined academic self-efficacy as "personal judgments of

one's capability to organize and execute courses of action to attain designated types of educational performance." A number of extant studies indicated that academic self-efficacy is a critical predictor of students' academic achievements and students' persistence (Caprara et al., 2008; Ferla et al., 2009; Zajacova et al., 2005; Lent, 1984; Starobin, 2004; Starobin & Laanan, 2005). In particular, Chemers, Hu, and Garcia (2001) surveyed more than 250 college students and found that academic self-efficacy was strongly associated with academic performance and first-year college adjustment. They also found an indirect association between academic self-efficacy and classroom performance, stress, health, and college persistence (Chemers et al., 2001). Another study investigated the joint effects of academic self-efficacy and stress among nontraditional, largely immigrant and minority, college freshmen at a large urban 4-year institution (Zajacova, Lynch, & Espenshade, 2005). The researchers found that academic self-efficacy is a more robust and consistent predictor on academic performance than the academic stress (Zajacova, Lynch & Espenshade, 2005). In relation to STEM education, Lent (1984) found that self-efficacy related to higher grades and longer persistence in STEM fields.

Third, social self-efficacy was also found related to students' academic life. For example, Carroll and colleagues found that social self-efficacy negatively impacts academic achievement (Carroll et al., 2009). While Wei and colleagues (2005) discovered that students' experiences of loneliness are connected to their deficiencies in social self-efficacy.

The majority of self-efficacy studies focused on four-year college students, scarce studies emphasized community college students or international students as the target group. There are only a few exceptions. For example, Edman and Brazil (2007) conducted a study about the ethnic differences in campus climate, social support, and academic efficacy among

community college students. The results indicated that African American and Caucasian students have higher cultural congruity than Asian students and higher academic self-efficacy than Asian and Latino students. However, neither of the cultural congruity nor academic self-efficacy correlates with GPA among African or Caucasian students (Edman & Brazil, 2007).

Community College Students' Educational Aspiration

The development of community college students' degree aspiration is closely related to the issue of educational aspiration. Educational aspiration has been studied by numerous researchers from K-12, four-year, or community college sectors. The issue of community college students' educational aspiration shares many common aspects with the educational aspiration issue of four-year college students and high school students. This section summarized some key factors that were identified as critically influence students' educational aspiration. These factors include: demographics, social capital, and school supports and barriers.

Personal Input

A number of studies focused on educational aspiration among young people who held different personal input, or demographic characteristics. Gender is one of the most studied variables. For example, it was found that girls are more likely than boys to aspire to careers that require a college education, more likely to emphasize the career goals in their rationale of attending colleges, and less likely to aspire a sex-typed career (e.g., fewer girls aspired a feminine occupation compared to the number of boys who aspired to have a masculine occupation) (Blackhust & Auger, 2008). Also, female students are found more likely to have higher aspiration to attend two-year colleges than their male counter-part. (Laanan, 2003).

Race and ethnicity were also used as the focal point of research studies that examined students' educational aspiration. In a quantitative study that utilized Hossler and Gallegher's model of college choice, the researcher found out that African American high school students shared the similar educational aspiration with their White counterparts regardless of their relatively low academic achievements (Pitre, 2006). Furthermore, Wang and colleagues (2003) studied Asian Pacific American community college students' degree aspiration. They found that parent education, age, average high school GPA, perceived language obstacles, and certain reasons of attending community college have significant influence on Asian Pacific American students' degree aspiration (Wang, Chang, & Lew, 2003). Additionally, in a recent study that focused on Latino students from emerging immigrant communities, Gonzalez and colleagues (2013) examined college-going self-efficacy and students' educational aspiration separately. They found that ethnic identity have significant influence on both college-going self-efficacy and educational aspiration for Latino students. Particularly, the Latino identity was found negatively related to students' educational aspiration (Gonzalez, Stein, & Hug, 2013).

In relation to the studies focused on race and ethnicity, a body of literature especially focused on immigrant students in community colleges. Gonzalez and colleagues' (2013) study is one of them. Similarly, Conway (2010) conducted a quantitative research to study the aspirational difference between immigrant and native student groups in an urban community college. He concluded that immigrant students have higher degree aspiration towards a 4-year degree or beyond compared to native students. However, despite the high aspiration, immigrant students are more likely to enroll in a terminal program because of financial concerns (Conway, 2010).

Social Capital

Bourdieu (1986) defined social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition." He viewed social capital and cultural capital as a key factor of social reproduction (Bourdieu, 1973, 1986). Compared to Bourdieu's critical view, Coleman emphasized social capital as a positive social control that can collectively help children's life chances (1988). Coleman's theory highlighted the role of social network as a social structure that facilitates the emergence of effective norms. The intergenerational closure is such a social network concept that refers to parents know the parents of their children's friends (Coleman, 1988). There are two major differences between Bourdieu's and Coleman's theory. The first one is that Bourdieu emphasized the distinction of resources from the ability to obtain them in the social structure while Coleman did not. Further, Bourdieu view social capital as a tool of reproduction for the domain class. Such reproduction was conducted through structural constrains and unequal access to institutional resources based on race, class and gender. On the other hand, Coleman viewed social capital as a positive social control. He emphasized family's responsibility to adopt certain norms to advance children's life chances (Dika & Singh, 2002).

Beginning with Coleman himself, studies that utilized large data set adopted Coleman's conceptualization of social capital. The measurements such as family structure (e.g., two-parent family, numbers of siblings) and parent-child interaction were utilized frequently (Dika & Singh, 2002). This tradition reflected in recent studies as well. For example, Byun and colleagues (2012) adopted Coleman's understanding of social capital and studied its role in educational aspiration of rural youth. They studied social capital into

family social capital and school social capital; and divided social capital into structure (e.g., numbers of siblings for family social capital, minority student proportion for school social capital) and process segments (e.g., parent-child interaction for family social capital, teacher's expectation for school social capital) under family and school two environments. They concluded that process segments such as discussion with parents about colleges, parents' and teachers' educational expectations were positively related to educational aspirations of rural youth. In comparison, some structure segments of social capital such as numbers of siblings, proportion of minority students in school were found not predictive to rural youth's educational aspiration (Byun, Meece, Irvin & Hutchins, 2012). In addition to Byun and colleagues' study, Wang (2013a) also adopted Coleman's concepts of social capital. She emphasized that in post-secondary research, social capital also referred to students' interaction with faculty, advisors and other types of socialization sources. Through a structural equation modeling techniques, Wang (2013a) found an indirect effect from parental expectation of education to academic integration of the children. Although the commonly used social capital measures were criticized as they narrowed and restricted the conceptualization of the social capital (Dika & Singh, 2002), this study used interaction indicators to measure participants' social capital.

Community College Supports and Barriers

As a well-known theory related to school/institution influence on students' aspiration, Clark's (1960) "cooling out" theory was adopted and discussed in many literatures. In community college context, cooling out function refers to how low socio-economic status students were "cooled out" or redirected from degree seeking program to vocational and career-related program (Laanan, 2003). In some recent studies that examined "cooling-out"

theory, although researchers found that disadvantaged youths are vulnerable to “cooling out”, this aspiration decline is not evidenced as a result of college experiences (Alexander, Bozic, & Entwisle, 2008; Conway, 2010). Specifically, Alexander and colleagues (2008) found that two-year college experiences is associated with a warming up rather than a “cooling out” process. Similarly, Conway (2010) suggested that because of the change of students’ characteristics and needs, there is no reason for community colleges to keep every student in degree-seeking path. Rather, students should be directed or redirected based on their own career interests and needs (Conway, 2010).

Another theory that emphasized institution input is social cognitive career theory (SCCT) developed by Lent (1994, 2003). In this theory, contextual influences, or the environmental support and barriers were hypothesized to shape learning experiences, students’ self-efficacy expectations, and eventually aspirations. In some studies that adopted SCCT model, the contextual supports and barriers were operationalized as institution, or college support and barriers. For example, in Wang’s (2013b) study of 2-year and 4-year college students’ decision to enter STEM field, she measured contextual supports and barriers through academic integration, financial aid, and numbers of remedial subjects; and found some of these measures significantly influence students’ STEM choice.

In other studies that did not adopt “cooling-out” or SCCT theory, institutional environments, college supports and perceived barriers were also examined thoroughly. For example, Gonzalez and colleagues (2013) utilized perceptions of barriers (POB) scales to investigate the perceived barriers of Latino students and their influence on educational aspiration. The findings suggested that personal based barriers (e.g., concerns of getting admitted to a college, choosing to continue working rather than pursue a degree, etc.) have

negative influence on students' educational aspirations. The researchers argued that counselors and educators should help students to distinguish external barriers from internal ones, and facilitate students to cope with these barriers strategically (Gonzalez, Stein, & hug, 2013). Another study that focused on nontraditional community college students also emphasized the influence from institutions on students' aspiration. Through interviews, observations and document analysis, Valadez (1993) indicated that nontraditional students' upward social mobility was either facilitated or hindered by the day-to-day experiences with community colleges; and these experiences would also affect students' academic decisions and career choices.

International Students in Community Colleges

Historical Background

The enrollment of international students in American post-secondary institutions has been increasing rapidly during the last decade. According to the Institute of International Education, 764,495 international students studied in American post-secondary institutions during the 2011-2012 academic year. The number has been increasing dramatically since 2006/2007 academic year (Institute of International Education, 2012a).

Community colleges started to attract and enroll an expanding number of international students during 1960s and 1970s (Bevis & Lucas, 2007). At the time, typical international students at community/junior colleges were single males from developing countries, with plans to receive degrees in engineering or business (Bevis & Lucas, 2007). The number of international students attending community college kept growing steadily since then. By 2012, 87,997 international students enrolled in Associate's institutions, which

represented 11.5% of the overall international student enrollment in American post-secondary institutions (Institute of International Education, 2012b).

Researchers began to study international students at community colleges since 1970s. A series of topics regarding to this student group were discussed in the 1977 colloquium sponsored by the American Association of Community and Junior Colleges and the National liaison Committee on Foreign Student Admission. In particular, Gleazer (1978) discussed the basic questions such as why we are having foreign students in community college, what are the outcomes brought by these foreign students to both the community colleges and themselves, etc. In another colloquium paper, *Profile of Foreign Students in United States Community and Junior Colleges*, Diener (1978) indicated that the most important matters of concern to foreign students were financial issues, English proficiency, admission and selection, and academic advising. Other early studies also raised several important questions such as foreign students' academic performance in community college and after transfer into 4-year institutions. However, at the time, only limited studies were done to address these questions (Bevis & Lucas, 2007).

Recent Studies on International Students in Community Colleges

Along with the steady and rapid increase of the international enrollment in community college, more and more in-depth studies were conducted recently. For example, Hagedorn and Lee (2005) argued that international students chose community college because of its “access bridge” function. The authors identified 466 international students at Los Angeles Community College District based on their student visa status. The findings concluded that these international students were more academically transfer-ready than their non-international counterparts (Hagedorn & Lee, 2005). Furthermore, Mamiseishvili (2011)

studied international students' persistence in community colleges by utilizing Beginning Postsecondary Students Longitudinal Study (BPS) data. In this study, faculty interaction and academic advising showed significant influence on first-to-second year persistence (Mamiseishvili, 2011). In addition to these quantitative studies, Bohman (2010) utilized a qualitative approach to study the decision-making process about international students' choice of attending community colleges. He found that factors such as lower college entry requirements and overall cost attracted international students to community colleges (Bohman, 2010).

Strategies to Improve International Students' Success in Community College

Two-year institutions may provide numerous strategies to improve international students' success in community colleges. For instance, supportive faculty was found important to improve international students' success. From interviewing student service administrators, Hagedorn (2004) indicated that hiring bilingual and bicultural faculty would be helpful to improve students' learning experiences (Hagedorn, 2004). Moreover, Zamel (1995) described the tension and conflicts between instructors and ESL students. Faculty members often view ESL students as deficient and having language problems that need to be "fixed" (Zamel, 1995). Zamel (1995) indicated that faculty members should improve collaboration with colleagues, shape the curriculum and respond to students' needs in order to avoid negative impacts from the deficit model perspective. In addition to the above faculty perspectives, Gonzalez (2010) introduced an intervention program that designed specifically to fit international students' needs. She cited the beyond-academic services that Johnson County Community College has been providing to immigrant and international students

(Gonzalez, 2010). These services included helping students purchasing car insurance, searching for a dentist, finding housing, and so on (Gonzalez, 2010).

Methodology Approach

This study adopted a quantitative methodology. In this section of literature review, a variety of quantitative methods related topics were discussed. In particular, this section focused on how previous studies identified international students, employed regression analysis and to examine educational aspiration studies, and tested theoretical models by conducting structural equation modeling analysis.

Identifying International Students

This study focused on whether the psychosocial mechanism of self-efficacy's influence on degree aspiration differs between domestic and international student groups. In previous studies and inquires, different ways of identifying international students were adopted by researchers.

First, one of the most common ways to identify international students is using the self-reported survey data. In Community College Survey of Student Engagement (CCSSE) survey (Center for Community College Student Engagement, 2013) and National Survey of Student Engagement (NSSE) survey (NSSE, 2013), the same question was adopted to identify international students. Participants were asked: "are you an international student or foreign national? Yes/No".

Second, citizenship status also has been used widely to identify international students. For example, Beginning Postsecondary Students Longitudinal Study (BPS) measures participants' current citizenship and this information was used by researchers for identifying international students (Mamiseishvilia, 2011). Also, Cooperative Institutional Research

Program (CIRP) Freshman Survey measures students' citizenship status by asking whether they are U.S. citizen, permanent resident (green card), or neither (HERI, 2011).

A third approach to identify international students is obtaining students' nationality information. This approach was often used when researchers have a targeted international student group. For example, in a study focused on Chinese students, Zhang and Goodson (2011) identified their target population by whether or not potential participants have Chinese citizenship.

The fourth approach to obtain international student information is from institutional data. It requires researchers to identify the institution(s) that they were working with and be able to access the institutional data. In a study of undocumented and documented international students, Dozier (2001) identified more than 500 international students from an urban community college in New York.

Among the above approaches to identify international students, the second one is the most adaptable to this study. In particular, this study incorporated a question collecting participants' citizenship status in the survey instrument.

Regression Analysis

Regression analysis refers to a set of statistical techniques that allows researchers to study the relationship between a dependent variable and several independent variables (Tabachnick & Fidell, 2007). Regression analysis does not reveal the causal relationship between variables. It will be best performed when each independent variable has strong correlation with dependent variable while has no correlation with other independent variables. The criteria of selecting independent variables to be included in a regression model should be grounded on the theory and previous literatures (Tabachnick & Fidell, 2007).

Regression analysis has been widely applied to a variety of research areas. In quantitative studies that explored students' educational aspiration, many researchers utilized regression analysis to test the relationship between variables. Within these studies, multiple linear regression was adopted most commonly, especially when the dependent variable was continuous or interval. For example, Wang and colleagues (2003) studied the academic aspiration of Asian Pacific American students by utilizing a linear regression model. The measure of their dependent variable has a five-point Likert scale. Similarly, in another study, Gonzalez and colleagues (2013) used college-going self-efficacy scale, a four-point Likert scale, as one of their dependent variables. The regression analysis associated with this scale was also, a multiple linear regression.

When the dependent variable is binary, researchers usually considered conducting a logistic regression analysis instead of linear regression analysis. For example, Conway (2010) studied educational aspiration change between immigrant and native community college students. The dependent variable was binary such that 0 = education aspiration changed and 1= did not change. Conway (2010), thus, ran logistic models for both immigrant and native community college student groups and made his conclusion.

Additionally, some researchers choose to conduct a block linear regression to study educational aspiration (Laanan, 2003; Byun, et al, 2012). In particular, blocks of independent variables were added into the regression model by a certain sequence. Effects of different blocks of independent variables were examined respectively. An example of hierarchical regression application is Laanan's (2003) study of community college students' educational aspiration. In this study, he designed three blocks of independent variables that measures students' demographic characteristics, high school experiences, and goals/ values related

information respectively. After each block entered the regression model, the relationship between variables was examined thoroughly and compared with the previous model.

Regression analysis focuses on the direct relationship between each independent variable and dependent variable with other independent variables controlled, or kept constant. It provides limited information about how independent variables interacted with each other and thus, may not be the most appropriate approach for this study.

Structural Equation Modeling

Structural Equation Modeling (SEM) is a statistical approach that allows researchers to examine a set of relationships between one or more independent variables and one or more dependent variables (Tabachnick & Fidell, 2007). It often involves both observed variables and unobserved (or latent) variables. SEM consists of two major parts: a) a measurement model that uses confirmatory factor analysis (CFA) to examine the relationship connecting observed variables and latent variables, and b) a structural model that uses path analysis to examine the relationships among endogenous, exogenous, and latent variables based on a theoretical framework (Kaplan, 2000; Tabachnick & Fidell, 2007). SEM is a confirmatory technique that often used to test a theory. Thus, a pre-structured conceptual model is essential to any SEM analysis. A number of statistical programs such as LISREL, Mplus, SPSS AMOS, and SAS are commonly used in conducting SEM analysis.

SEM analysis has been frequently used in higher education research. As closely related to the purpose of this study, a group of literatures utilized SEM to analyze the SCCT model (Lent, 1994). For example, Lent and colleagues utilized SEM to test the SCCT model on engineering students enrolled in a predominantly white university and two historically black universities (Lent, Brown, Schmidt, Brenner, Lyons, & Treistman, 2003; Lent et al.,

2005). The analysis on both of these two populations confirmed that SCCT is a viable model to predict students' choice and persistence in engineering major. Further, Wang (2013b) adopted SCCT model to examine factors that shaped students' STEM choice among community college and four-year college students. Through a multi-group structural equation modeling analysis, she found some factors influence STEM choice differently among community college students and four-year college students. Such factors included high school math and science courses, college academic integration and financial aid receipt (Wang, 2013b).

Some other higher education researches also incorporated SEM analysis. For example, Vogt, Hocevar, and Hagedorn (2007) focused on gender difference on success in engineering program. Utilizing SEM analysis, they found that a number of factors such as course taking, test scores, self-confidence, and academic integration affect female college students' success in engineering. However, female students were still found dissuaded from pursuing male-dominated fields (Vogt, Hocevar, & Hagedorn, 2007). Also, in another paper, Wang (2013a) studied the formation of community college students' baccalaureate expectation through SEM techniques. In this study, Wang (2013a) established a conceptual model based on status attainment theory, social capital theory, and college persistence literature. According to her findings, the influence from social origin and parents' expectation was confirmed; and the academic integration was proved to be important to students' baccalaureate expectation. In addition, Wang tested the hypothesized model on both female group and male group through multi-group invariance analysis. The results showed that the mechanism of developing educational expectations is the same for male and female students (Wang, 2013a).

For the purpose of this study, SEM is an appropriate approach. There were three advantages that encourage the researcher to adopt SEM analysis in this study: a) it satisfies the purpose of examining how self-efficacy and other factors interacted and worked together as a psychosocial mechanism to impact students' degree aspiration, b) it allows the researcher to develop and test a conceptual model both with an overall sample and with multiple sub-sample, and c) many previous studies on students' educational aspirations adopted SEM analysis and thus provided a variety of examples about developing a theory-grounded conceptual model for this study.

Summary

Chapter Two included an extensive literature review that informed this study. Specifically, the researcher summarized previous literatures from four aspects: a) self-efficacy theory, b) previous studies about community college students' educational aspiration, c) studies focused on international students in community colleges, and d) methodology approaches that informed this study. The implications of the literature review were reflected in the following chapters.

In the next chapter, methodology related issues will be discussed. In particular, the next chapter focused on research questions, hypothesis, research design, variables, methods, ethnical issues, and limitations of the study. Some of the literature review implications directly informed the researcher's consideration on research design, variables included in this study, and specific quantitative research methods.

CHAPTER THREE. METHDOLOGY

Overview

This study aimed at a) investigating the psychosocial mechanism of how self-efficacy influences community college students' degree aspiration, and b) examining whether there are significant differences in self-efficacy's influence between domestic and international community college students. This study adopted a quantitative approach. Specifically, the STEM Student Success Literacy (SSSL) survey served as the instrument measuring students' self-efficacy and other key variables. This chapter illustrated the methodological approaches utilized in this study. In particular, this chapter provided a review of research questions, statements of hypothesis, research design, conceptual model, variables, specific statistic techniques, ethical issues, and limitations of the study.

Research Question

In order to fulfill the research purpose, this study focused on the following research questions:

1. What are the demographic characteristics of Sunshine College students who participated in this study?
2. Are there any statistically significant differences in variables such as age, gender, ethnicity, native language, college preparedness and social capital between students who have high self-efficacy levels and those who have low self-efficacy levels?
3. Are there any statistically significant differences in self-efficacy level between international and domestic community college students?

4. How does self-efficacy interact with the factors that were proved to be critical in affecting community college students' degree aspiration?
5. How does self-efficacy levels, with the interaction of other critical factors affecting degree aspiration, influence community college students' degree aspiration?
6. Are there any differences between international and domestic students in the psychosocial mechanism of how self-efficacy levels influence their degree aspiration?

Hypothesis

A hypothesis for every eligible research question was stated in a null hypothesis form. Because research question one referred to descriptive analysis, only research questions two to six warranted hypothesis testing.

RQ 2: Are there any statistically significant differences in variables such as age, gender, ethnicity, native language, college preparedness and social capital between students who have high self-efficacy levels and those who have low self-efficacy levels?

H1: There are no statistically significant differences in variables such as age, gender, ethnicity, native language, college preparedness and social capital between students who have high self-efficacy levels and those who have low self-efficacy levels.

RQ 3: Are there any statistically significant differences in self-efficacy level between international and domestic community college students?

H2: There is no statistically significant difference in self-efficacy level between international and domestic community college students

RQ 4: How does self-efficacy interacts with the factors that were proved to be critical in affecting community college students' degree aspiration?

H3: There is no interaction between self-efficacy variables and factors that were proved to be critical in affecting community college students' degree aspiration.

RQ 5: How does self-efficacy levels, with the interaction of other critical factors affecting degree aspiration, influence community college students' degree aspiration?

H4: Self-efficacy levels along with other critical factor affecting degree aspirations have no influence on community college students' degree aspiration.

RQ 6: Are there any differences between international and domestic students in the psychosocial mechanism of how self-efficacy levels influence their degree aspiration?

H5: There are no statistically significant differences between international and domestic students in the psychosocial mechanism of how self-efficacy levels influence their degree aspiration.

Research Design

Survey Instrument

This study adopted the STEM Student Success Literacy (SSSL) Survey as the instrument to measure Sunshine College students' self-efficacy levels, degree aspirations and other key variables. The SSSL survey was developed by a research team led by Dr. Soko Starobin at Iowa State University. It is an on-line survey that asks about the academic and social experiences to ascertain the level of literacy among community college students regarding their transfer readiness for obtaining a baccalaureate degree in STEM fields. The SSSL survey was composed of four sections where students' information about self-efficacy, social capital, transfer knowledge, and general demographic characteristics are collected respectively. In particular, the measure of self-efficacy constructs were derived from the general self-efficacy scales proposed by Sherer and colleagues (1982) and Campus Life and Learning survey (Bryant, Spenner, & Martin, 2006). The participants' social capital level was measured by a sub-scale of the Cooperative Institutional Research Program (CIRP) Freshman Survey (HERI, 2011). And the transfer knowledge measures were derived from a sub-scale of the Laanan Transfer Student Questionnaire, L-TSQ (Laanan, 2007). The measures of demographic characteristics of the SSSL Survey were developed after reviewing commonly used national surveys such as CIRP freshman survey, Community College Survey of Student Engagement (CCSSE), and so on.

The survey instrument had two versions. The fall 2012 SSSL survey instrument contained 67 questions and 212 items. The spring 2013 version SSSL survey added two more questions based on the Fall 2012 survey which led to a questionnaire of 69 questions and 214

items. This study adopted the spring 2013 survey as the instrument. Please see Appendix A for the details of spring 2013 survey instrument.

Pilot Study

A pilot study was conducted in spring 2012 prior to the finalization of the survey in fall 2012. Five Iowa community colleges were invited to participate in the pilot survey. A total of 5,448 students enrolled in a STEM-related course in the fall 2011 and spring 2012 semester were invited to take the pilot survey via e-mail. A number of 565 students responded to the survey, resulting in a response rate of 10.4%.

The survey instrument was modified based on the pilot study results. Specifically, the survey items were reduced based on the results of exploratory factor analysis (EFA). The EFA was conducted first with the entire data. After removing items that loaded lowly (lower than 0.6) on the emerging constructs, each construct was tested both with the entire pilot data and with two randomly selected subsets of the pilot data. Using the self-efficacy section as an example, 30 items were included in the EFA analysis. Thirteen items were removed due to their low factor loading (lower than 0.6). After deleting the items, all constructs' Cronbach's alpha scores were tested with both the overall and the two randomly selected subsets of the pilot data. After the modification, the survey was significantly shortened.

Reliability and Validity

In a quantitative study, reliability refers to the consistency and stability of the scores obtained through measurements (Creswell, 2008). The reliability of SSSL survey was examined through the pilot study in spring 2012. Specifically, the EFA results provided the evidence of reliability through high Cronbach alpha coefficients among key constructs of the survey measurements. Further, the reliability of the survey instrument was also considered at

the survey development stage. The questions in SSSL survey were developed based on the investigation of several existed survey such as CIRP, CCSSE, TSQ, etc. These surveys were used and tested repeatedly so that a relatively good reliability was ensured at the very beginning. Additionally, several previous dissertation studies from our research team also confirmed the reliability of some SSSL constructs. For example, Kruse (2013) examined and confirmed the reliability of social capital factor construct, financial factor construct and environmental pull factors by using EFA and Confirmatory Factor Analysis (CFA) techniques. Similarly, Myers (2013) utilized the same techniques and confirmed the reliability of several student engagements constructs in SSSL survey. Moreover, Johnson (2013) tested and confirmed the reliability of self-efficacy construct, student validation construct and transfer capital construct.

The concept of validity refers to that the test interpretation of scores matches its proposed use (Creswell, 2008). The development of SSSL survey instrument was based on solid theory and previous literatures. The theoretical base and empirical findings evidenced the validity of the survey. For example, the general self-efficacy scale that used in this study was based on social cognitive theory. A variety of previous studies have confirmed its validity by implementing the scale in different population (Choi, 2003; Bosscher & Smit, 1998; Woodruff & Cashman, 1993). Specifically, when investigating its relationship with other related scales such as self-esteem scale, mastery scale, and a specific field self-efficacy scale, researchers found significant correlations between general self-efficacy subscales and these related scales ensured its validity (Woodruff & Cashman, 1993).

Population and Sample

Although the SSSL survey was originally designed for community college STEM students, in this study, the population was expanded to both STEM and non-STEM students at Sunshine College. Considering the diversity of community college students and the purpose of this survey, only students in academic programs, taking classes on campus, and have completed at least one semester in the two-year institution were invited for participation. Students who were enrolled in ESL program were excluded in the study. Students under 18 were also removed from the population.

In total, 24,319 students from Sunshine College were invited to participate the survey, while 2,169 students responded to the survey. The overall response rate for the SSSL survey in this study was 8.9%. Within the entire sample size of 2,169 students, 214 students were identified as international students. The criterion to identify international students was participants' answers on survey question #62 "Currently, what is your citizenship status?" All students who reported themselves as "Non-U.S. citizen, with a permanent resident visa/green card" or "Non-U.S. citizen, with a temporary U.S. resident visa" were identified as international students.

Data Collection

The data collection was conducted with the following procedures. First, the SSSL research team communicated with Sunshine College to obtain a list that contains potential participants' name and e-mail address. The researchers then imported the list into the on-line survey software Qualtrics. All potential participants received an e-mail that invited them to participate in the SSSL survey. In this invitation e-mail, potential participants were informed that all responses to the survey will be kept confidential and all data analysis will be

conducted only with an aggregated dataset. If they agree to participate, they can access to the SSSL survey through a web-link that was inserted in the invitation e-mail. The survey was kept active for two weeks. Participants were allowed to stop taking the survey at any time and then resume the survey later within 7 days. Once the survey was submitted by the participants or expired due to the end of the two-week active time window, all responses (including partial responses) were recorded by the Qualtrics system. Two follow-up emails were sent to those who did not respond to the survey one week after sending out the initial e-mail invitation and one day before the survey closure, respectively. To obtain a higher response rate, a random lottery drawing for winning a free iPad was organized and promoted. All participants who completed the survey were granted the chance to win one of the five free iPads. Please refer to Appendix B for the details of the invitation e-mail.

After the SSSL survey was deactivated, a data cleaning process took place. The researchers first downloaded the complete survey data from the Qualtrics system. After removing the identifiers of participants, the researcher deleted all 0% completion responses. The 0% completion responses refer to those participants who clicked the survey link but did not answer any questions. The survey response rate was calculated using the cleaned survey data. The cleaned survey data was treated as the raw data and was utilized to conduct descriptive, comparative analysis, and exploratory factor analysis.

Conceptual Model

Among previous studies that focused on self-efficacy's role in one's educational and career life, Lent (1994) adopted Bandura's social cognitive theory and developed a theoretical model that explains how individuals exercise personal agency in the career development process. The model was named Social Cognitive Career Theory (SCCT) model.

The SCCT model illustrated how the social cognitive factors, personal inputs, as well as environmental supports and barriers linked together to guide individuals' career development. In the original SCCT model, researchers focused on a three-fold mechanism of how these factors influence individuals' a) academic and career interests, b) educational and vocational plans, and c) performance of their chosen academic and career fields (Lent, et al., 2003). Besides Lent's original work, many recent studies applied SCCT model to study how students developed their STEM related aspiration and career choice (Navarro et al., 2007; Wang, 2013b). This study modified and employed a part of the SCCT model (the second framework that refers to educational and vocational plans) to investigate the psychosocial mechanism of how self-efficacy and other factors influence community college students' degree aspiration.

In addition to Lent's SCCT model, the framework of this study also incorporated the status attainment theory established by Blau and Ducan (1967). The status attainment theory focused on the influence of social origin (commonly measured by socio-economic status) and socialization/encouragement from significant others on individual's educational aspiration and eventually social position. Specifically, the status attainment theory indicated that children from higher social origin had higher occupational goals, while working class children had lower occupational goals (Blau & Ducan, 1967). In this study, the status attainment theory supplemented SCCT model by including the influence of social origin and social capital on students possessed before entering the education system. The hypothesized relationship between social capital and educational aspiration can also be supported by Coleman's understanding of social capital (Coleman, 1988).

Figure 3.1 The hypothetical general self-efficacy model for community college student

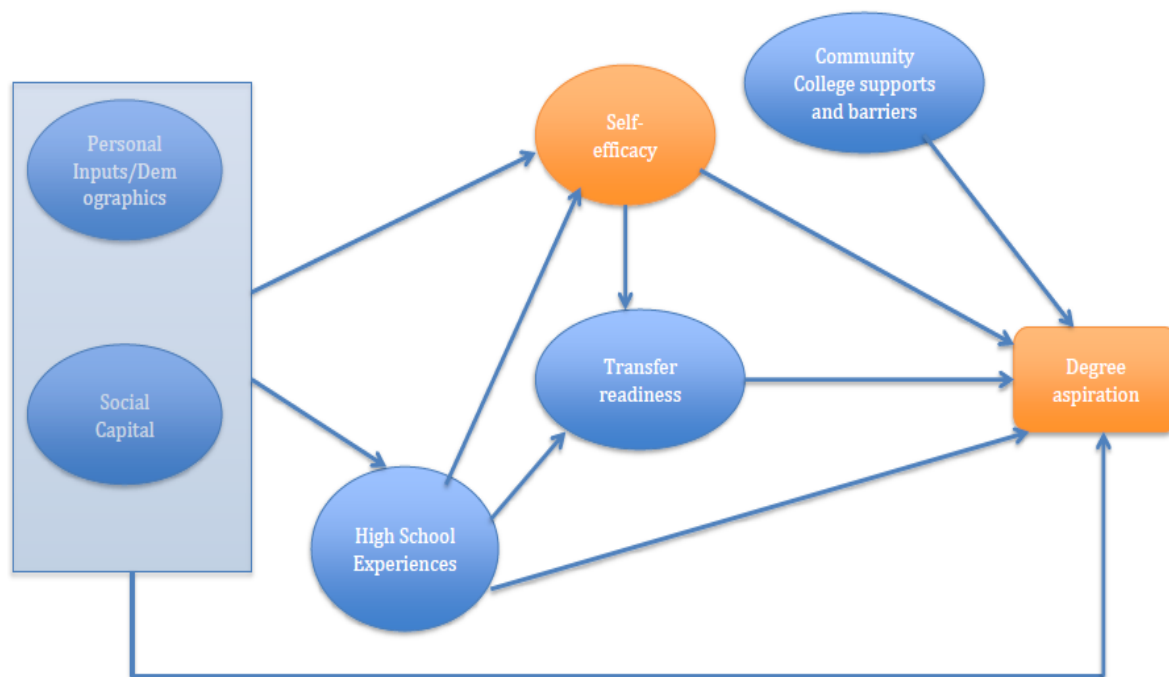


Figure 3.1 presents the conceptual model that guided this study. The technique of structural equation modeling (SEM) was utilized to examine this model. All factors were operationalized by observed and latent variables that generated from the survey measurements. The arrows between these variables represented paths of direct and indirect effects among predictors and degree aspiration. The researcher adopted confirmatory factor analysis (CFA) and SEM to test the structure of latent variables and the significance of each path in the conceptual model.

Besides adding Ducan and Blau's (1967) status attainment theory, this conceptual model distinguishes itself with previous applications of SCCT model mainly in two aspects. First, this model emphasizes the influence of previous learning experiences on self-efficacy level. Such influence was originally discussed by social cognitive theory and was articulated

in Lent's original model (Lent, et. al, 2003). However, many previous studies that utilized SCCT model were not able to include this relationship (e.g., Wang, 2013b). Since the self-efficacy was measured after SSSL participants entered community colleges, previous learning experiences in this study mainly refer to high school experiences. Second, the original SCCT model mainly considered students' self-efficacy, outcome expectations and career/academic related interests, while this model also emphasizes the influence of students' transfer readiness. This add-on was the result of considering SSSL survey participants' characteristics as community college students and the nature of the dependent variable in a community college context.

Variables in This Study

Endogenous / Dependent Variable

Degree Aspiration. The dependent variable of this study was community college students' degree aspiration. In the survey, degree aspiration was measured by Question 33: "If there were no obstacles, what is the highest academic degree you would like to attain in your lifetime?" After recoding, the scale of this question was "will take classes, but do not intend to earn a degree=1, Vocational certificate/Diploma=2, Associate degree=3, Bachelors' degree & at least a Bachelor degree, maybe more=4, Master degree=5, Doctoral degree & Medical degree=6".

Exogenous / Independent Variables

Demographics. A group of seven variables captured participants' demographic characteristics. These variables measured participants' gender, age, race, citizenship status, native language, and parents' education level. In these variables, parents' education level served as a proxy of measuring participants' social origin, or social economic status, for

another measure of social economic status, parents' total income, had a large proportion of missing values. The demographic measures were reflected in question #17, #55, #56, #57, #62 and #65.

Social Capital. According to Coleman's (1988) social capital theory as well as Byun and colleagues' (2012) approach to measure social capital, this study adopted question #25 as the main measure of social capital. Question #25 emphasized the frequencies of interactions between participants and their significant others during high school. There are in total 7 items under this question, including items that related to ordinary activities such as "discuss book, films, or television programs" as well as academic-related activities such as "work with you on your homework" and "discuss your progress in school with you". The underlying dimension of potential constructs derived from question #25 was investigated by factor analysis.

Self-efficacy. As indicated in the previous chapters, self-efficacy levels were measured by general self-efficacy scales proposed by Sherer and colleagues (1982). In this study, the general self-efficacy scale was reduced from 23 items to 13-items based on the EFA results of pilot study. These 13 items were reflected in question #2 & #3 in the SSSL survey. The self-efficacy was assessed by 7-point Likert scale from disagree strongly (1) to agree strongly (7). The factor analyses (both exploratory and confirmatory) further examined and confirmed the self-efficacy constructs with the sample in this study.

Transfer Readiness. The transfer readiness was mainly measured by three survey questions: question #39. Question #39 refers to four aspects that directly related to the transfer process. Specifically, it asked whether or not participants have visited 4-year institutions, spoke to academic counselors at 4-year institutions, got familiar with the

administration facilities at 4-year institutions, and communicated with former transfer students. Question #39 was measured by a 7-point Likert scale in which 1 equals to strongly disagree and 7 equals to strongly agree.

High school experiences. Participants' high school experiences were measured from two aspects: course taking in high school and high school diploma attainment. These two measurements reflected in two survey questions. Question #50 and #51 listed a number of math and science courses and asked whether or not participants have taken these course. A recoding process transformed these two questions into two observed variables indicating the numbers of math and science courses participants had taken in high school.

Community College supports and barriers. College supports and barriers related to the environmental influence on students' aspiration. It was measured through survey items under question #44. Question #44 asked students to rate their satisfaction on services provided by community college. These services include 1) creating faculty and administrative role models; b) providing clubs and organization that match students' interests; c) providing an encouraging classroom environments; d) promoting a sense of belonging; and e) providing opportunities to interact socially with friends. The factor analysis was conducted to investigate and confirm the construct measured by these items.

Data Analysis

This study employed a quantitative research approach. The data analysis involved various statistical techniques such as descriptive analysis, comparative analysis, factor analysis, missing data imputation, and structural equation modeling. The statistical software IBM SPSS 21.0 was utilized to conduct descriptive, comparative, and exploratory factor

analysis; while Mplus 7 was used to conduct confirmatory factor analysis and structural equation modeling.

Descriptive Analysis and Comparative Analysis

The first research question was addressed by descriptive analysis. Specifically, frequencies were utilized to describe the characteristics of Sunshine College students who participated in the SSSL survey.

The second and the third question were addressed by conducting comparative analysis. First of all, in order to capture the characteristics of high self-efficacy students, several *t*-tests and cross-tabulation analysis were conducted on selected variables between high self-efficacy and low self-efficacy student groups. Furthermore, for addressing the third research question, a *t*-test was conducted to investigate the difference in self-efficacy levels between international and domestic community college students groups.

Exploratory and Confirmatory Factor Analysis

An exploratory factor analysis (EFA) was adopted to explore the inter-correlations among self-efficacy items and to structure the constructs of students' general self-efficacy. The EFA analysis was also conducted to explore the constructs of other factors such as social capital, transfer readiness, community college supports and barriers, etc. Further, the confirmatory factor analysis (CFA) was conducted after the EFA. The purpose of conducting CFA was to confirm the constructs that emerged from EFA and to finalize a measurement model with both a good model fit to the data and good conceptual soundness. The CFA results were utilized as the measurement model in the structural equation modeling (SEM) analysis.

Structural Equation Modeling

The SEM was conducted for investigating the psychosocial mechanism of how self-efficacy level interacts with other factors and influences community college students' degree aspiration. The conceptual model was operationalized through observed and latent variables, and tested by path analysis. The model was fitted to the entire sample, and then to domestic student group and international student group separately.

Furthermore, a multi-group analysis was conducted to test and compare the potential differences in path coefficients between international and domestic students. A major concern of comparing the two groups was the unequal sample size. As indicated above, there were only 214 international students within the entire sample. Documented in previous research, the unequal sample size reduces the power of invariance testing to detect the non-invariance (Kaplan & George, 1995; Chen, 2007).

For addressing this issue, this study conducted a random sampling process to reduce the sample size of domestic student group. It should be noticed that the random sampling was not the most ideal but the most realistic and applicable choice. Some matching techniques (e.g., propensity score matching) might create a better comparison group in terms of the equality not only on sample size but also on sample characteristics. However, such techniques were not applicable to this study. For example, propensity score matching (PSM) is a statistical technique designed to simulate an experimental process by matching groups of participants based on observable characteristics. PSM can remove pre-existing difference between the two groups so that the only difference comes from the types of the treatment received (Rosenbaum & Rubin, 1983). In education field, researchers often use PSM to match two groups of students and compare the effect of a certain program, intervention, or

specific educational process (Melguizo, Kienzl, & Alfonso, 2011; Reynolds & DesJardins, 2009; Rodriguez, 2013). However, in this study, it was difficult to locate and justify the effect of treatment between domestic and international students. Besides, differences of observable variables among international and domestic students (often operationalized as demographic characteristics, social background, etc.) also contributed to the variances that to be examined in the analysis. Therefore, random sampling was selected to create the comparison group for international student group in this study.

In order to examine the difference in every path in the SEM model between the two groups, a nested model was first fitted to the two groups. A series of structural path invariance tests were then conducted. The invariance tests aims at investigating whether or not the structural model (results of SEM) can be applicable equivalently to different population (i.e., international students and domestic students). The procedures of multi-group invariance testing was applied as follow:

- a) Obtain the Chi-square statistics of the nested model where all structural weights were freely estimated between the two groups.
- b) Obtain the Chi-square statistics of a testing model where only one given structural weights were constrained to be the same across groups.
- c) Conduct a Chi-square difference ($\Delta\chi^2$) test with the Chi-square statistics in a) and b), if the Chi-square difference test was not significant, then the structural weight being constrained in b) was deemed equivalent (i.e., having non-significant difference) across the groups. On the other hand, a significant Chi-square difference test would indicate the structural weight being constrained was different across the groups.

d) Repeat the procedures a) through c) until all structural weights were tested.

Following the invariance testing, a finalized model was concluded. In this finalized model, only the structural weights that were tested to be the same across groups were constrained to be the same across the groups. The specific model differences were summarized based on this finalized model. As such, the detailed differences between international and domestic student groups on the psychosocial mechanism of how self-efficacy influences degree aspiration was concluded.

Missing Data Imputation

In order to conduct the CFA and SEM, it is required that all missing data be imputed. Given the nature of the on-line survey, many respondents skipped some questions or did not finish the entire survey. These resulted in a proportion of missing values in the data set leading to the need to impute these missing data.

This study adopted a model based missing data imputation method, namely the EM method, as the approach to addressing missing data issues. Specifically, the EM method included two steps. The first step, the Expectation step (E), aimed at seeking conditional expectation of missing data through observed variables as well as current parameter estimates. In this step, the missing observations were imputed through a regression process. The incomplete variables were regressed on the remaining variables. The second step, the Maximization step (M), utilized maximum likelihood estimation and combined with the results of the first step to filled in the missing values. The Chi-square statistic was used to test whether the data are missing at random or not.

A weighting process was added to the data imputation to account for sample bias. The possible bias regarding ethnicity, gender, full-time/part-time enrollment, and age was

considered for missing cases in the sample. The related demographic information of the entire population (students in Sunshine College who were invited to participate the survey) were used to provide a bias weight for applying the case-weighting process.

Limitations

The limitation of this study can be summarized in two aspects. First, the SSSL survey data mainly involved self-reported data. For example, instead of using participants' transcript data, the SSSL survey asked participants to report their course taking information in community colleges and high schools. Also, SSSL only provided information about students' degree and transfer aspiration as compared to actual transfer rate and degree completion outcomes. Future studies examining the actual transcript data, transfer rate, and degree completion outcomes may obtain more accurate data.

Second, the availability of the some variables might affect the generalizability of this study. For example, it would be ideal if the researcher could measure students' social origin by using both students' family income and parents' education level. However, responses to the question of students' family income had a large missing data and could not be included in the analysis. Thus, parents' education level became the only measure for students' social origin. Also, the variable of students' nationality was not included in the analysis. The corresponding survey question was an open-ended question. The answers showed a great variety of countries in the world but it was impossible to quantify the variable and to be added into the model.

Ethical Issues

As a research that involves human participants, the proposal protocol application was approved by the Iowa State University Institutional Review Board (IRB) on March 23, 2012.

Additionally, a separate proposal application was approved by the Sunshine College to affirm this research has met its institutional requirements.

There were two ethic related issues that need to be specified in particular. First, this study required a list of potential participants' names and e-mails to send out the on-line survey link. In order to ensure the confidentiality, an exclusive ID number was created and assigned to each participant. The personal identifiers were all removed from the data before any data analysis took place.

Second, in order to promote a higher response rate, the SSSL survey project provided free iPads as incentives to those who completed the entire survey. All participants were notified that they would have a chance to enter into a random drawing for winning one of the five free iPad. And if they decided to drop out the survey, there would be no consequences.

Summary

The purpose of this study was to investigate the psychosocial mechanism of how self-efficacy affected Sunshine College students' degree aspiration and to examine whether such influence was different between domestic and international community college students. This chapter addressed methodology issues that related to how such purpose can be fulfilled by providing details about research questions, hypothesis, research design, variables, data analysis procedures, limitations, and ethical issues. In the next chapter, a complete report of the findings will be presented. Specifically, the author will present the findings that generated from descriptive analysis, comparative analysis, factor analysis, and structural equation modeling techniques.

CHAPTER FOUR. RESULTS

Overview

This chapter presented the detailed results of this study by tables, figures, and narratives. First of all, the descriptive results were focused on the demographic characteristics as well as other variables related to social economic status, degree aspiration, academic outcomes, etc. The descriptive analysis was conducted for the entire sample as well as for domestic and international student groups separately. Second, the results of comparative analysis (t-test and cross-tabulation) were reported. The comparative analysis addressed the research questions two and three. It focused on the comparison between high self-efficacy students and low self-efficacy students, as well as the comparison between international and domestic students. Third, exploratory factor analysis (EFA) results provided the findings regarding the possible constructs of self-efficacy and other critical factors that influence community college students' degree aspiration. Fourth, the confirmatory factor analysis (CFA) results illustrated the reduced and finalized model of latent variables. Both the EFA and CFA were conducted for the entire sample (all students), domestic students, and international students respectively. Lastly, the structural equation modeling (SEM) findings provided the answers to the last two research questions: a) how does self-efficacy level affect degree aspiration with the interaction of other factors; and b) is there any significant difference between domestic and international student groups in the psychosocial mechanism of self-efficacy affecting degree aspiration.

Descriptive Analysis

In order to describe the characteristics of the sample, a descriptive analysis was conducted on the all students, the domestic student group, and the international student

group, respectively. Table 4.1 presents the frequency and percentage of the variables involved in this analysis.

Table 4.1 Descriptive analysis for all, domestic, and international sunshine college participants --- Frequency

Variables	All students (<i>n</i> =2,169)		Domestic student (<i>n</i> =1,574)		International students (<i>n</i> =214)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender						
Male	591	27.2	526	33.4	62	29.0
Female	1,215	56.0	1,046	66.5	150	70.1
Missing (nonresponse)	363	16.7	2	0.1	2	0.9
Age						
18-24	773	35.6	662	42.1	103	48.1
25-39	645	29.7	567	36.0	74	34.6
≥40	322	14.8	290	18.4	28	13.1
Missing (nonresponse)	429	19.8	55	3.5	9	4.2
Race/ethnicity						
American Indian/Alaskan Native	6	0.3	6	0.4	0	0.0
Asian	91	4.2	63	4.0	27	12.6
Black/African American	299	13.8	248	15.8	45	21.0
Hispanic	587	27.1	497	31.6	84	39.3
Native Hawaiian or Pacific Islander	9	0.4	6	0.4	2	0.9
White	677	31.2	636	40.4	38	17.8
Two or more races	94	4.3	86	5.5	7	3.3
Unknown	38	1.8	28	1.8	9	4.2
Missing (nonresponse)	368	17.0	4	0.2	2	0.9
English as Native Language						
Yes	1269	58.5	1223	77.7	33	15.4
No	469	21.6	284	18.0	180	84.1
Missing (nonresponse)	431	19.9	67	4.3	1	0.5
Highest level of education completed (Mother)						
Elementary school or less	138	6.4	84	5.3	27	12.6
Some high school	241	11.1	178	11.3	26	12.1
High school graduate	561	25.9	424	26.9	50	23.4
Some college	369	17.0	290	8.4	25	11.7
Associate degree from two-year college	229	10.6	183	11.6	13	6.1
Bachelor's degree	291	13.4	210	13.3	32	15.0
Some graduate school	24	1.1	15	1.0	3	1.4
Graduate degree	184	8.5	125	7.9	23	10.7
Don't know	73	3.4	45	2.9	12	5.6

Table 4.1 (continued)						
Missing (nonresponse)	59	2.7	20	1.3	3	1.4
Highest level of education completed (Father)						
Elementary school or less	136	6.3	90	5.7	22	10.3
Some high school	282	12.1	191	12.1	28	13.1
High school graduate	576	26.6	446	28.9	45	21.0
Some college	301	13.9	237	15.1	21	9.8
Associate degree from two-year college	179	8.3	130	8.3	13	6.1
Bachelor's degree	269	12.4	189	12.0	36	16.8
Some graduate school	23	1.1	19	1.2	2	0.9
Graduate degree	181	8.3	126	8.0	22	10.3
Don't know	186	8.6	132	8.4	21	9.8
Missing (nonresponse)	56	2.6	14	0.9	4	1.9
Best estimate of parents' total income last year						
Less than \$20,000	152	7.0	101	6.4	25	11.7
\$20,000 --- \$39,999	161	7.4	119	7.6	22	10.3
\$40,000 --- \$59,999	100	4.6	79	5.0	5	2.3
\$60,000 --- \$79,999	54	2.5	40	2.5	4	1.9
\$80,000 or more	66	3.0	55	3.5	6	2.8
I don't know	171	7.9	133	8.4	21	9.8
Prefer not to answer	96	4.4	66	4.2	16	7.5
Missing (nonresponse)	1369	63.1	981	62.3	115	53.7
Age when first come to U.S.						
Birth to 3	-	-	-	-	11	5.1
4 to 7	-	-	-	-	37	17.3
8 to 12	-	-	-	-	48	22.4
13 to 17	-	-	-	-	19	8.9
18 to 21	-	-	-	-	41	19.2
Oder than 21	-	-	-	-	54	25.2
Not applicable	-	-	-	-	3	1.4
Missing (nonresponse)	-	-	-	-	1	0.5
Highest degree aspired						
Will take classes, but do not intend to earn a degree	4	.2	4	.3	0	0
Vocational certificate/Diploma	9	.4	8	.5	0	0
Associate degree (A<A, or equivalent)	49	2.3	43	2.7	2	.9
Bachelors' degree (B.A., B.S., etc.)	149	6.9	125	7.9	11	5.1
At least a Bachelor's degree, maybe more	325	15.0	278	17.7	27	12.6
Master's degree (M.A., M.S., etc.)	503	23.2	426	27.1	40	18.7
Doctoral degree (Ph.D., Ed.D., J.D., etc.)	603	27.8	465	29.5	89	41.6

Table 4.1 (continued)

Medical degree (M.D., D.D.S., D.V.M., etc.)	281	13.0	222	14.1	44	20.6
Missing (nonresponse)	246	11.3	3	.2	1	.5
Self-reported GPA						
3.75-4.00 (mostly As)	445	20.5	377	24.0	58	27.1
3.25-3.74 (about half As and half Bs)	634	29.2	542	34.4	80	37.4
2.75-3.24 (mostly Bs)	405	18.7	358	22.7	43	20.1
2.25-2.74 (about half Bs and half Cs)	223	10.3	198	12.6	23	10.7
1.75-2.24 (mostly Cs)	52	2.4	48	3.0	4	1.9
1.25-1.74 (about half Cs and half Ds)	7	.3	6	.4	0	0
Less than 1.25 (mostly Ds or below)	4	.2	4	.3	0	0
Have not taken courses for which grads were given	0	0	0	0	0	0
Prefer not to answer	43	2.4	36	2.3	6	2.8
Missing (nonresponse)	356	16.4	5	.3	0	0
Intention to transfer to a 4-year institution						
Yes	1421	65.5	1126	77.9	172	80.4
No	386	17.8	339	21.6	41	19.1
Missing (nonresponse)	362	16.7	9	.6	1	.5
STEM aspiration						
Yes	575	26.5	474	30.1	93	43.5
No	860	39.6	760	48.3	80	37.4
Missing (nonresponse)	734	33.8	340	21.6	41	19.2

As shown in Table 4.1, more than half of the entire sample (56%) were female students. The largest age group was younger adult (18-24 years old) group; 35.6% of the students fell in this category. As anticipated, White (31.2%) and Hispanics (27.1%) were the two most represented race group. For all students (entire sample, $n=2,169$), the majority (58.5%) spoke English as their native language. In regards to participants' family background, the majority (71%) of the participants' mother had less than a Bachelor's degree. Only 23% of the participants' mother held baccalaureate degree or beyond; while

43.4% had high school degree or less. Similar pattern held true for the fathers' education. More than 65% fathers had less than a Bachelor degrees. Only 21.8% had a Bachelor's degree or beyond; while 45% had only high school degrees or less. The variable measuring family income had many missing values (non-responses). This variable came from a survey question asking participants to estimate their parents' total income. It might be that most of the participants had no clue about this question; thus did not answer it. Because of the missing value issue, the author decided not to include this variable to measure participants' social economic status.

The domestic student group ($n=1,574$) shared similar demographic characteristics with the all student group ($n=2,169$). More students were female (66.5%) and younger aged from 18-24 years old (42.1%). White (40.4%) and Hispanics (31.6%) were the two most represented race groups. More than 70% students spoke English as their native language. Relatively fewer parents (22.2% for mothers and 21.2% for fathers) had Bachelor degree or beyond.

The demographics of international students showed some differences from domestic students. Although it was the same that more participants were female (70%), a larger proportion of participants were younger students aged from 18-24 years old (48.1%). Moreover, the two biggest race groups were Hispanic (39.3%) and Asian (21.0%) instead of White and Hispanic. Most students (84.1%) did not speak English as native language. The parents' highest degree indicated a slightly better education level; that is, 27.1% international students' mothers and 28% of their fathers had a Bachelor degree and beyond. Additionally, more than 40% of international participants reported that they came to the U.S. when they

were 18 or older. It should be noticed that 44.8% international participants came to the U.S. before they entered the high school (birth to 12 years old).

In addition to investigating the demographics and background variables, the results of descriptive analysis also illustrated participants' degree aspiration, self-reported GPA, transfer intention and STEM intention. Generally, participants of the survey showed high degree aspiration as previous literatures suggested (Hagedorn, 2004b) – 64% out of all participants indicated they were aspired to have a graduate degree (Master, Doctoral and Medical degrees). International students indicated even higher degree aspiration: 80.9% international participants responded that they would have a graduate degree if no obstacles. The frequency of self-reported GPA showed similar patterns among the three groups (all, domestic, and international). More than half of the students indicated their GPA are either about half As and half Bs (3.25-3.74) or mostly As (3.75-4.00). However, international students had higher GPA than domestic students. More international students reported having mostly As GPA (27.1%) and half As and half Bs (37.4%) compared to the domestic student group (24.0% for mostly As, 34.4% for half As and half Bs). Furthermore, international students showed stronger intention towards transferring to a 4-year institution (80.4%) and a STEM major (43.5%).

To further descriptively examine these variables, means and standard deviations (SD) were calculated for selected variables. Table 4.2 illustrated these statistical results for all three groups.

Table 4.2 Descriptive analysis for all, domestic, and international sunshine college participants ---Means and SDs

Variables	All students (n=2,169)		Domestic student (n=1,574)		International students (n=214)	
	Mean	SD	Mean	SD	Mean	SD
Age	29.55	10.45	29.79	10.62	27.83	8.88
Highest level of education completed (Mother)	4.08	1.89	4.08	1.83	3.97	2.17
Highest level of education completed (Father)	4.00	1.93	3.98	1.89	4.06	2.17
Best estimate of parents' total income last year	2.48	1.33	5.99	1.15	2.10	1.28
Age when first come to U.S.	-	-	-	-	3.99	1.63
Highest degree aspired	6.03	1.14	5.99	1.15	6.37	.96
Self-reported GPA	2.34	1.12	2.37	1.13	2.21	1.03

Note: Variables recoded to remove options like "I don't know", "not applicable" and/or "prefer not to answer". Self-reported GPA also removed "Have not taken courses for which grads were given". Age was calculated on the original scales.

It can be concluded from the analyses that international students have younger average age (27.83 years old). The mean of parents' education level did not show significant difference across the groups. International student had higher mean on degree aspiration and self-reported GPA. It should be noticed that due to the limited sample size (n=214) for the international student group, the mean score could be largely influenced by the sample's higher variance and cases of outliers, which might have complicated our interpretation of the descriptive analysis. This comparison will only give us a brief idea of how international students group scored on these selected variables.

Comparative Analysis

The comparative analysis included t-test and cross-tabulation techniques. These two techniques were used to answer the second and the third research questions. Specifically, the second research question was addressed by using both the cross-tabulation and t-test analysis. The third research question was answered solely by conducting t-test analysis.

Comparison between High Self-efficacy and Low Self-efficacy Students

The second research question asked whether or not there are significant differences between high self-efficacy students and low self-efficacy students in variables such as age, gender, ethnicity, native language, college preparedness and social capital. The first step of analysis was to define high self-efficacy student group and low self-efficacy student group. Based on the results of exploratory factor analysis (EFA), the self-efficacy was measured by three constructs: initiative, effort and time management (Table 4.6). The author divided the entire sample into high and low self-efficacy groups by the magnitude of the participants' scores on these three self-efficacy constructs. Specifically, those who scored high on all three self-efficacy constructs (scored higher than 5 = "slightly agree") were coded as high self-efficacy students; whereas all the others were coded as low self-efficacy students. The negative statements in survey question #2 were reverse-coded prior to the process. As the results, the entire sample was divided into the 1,574 high self-efficacy students group and 546 low self-efficacy students group. There were 50 students coded as "missing" and were not included in this analysis because they skipped some self-efficacy items listed under survey question #2.

Next, a comparative analysis was conducted based on this grouping. Either a cross-tabulation or an independent *t*-test was conducted for comparing the two groups. The decision on conducting either cross-tabulation or *t*-test analysis was based on the characteristics of dependent variables. In particular, if the dependent variable was continuous (e.g., age, self-report GPA), a *t*-test analysis was conducted. If the dependent variable was categorical (e.g., gender, native language), a cross-tabulation was adopted. The *t* and *p* statistics were used to determine the statistical significance. In the cross-tabulation, the Chi-

square statistics were used to determine if the two groups were statistically significantly different on tested variables. Table 4.3 and Table 4.4 (A through D) illustrated the results of cross-tabulation and *t*-test respectively. It should be noted that the following tables only represented the results in where the statistically significant differences were found between the two groups.

Table 4.3. Cross-tabulation on gender for self-efficacy groups

			Self-efficacy Groups		Total
			Low SE	High SE	
What is your gender?	Male	Count	201	379	580
		Expected Count	142.3	437.7	580.0
		% within HighSEonallSEfactor	46.3%	28.4%	32.8%
	Female	Count	233	956	1189
		Expected Count	291.7	897.3	1189.0
		% within HighSEonallSEfactor	53.7%	71.6%	67.2%
Total	Count	434	1335	1769	
	Expected Count	434.0	1335.0	1769.0	
	% within HighSEonallSEfactor	100.0%	100.0%	100.0%	

Table 4.3 presented the cross-tabulation results on gender. The Pearson Chi-square statistic was 47.748 ($df=1$). The Chi-square numbers were statistically significant ($p < .001$). According to Table 4.3., participants who had high self-efficacy consisted of significantly more female students (71.6%) compared to low self-efficacy participants (53.7% females). All the other variables involved in cross-tabulation analysis such as native language, transfer aspiration and STEM aspiration were not found to be statistically significantly different between the two groups.

Table 4.4.A. *t*-test on Age for self-efficacy groups

		Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2- tailed)	Mean Difference	Std. Error Difference
What is your age?	Equal variances assumed	17.314	<.001	3.781	1701	<.001	2.221	.587
	Equal variances not assumed			4.009	779.441	<.001	2.221	.554

Table 4.4.B. *t*-test on Social Capital for self-efficacy groups

		Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2- tailed)	Mean Difference	Std. Error Difference
SocialCapital	Equal variances assumed	7.851	.005	2.208	1886	.027	.131	.05930
	Equal variances not assumed			2.286	858.481	.023	.131	.05729

As shown in Table 4.4 (A to D), high self-efficacy and low self-efficacy students were found significantly different in age, social capital, self-report GPA, and degree aspiration. Specifically, high self-efficacy students were significantly older than low self-efficacy students ($t=4.009$, $p<.001$). The mean age difference was about two years. Further, high self-efficacy students had significantly higher social capital compared to low self-efficacy students ($t=2.286$, $p<.05$). The social capital was measured by a seven-item construct based on the factor analysis results (see EFA sections for details). Third, on

average, high self-efficacy students reported significantly higher GPA compared to low self-efficacy students ($t=-4.642, p<.001$). Lastly, high self-efficacy students had higher degree aspiration compared to low self-efficacy students ($t=3.774, p<.001$). Parents' education level, high school math and science course were found not to be significantly different between the two groups.

Table 4.4.C. *t*-test on Self-report GPA for self-efficacy groups

		Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)	Mean Difference	Std. Error Difference
GPA	Equal variances assumed	17.450	<.001	-4.974	1732	<.001	-.309	.0621
	Equal variances not assumed			-4.642	644.794	<.001	-.309	.0666

Table 4.4.D. *t*-test on degree aspiration for self-efficacy groups

		Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)	Mean Difference	Std. Error Difference
Highest Degree	Equal variances assumed	11.432	0.001	3.941	1882	<.001	0.236	.0599
	Equal variances not assumed			3.774	753.213	<.001	0.236	-.626

Comparison of Domestic and International Students

The third research question referred to the difference in self-efficacy between domestic and international students. To address this question, the first thing to do was to define the two comparison groups. As indicated in Chapter Three, international students were defined based on the self-reported citizenship. There were 214 international students and 1,574 domestic students in the data set. In order to avoid the influence of the unequal sample size, a random sample of 214 students were retrieved from the 1,574 domestic students using SPSS. A *t*-test was then performed on three self-efficacy constructs “effort,” “initiative,” and “time management” between the two groups (see EFA section for details about the constructs). Table 4.5 reported these results. There were no statistically significant differences between domestic and international student groups.

Table 4.5. *t*-test on self-efficacy for international and domestic student groups

		Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2- tailed)	Mean Differ ence	Std. Error Differ ence
SEInitiative	Equal variances assumed	5.014	.026	-1.439	419	.151	-.156	.109
	Equal variances not assumed			-1.437	401.124	.151	-.156	.109
SEeffort	Equal variances assumed	.316	.575	-.112	422	.911	-.009	.077
	Equal variances not assumed			-.112	415.133	.911	-.009	.077
SEtime management	Equal variances assumed	.200	.655	-.110	416	.912	-.014	.126
	Equal variances not assumed			-.110	410.798	.913	-.014	.126

Exploratory Factor Analysis

The exploratory factor analysis (EFA) was conducted to explore the constructs configuration among the variables. The goal of EFA in this study was to explore how the constructs of self-efficacy, social capital, transfer readiness, high school experiences, and community college support and barriers were structured. Specifically, the EFA included a number of variables that measured the factors proposed in the hypothetical general self-efficacy model for community college students (Figure 3.1). The selection of variables was based on the literature review and previous projects using the SSSL data set. The EFA analysis was conducted with the cleaned raw data. The same SPSS syntax was applied to the imputed data. No significant change was observed. Table 4.6 summarized the findings of EFA analysis for all students.

Table 4.6 EFA results for all participants

Variables	Factor loading
Self-Efficacy_Initiative ($\alpha = .826$)	
If something looks too complicated, I will not even bother to try it. (Reversed)	.841
I do not seem capable of dealing with most problems that come up in life. (Reversed)	.823
When trying to learn something new, I soon give up if I am not initially successful. (Reversed)	.807
Self-Efficacy_Effort ($\alpha = .716$)	
Failure makes me try harder	.760
If I can't do a job the first time, I keep trying until I can.	.758
When I have something unpleasant to do, I stick to it until I finish it.	.742
Self-Efficacy_Time Management ($\alpha = .744$)	
I often make lists of things to do	.868
I usually mark important dates on my calendar.	.860
Social Capital ($\alpha = .866$)	
Discuss your progress in school with you	.831
Work with you on your homework	.779
Spend time just talking to you	.753
Spend time talking with your friends	.722
Participate in school related activities	.720

Table 4.6 (continued)

Discuss book, film, or television programs with you	.705
Eat the main meal with you around a table	.670
High School Experiences ($\alpha = .819$)	
High school math courses	.875
High school science courses	.874
Community College supports and barriers ($\alpha = .905$)	
A sense of being a valued member of the community	.870
Administrative/staff role models similar to you	.852
Faculty role models similar to you	.852
Classroom environment that encourage your academic success	.798
Opportunities to interact socially with your friends	.771
Clubs and organizations that match your interest	.746
Transfer Readiness($\alpha = .796$)	
I visited the 4-year institutions at least once...	.857
I spoke to academic counselors at 4-year institutions...	.801
I researched various aspects of 4-year institution...	.751
I spoke to former community college transfer students...	.701

The exploratory factor analysis was conducted with varimax rotation. The KMO measure of sampling adequacy was .830 and Bartlett's test of sphericity showed a statistical significance ($p < .001$). These results illustrated the adequacy for conducting a factor analysis. Utilizing principle component extraction, SPSS extracted seven components (or constructs) with eigenvalues bigger than 1. The factor loadings were generally good (higher than .60). According to Kline (2011), a factor loading around .90 is excellent, .80 is very good, .70 is adequate, .60 is questionable, and around .50 is considered unacceptable. In order to keep the flexibility for the confirmatory factor analysis (CFA), the author decided to keep all items for EFA results if the factor loading is higher than .65. In particular, the lowest factor loading in Table 4.4 is .670 (i.e., social capital item: eat the main meal with you around a table).

The first three constructs were the three self-efficacy constructs. Specifically, the first self-efficacy construct, "initiative," consisted of three items with factor loading higher than .80. The second self-efficacy construct "effort" consisted of three items with a factor loading

higher than .70. Two more items illustrating time management behaviors contributed the last self-efficacy construct “time management”. All self-efficacy items came from survey question #2, measured with a 7-point Likert scale from strongly disagree to strongly agree. All three constructs had a high alpha level (ranged from .716 to .826) indicating a good internal reliability (Tabachnick & Fidell, 2012).

The construct of social capital included all items from survey question #25. This set of seven items described parent-child interaction during participants’ high school. All items were measured by a 5-point Likert type scale for frequency including “never or very rarely,” “a few times a year,” “about once a month,” “several times a month,” and “several times a week.” The alpha level of this construct was high ($\alpha = .866$). The factor loading of items ranged from .670 to .831.

Similarly, the constructs of community college support and barriers consisted of a series of items from survey question #44. This series of items asked participants to rate their colleges on providing academic services and creating positive learning environment. The participants rated their college on a 5-point scale from “not at all successful” to “extremely successful”. The alpha level was high ($\alpha = .905$); and the factor loadings ranged from .746 to .870.

The construct of transfer readiness involved four items from survey question #39. The participants were asked to report their activity related to transfer preparation. This question was anchored on a 7-point Likert scale from “strongly disagree” to “strongly agree”. An alpha level of .796 indicated sufficient reliability. The factor loading of all items were good (ranged from .701 to .857).

The construct of high school experiences contained two proxy measurements relating to students' math and science course taking experiences. The computed variable "high school math courses" was generated by adding up students' self-reported math courses taken in high school. The variable has a range from 0 to 7, in where 0 means students took no listed math courses during the high school; 7 means students took 7 listed math courses. The high school math courses information was collected in survey question #50. The computed variable "high school science courses" was generated based on the same procedures with the original information collected from survey question #51. The variable "high school science courses" had a range from 0 to 6. This construct also had a high alpha level ($\alpha = .819$). And the factor loadings of these two items were .875 and .874.

The same EFA procedure was conducted for domestic students and international students, respectively. For the domestic students, the KMO measure of sampling adequacy was .829; while for the international students, the KMO number is .776. The Bartlett's test of sphericity for both groups showed statistical significance ($p < .001$). These measures indicated the adequacy of conducting EFA analysis on domestic and international student groups. In general, the similar components were extracted from both groups. And the factor loadings were high enough for retaining all items in the Table 4.4. Specifically, the lowest factor loading was .664 (social capital item: eat the main meal with you around a table) for domestic and .715 (transfer readiness item: I researched various aspects of 4-year institution) for international students. The alpha levels of all components for both domestic and international student groups were high enough to indicate a good reliability. The alpha value ranged from .917 to .710. Table 4.7 summarized and compared the EFA findings for domestic and international student subgroups

Table 4.7 EFA results for domestic students and international students

Variables	Factor Loading	
	Domestic (n=1,574)	International (n=214)
Self-Efficacy_Initiative ($\alpha = .812 /.816$)		
If something looks too complicated, I will not try it. (Reversed)	.836	.844
I do not seem capable of dealing with most problems. (Reversed)	.817	.849
When trying to learn something new, I soon give up if I am not initially successful. (Reversed)	.806	.799
Self-Efficacy_Effort ($\alpha = .710/.719$)		
Failure makes me try harder	.769	.737
If I can't do a job the first time, I keep trying until I can.	.736	.818
When I have something unpleasant to do, I stick until I finish it.	.734	.730
Self-Efficacy_Time Management ($\alpha = .728 /.789$)		
I often make lists of things to do	.866	.868
I usually mark important dates on my calendar.	.855	.840
Social Capital ($\alpha = .865/.881$)		
Discuss your progress in school with you	.827	.868
Work with you on your homework	.782	.738
Spend time just talking to you	.747	.819
Spend time talking with your friends	.733	.622
Participate in school related activities	.719	.696
Discuss book, film, or television programs with you	.698	.767
Eat the main meal with you around a table	.664	.756
High School Experiences ($\alpha = .717 /.757$)		
High school math courses	.869	.855
High school science courses	.870	.868
Community College supports and barriers ($\alpha = .901 /.917$)		
A sense of being a valued member of the community	.866	.889
Administrative/staff role models similar to you	.846	.869
Faculty role models similar to you	.847	.864
Classroom environment that encourage your academic success	.794	.819
Opportunities to interact socially with your friends	.774	.784
Clubs and organizations that match your interest	.735	.721
Transfer Readiness ($\alpha = .791 /.836$)		
I visited the 4-year institutions at least once...	.855	.862
I spoke to academic counselors at 4-year institutions...	.790	.863
I researched various aspects of 4-year institution...	.759	.715
I spoke to former community college transfer students...	.694	.770

Confirmatory Factor Analysis

The confirmatory factor analysis was conducted to confirm the EFA results with the data set. In particular, the author established a measurement model based on the EFA results, and fitted the model on all students, domestic students, and international students respectively. The CFA and SEM analyses were conducted with an imputed data set via M-plus version 7. As indicated in Chapter Three, the missing data imputation process was conducted by the EM method using SPSS Missing Value function plug-in for SPSS 21.0 version. After the missing data imputation, the entire sample contained 1,938 domestic students and 218 international students.

The Reduced Measurement Model

In order to obtain a parsimonious measurement model and reach an optimal model fit, several items in EFA results were removed to emerge a reduced model. First of all, some items were deleted from specific constructs. For example, four items (eat main meal with you, spend time just talking to you, discuss book, films, or television programs with you, spend time talking with your friends) from social capital were removed from the final model due to its low factor loadings and less academic-centered nature. One item from self-efficacy construct effort was also removed (*If I can't do a job the first time, I keep trying until I can*). Based on the modification indices provided by Mplus, this item was cross-loaded on other items. By removing it, the model fit improved significantly for all three groups (Chi-square difference test showed significance, $p < .001$). It should be noted that one item of transfer readiness (*I spoke to former community college transfer students...*) was retained although its factor loading was lower than some of those deleted items. The reason is that this item was

proved to be a conceptually necessary and critical part of the construct in previous studies utilizing the similar survey instrument (Laanan, 2007; Laanan, Starobin, & Eggleston, 2010).

Moreover, the construct community college support and barriers was removed from the CFA model. By removing this construct, the model fit improved significantly. More importantly, this construct has less interaction with the key variables of this study, self-efficacy constructs. The deletion resulted in not only a parsimonious model, but also an easier interpretation of the model.

First-Order CFA Model Results

A confirmatory factor analysis (CFA) of the reduced model was conducted via Mplus 7 software with the imputed data set. The same model was tested for all participants ($n=2,169$), domestic students ($n=1,938$), and international students ($n=218$). Table 4.8 illustrates details of the model fit indices for three model results. All models had a significant Chi-square value. However, Chi-square statistics are sensitive to sample size and are likely to wrongly reject a well fit model, it is suggested to use several alternative indices such as Root Mean Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI) as the primary measures instead (Hooper et al., 2008; Kline, 2011; Hu & Bentler, 1999). A smaller RMSEA value (e.g., $RMSEA < .06$) and a CFI closer to 1 (e.g., $CFI > .90$ or conservatively $> .95$) indicate a good model fit (Hu & Bentler, 1999; Schreiber et al., 2006). Based on the model fit indices criteria, all three models fitted the data very well.

Table 4.8 First-order CFA model fit

Model	<i>n</i>	Chi-square(df)	RMSEA	CFI
All student group	2,169	236.364(89)	.028	.986
Domestic student group	1,938	236.430(89)	.029	.984
International student group	218	113.645(89)	.036	.981

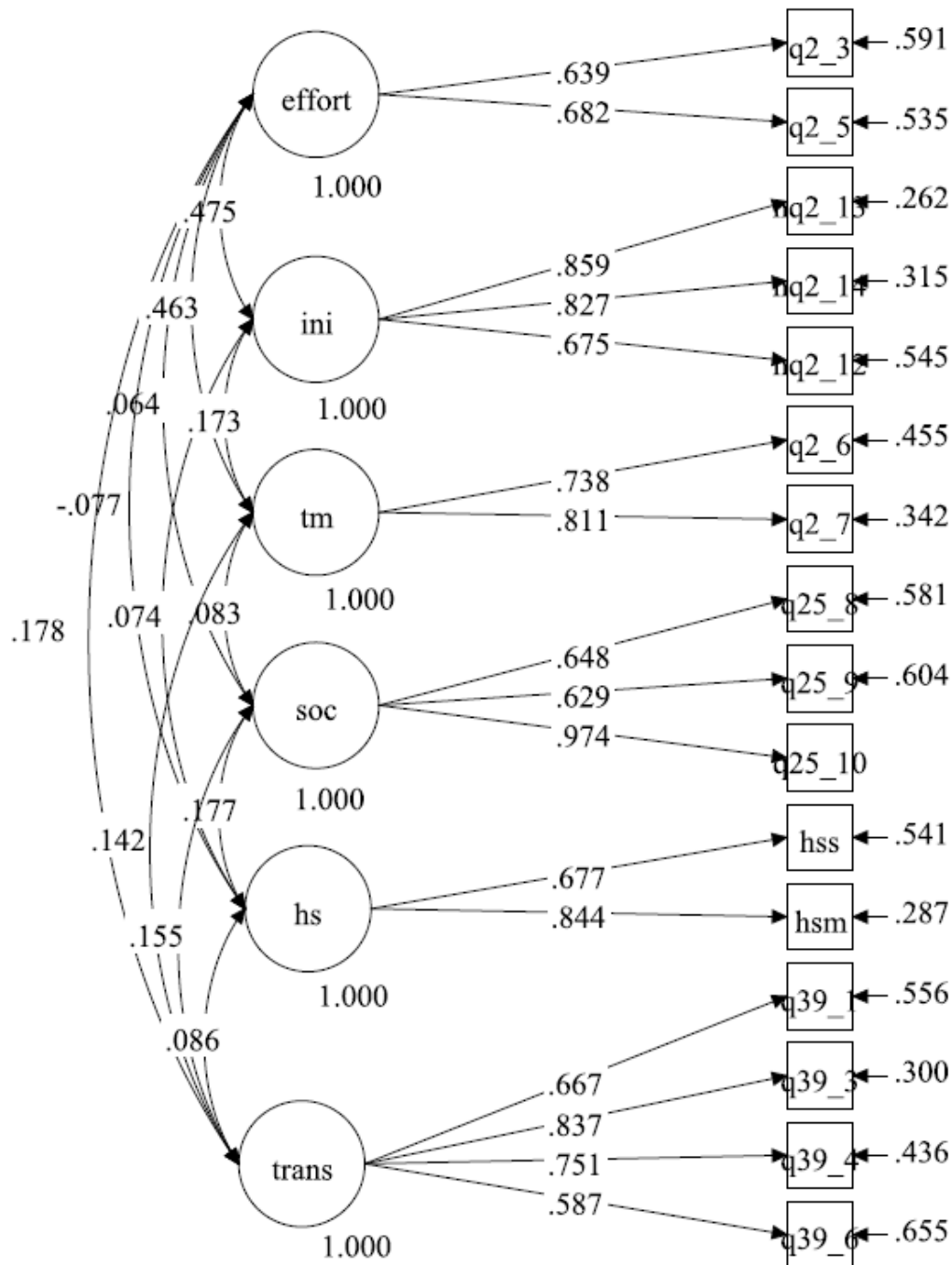
In addition, Table 4.9 (A to C) reported the detailed model results for all, domestic and international student group. Factor loading (estimates), Standardized Factor Loading (Std. Estimate), Standard errors (S.E.) and p-value were reported in the tables. Further, Figure 4.1 to 4.3 graphically presented the model results. Only the statistically significant estimates ($p < .05$) and the standardized factor loadings were reported in the figures.

Table 4.9. A First –order CFA results for all student ($n=2,169$)

	Estimate	Std. Estimate	S.E.	p-value
Self-efficacy: Effort				
When I have something unpleasant to do, I stick to it until I finish it.	1.000	.639***	.022	<.001
Failure makes me try harder	1.117	.682***	.022	<.001
Self-efficacy: Initiative				
If something looks too completed I will not even bother to try it.	1.000	.859***	.011	<.001
When trying to learn something new, I soon give up if I am not initially successful.	.944	.827***	.011	<.001
I do not seem capable of dealing with most problems that come up in life.	.872	.675***	.014	<.001
Self-efficacy: Time Management				
I often make lists of things to do.	1.000	.738***	.025	<.001
I usually mark important dates on my calendar.	1.068	.811***	.027	<.001
Social Capital				
Spend time just talking to you	1.000	.648***	.016	<.001
Work with you on your home work	1.098	.629***	.016	<.001
Discuss your progress in school with you.	1.638	.974***	.015	<.001
High School Experiences				
High school Science Courses	1.000	.677***	.044	<.001
High school Math Courses	1.533	.844***	.054	<.001
Transfer Readiness				
I researched various aspects of 4-year institutions...	1.000	.667***	.015	<.001
I visited the 4-year institutions at least once...	1.325	.837***	.011	<.001
I spoke to academic counselors at 4-year institutions...	1.180	.751***	.013	<.001
I spoke to former community college transfer students...	.952	.587***	.017	<.001

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.1. First-order CFA model results for all students



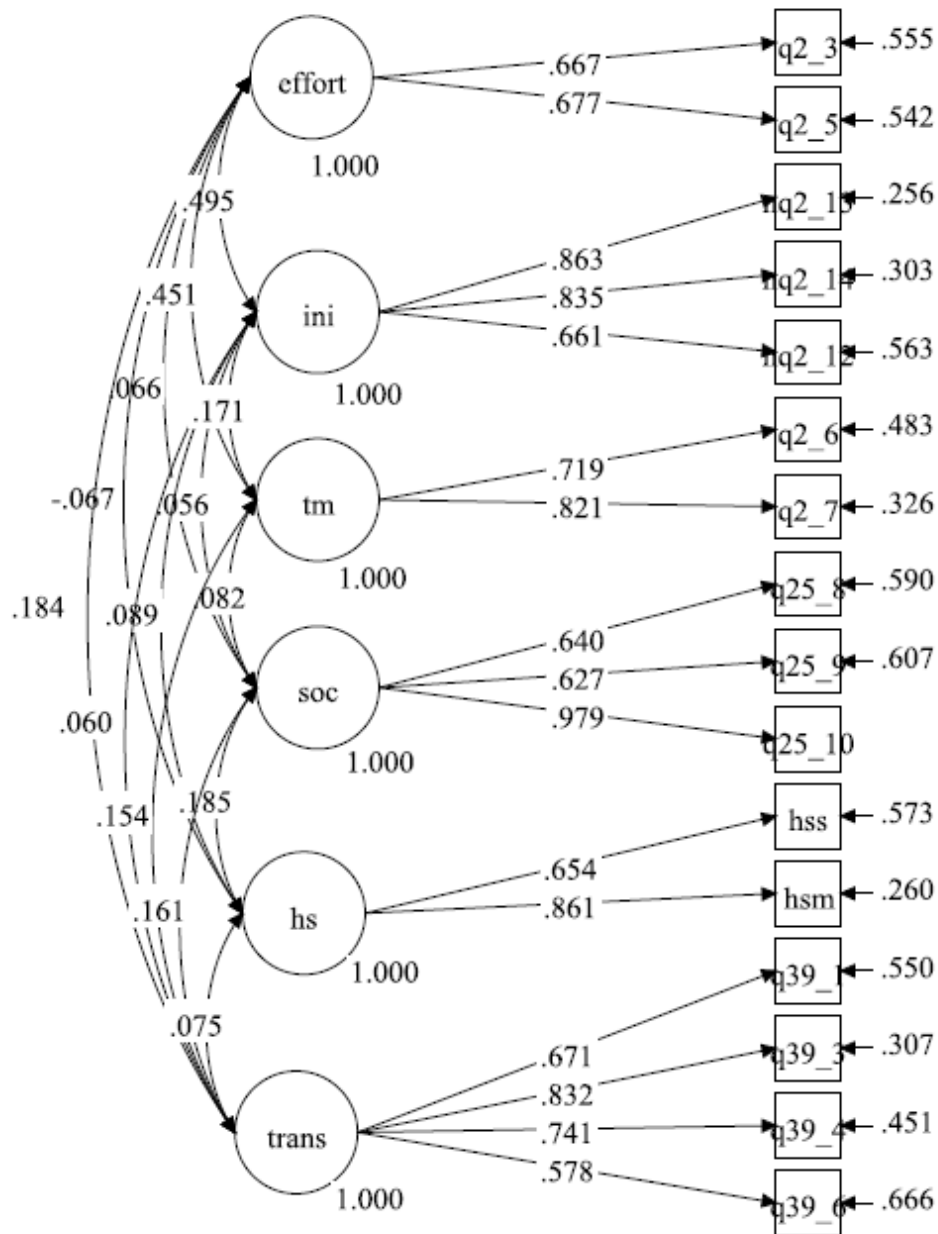
Note: effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, cc=community college support and barriers, trans=transfer readiness, hss=high school science courses, hsm=high school math courses.

Table 4.9.B First-order CFA results for domestic students ($n=1,938$)

	Estimate	Std. Estimate	S.E.	<i>p</i> - value
Self-efficacy: Effort				
When I have something unpleasant to do, I stick to it until I finish it.	1.000	.667***	.023	<.001
Failure makes me try harder	1.094	.677***	.023	<.001
Self-efficacy: Initiative				
If something looks too completed I will not even bother to try it.	1.000	.863***	.011	<.001
When trying to learn something new, I soon give up if I am not initially successful.	.950	.835***	.012	<.001
I do not seem capable of dealing with most problems that come up in life.	.858	.661***	.015	<.001
Self-efficacy: Time Management				
I often make lists of things to do.	1.000	.719***	.027	<.001
I usually mark important dates on my calendar.	1.105	.821***	.029	<.001
Social Capital				
Spend time just talking to you	1.000	.640***	.018	<.001
Work with you on your home work	1.113	.627***	.017	<.001
Discuss your progress in school with you.	1.669	.979***	.017	<.001
High School Experiences				
High school Science Courses	1<.001	.654***	.046	<.001
High school Math Courses	1.602	.861***	.058	<.001
Transfer Readiness				
I researched various aspects of 4-year institutions...	1.000	.671***	.016	<.001
I visited the 4-year institutions at least once to learn where offices and departments were located.	1.298	.832***	.012	<.001
I spoke to academic counselors at 4-year institutions about transferring and major requirements.	1.148	.741***	.014	<.001
I spoke to former community college transfer students to gain insight about their transfer experiences.	.926	.578***	.018	<.001

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.2. First-order CFA model results for domestic students



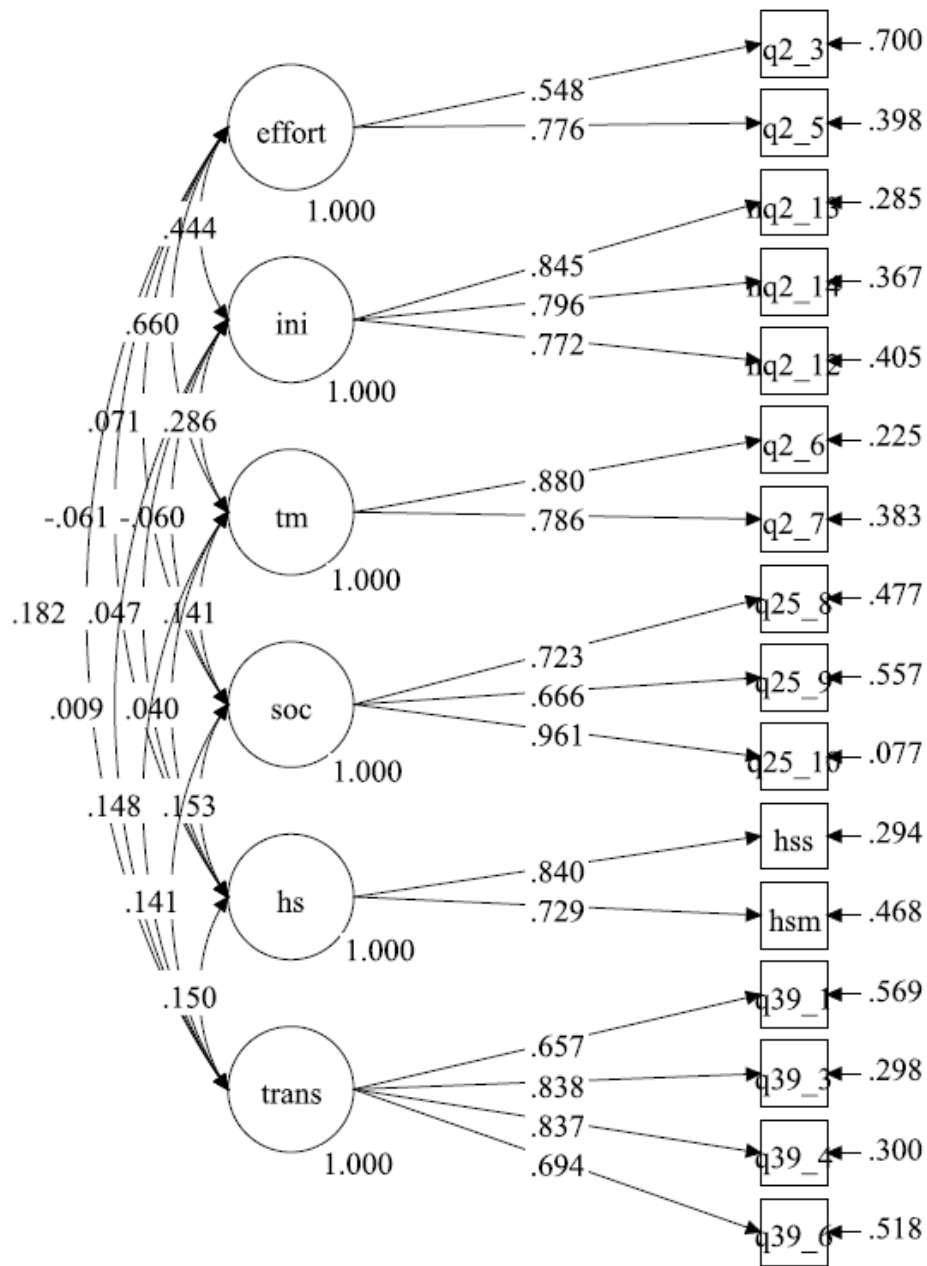
Note: effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, cc=community college support and barriers, trans=transfer readiness, hss=high school science courses, hsm=high school math courses.

Table 4.9.C First-order CFA results for international student ($n=218$)

	Estimate	Std. Estimate	S.E.	<i>p</i> - value
Self-efficacy: Effort				
When I have something unpleasant to do, I stick to it until I finish it.	1.000	.548***	.065	<.001
Failure makes me try harder	1.241	.776***	.068	<.001
Self-efficacy: Initiative				
If something looks too completed I will not even bother to try it.	1.000	.845***	.032	<.001
When trying to learn something new, I soon give up if I am not initially successful.	.905	.796***	.035	<.001
I do not seem capable of dealing with most problems that come up in life.	.954	.772***	.036	<.001
Self-efficacy: Time Management				
I often make lists of things to do.	1.000	.880***	.049	<.001
I usually mark important dates on my calendar.	.906	.786***	.049	<.001
Social Capital				
Spend time just talking to you	1.000	.723***	.042	<.001
Work with you on your home work	.985	.666***	.045	<.001
Discuss your progress in school with you.	1.411	.961***	.036	<.001
High School Experiences				
High school Science Courses	1.000	.840***	.195	<.001
High school Math Courses	1.129	.729***	.172	<.001
Transfer Readiness				
I researched various aspects of 4-year institutions...	1.000	.657***	.046	<.001
I visited the 4-year institutions at least once to learn where offices and departments were located.	1.469	.838***	.031	<.001
I spoke to academic counselors at 4-year institutions about transferring and major requirements.	1.439	.837***	.031	<.001
I spoke to former community college transfer students to gain insight about their transfer experiences.	1.188	.694***	0.043	<.001

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.3. First-order CFA model results for international students



Note: effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, cc=community college support and barriers, trans=transfer readiness, hss=high school science courses, hsm=high school math courses.

Second-order CFA Results

A second-order CFA model was fitted to the three student groups (all, domestic, and international). One potential advantage of second-order CFA compared to first-order CFA is that it explains the covariance in a more parsimonious way with fewer parameters (Rindskopf & Rose, 1988). In other words, it will provide a more parsimonious model. More importantly, in the hypothetical model, self-efficacy was expected as a single construct (Figure 3.1). Nevertheless, the EFA results suggested three self-efficacy constructs: effort, initiative, and time management. It was hypothesized that the three self-efficacy constructs worked together and contributed to a single, second-order latent variable – self-efficacy. It was then the second-order variable, self-efficacy, interacted with other key factors and eventually influenced the dependent variable, degree aspiration. In sum, for reaching a parsimonious SEM model and to testing the proposed framework, a second order factor was added to the CFA process.

Table 4.10 reported the model fit information of the second-order CFA on all three groups. Based on the model fit indices criteria (RMSEA<.06, CFI>.90 or conservatively>.95) the second-order CFA model adequately fitted the data sets.

Table 4.10 Second-order CFA model fit

Model	<i>n</i>	Chi-square	RMSEA	CFI
All student group	n=2169	816.248(97)	.058	.931
Domestic student group	n=1938	682.603(97)	.056	.937
International student group	n=218	154.009(97)	.052	.956

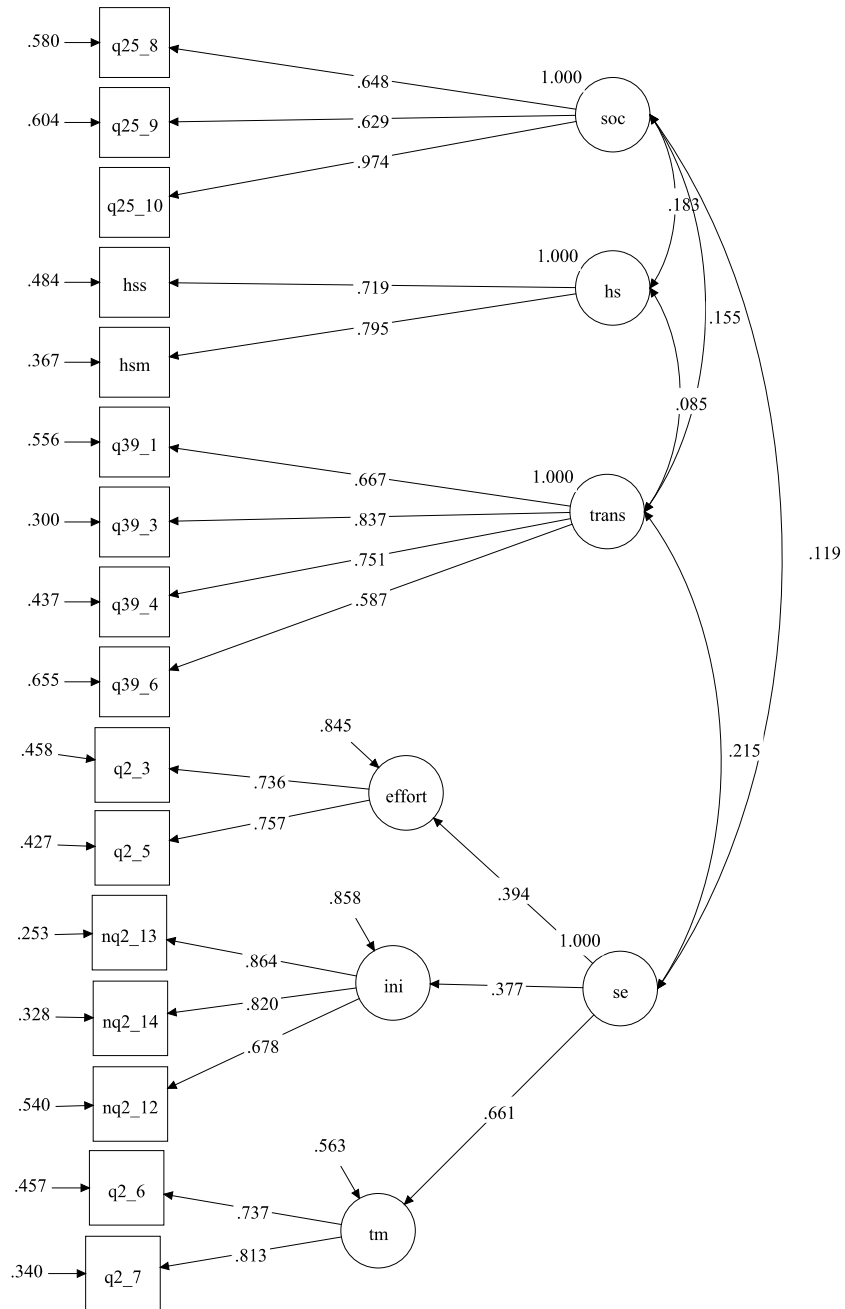
The details of the model results of second-order CFA were reported in Table 4.11.A, Table 4.11.B, and Table 4.11.C. Figure 4.4, Figure 4.5 and Figure 4.6 presented the CFA model graphically. Only the statistically significant estimates ($p < .05$) and the standardized factor loadings were included in figures.

Table 4.11.A Model results of Second Order CFA for All Students ($n=2,169$)

	Estimate	Std. Estimate	S.E.	<i>p</i> - value
Self-efficacy: Effort				
When I have something unpleasant to do, I stick to it until I finish it.	1.000	0.736***	0.004	<.001
Failure makes me try harder	0.853	0.757***	0.023	<.001
Self-efficacy: Initiative				
If something looks too completed I will not even bother to try it.	1.000	0.864***	0.011	<.001
When trying to learn something new, I soon give up if I am not initially successful.	0.929	0.820***	0.012	<.001
I do not seem capable of dealing with most problems that come up in life.	0.871	0.678***	0.014	<.001
Self-efficacy: Time Management				
I often make lists of things to do.	1.000	0.737***	0.029	<.001
I usually mark important dates on my calendar.	1.071	0.813***	0.031	<.001
Social Capital				
Spend time just talking to you	1.000	0.648***	0.016	<.001
Work with you on your home work	1.097	0.629***	0.016	<.001
Discuss your progress in school with you.	1.637	0.974***	0.015	<.001
High School Experiences				
High school Science Courses	1.000	0.719***	0.053	<.001
High school Math Courses	1.361	0.795***	0.058	<.001
Transfer Readiness				
I researched various aspects of 4-year institutions...	1.000	0.667***	0.015	<.001
I visited the 4-year institutions at least once to learn where offices and departments were located.	1.325	0.837***	0.011	<.001
I spoke to academic counselors at 4-year institutions about transferring and major requirements.	1.179	0.751***	0.013	<.001
I spoke to former community college transfer students to gain insight about their transfer experiences.	0.952	0.587***	0.017	<.001
Self-efficacy (Second order factor)				
Effort	1.000	0.394***	0.028	<.001
Initiative	0.949	0.377***	0.071	<.001
Time Management	1.708	0.661***	0.092	<.001

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.4. Second-order CFA model results for all students



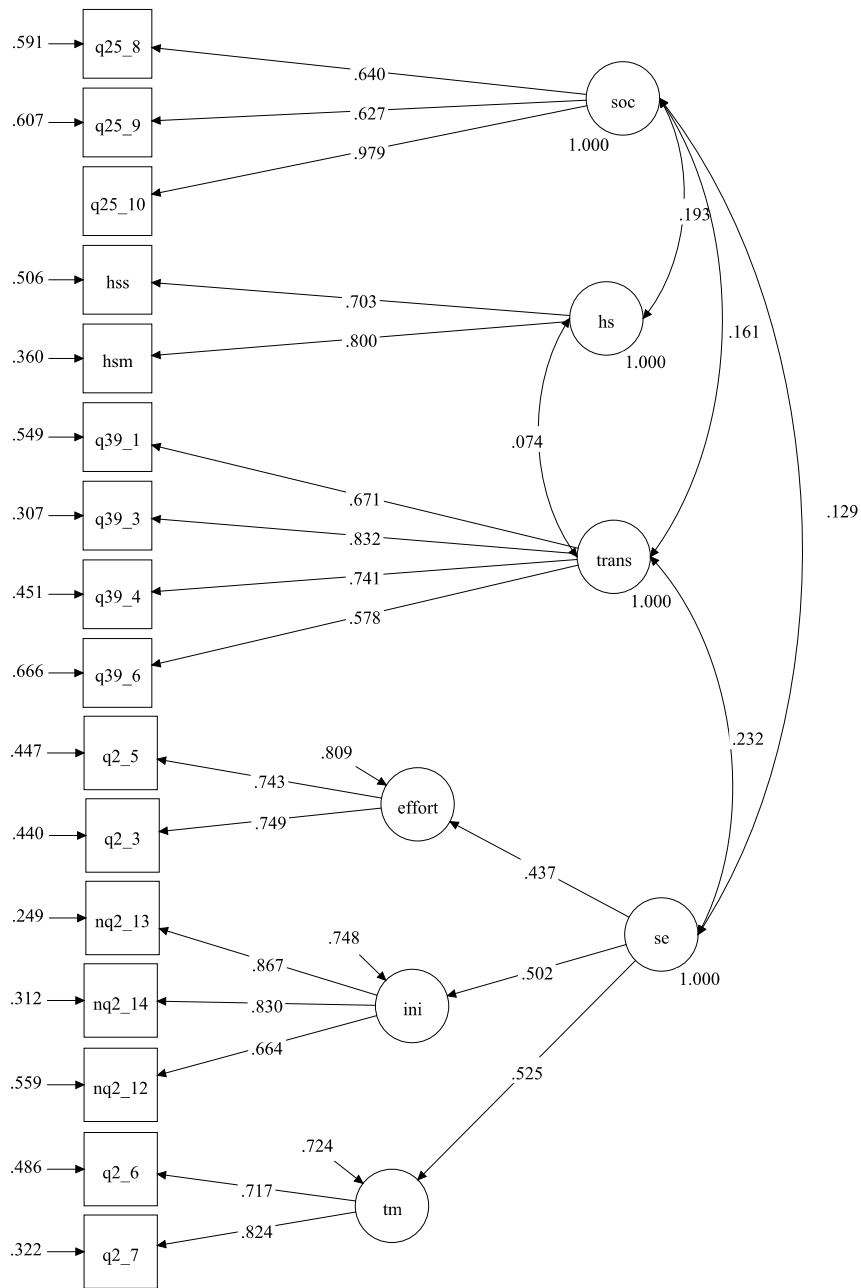
Note: effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, cc=community college support and barriers, trans=transfer readiness, hss=high school science courses, hsm=high school math courses, se=self-efficacy.

Table 4.11.B Model results of Second-order CFA for Domestic Students ($n=1,938$)

	Estimate	Std. Estimate	S.E.	<i>p</i> - value
Self-efficacy: Effort				
Failure makes me try harder	1.000	0.743***	0.005	<.001
When I have something unpleasant to do, I stick to it until I finish it.	0.764	0.749***	0.023	<.001
Self-efficacy: Initiative				
If something looks too completed I will not even bother to try it.	1.000	0.867***	0.012	<.001
When trying to learn something new, I soon give up if I am not initially successful.	0.940	0.830***	0.012	<.001
I do not seem capable of dealing with most problems that come up in life.	0.858	0.664***	0.015	<.001
Self-efficacy: Time Management				
I often make lists of things to do.	1.000	0.717***	0.033	<.001
I usually mark important dates on my calendar.	1.111	0.824***	0.037	<.001
Social Capital				
Spend time just talking to you	1.000	0.640***	0.018	<.001
Work with you on your home work	1.113	0.627***	0.017	<.001
Discuss your progress in school with you.	1.669	0.979***	0.016	<.001
High School Experiences				
High school Science Courses	1.000	0.703***	0.053	<.001
High school Math Courses	1.385	0.800***	0.060	<.001
Transfer Readiness				
I researched various aspects of 4-year institutions...	1.000	0.671***	0.016	<.001
I visited the 4-year institutions at least once to learn where offices and departments were located.	1.298	0.832***	0.012	<.001
I spoke to academic counselors at 4-year institutions about transferring and major requirements.	1.147	0.741***	0.014	<.001
I spoke to former community college transfer students to gain insight about their transfer experiences.	0.925	0.578***	0.018	<.001
Self-efficacy (Second order factor)				
Effort	1.000	0.437***	0.027	<.001
Initiative	1.094	0.502***	0.082	<.001
Time Management	1.165	0.525***	0.082	<.001

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.5. Second-order CFA model results for domestic students



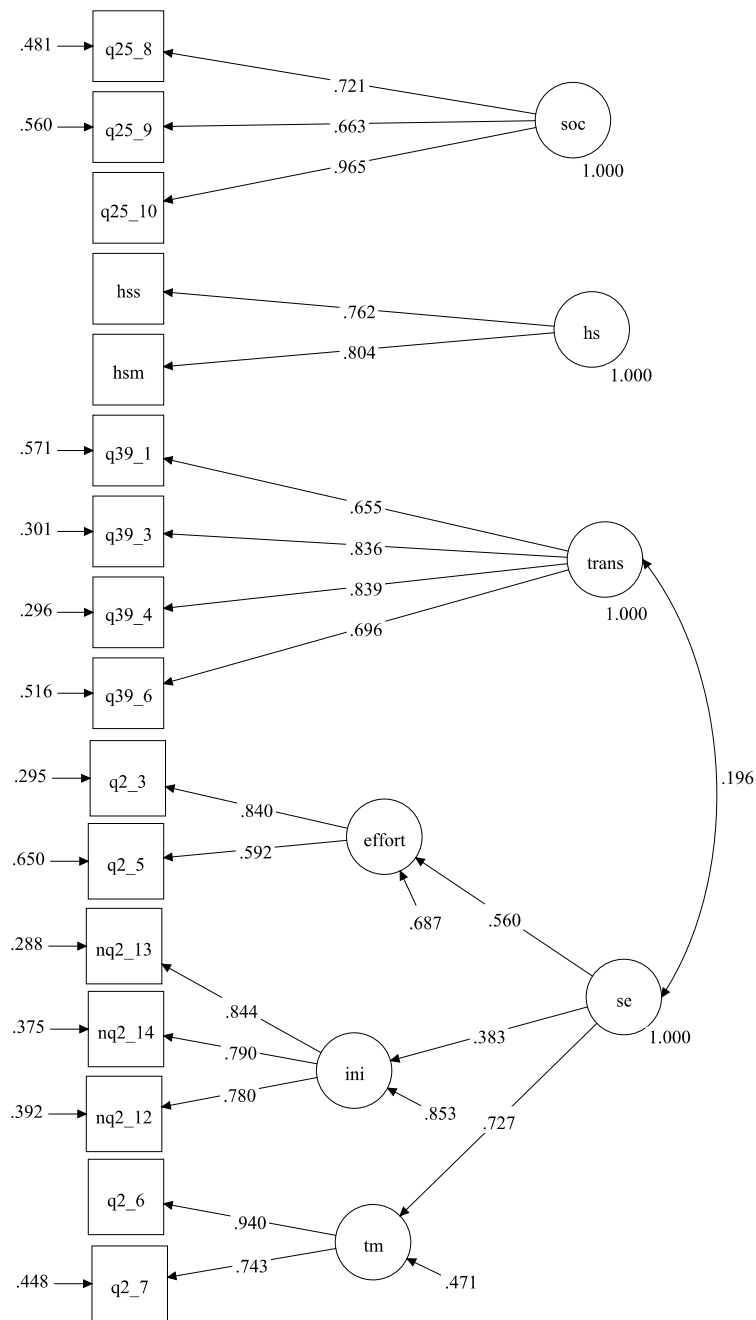
Note: effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, cc=community college support and barriers, trans=transfer readiness, hss=high school science courses, hsm=high school math courses, se=self-efficacy.

Table 4.11.C Model results of Second-order CFA for International Students ($n=218$)

	Estimate	Std. Estimate	S.E.	<i>p</i> -value
Self-efficacy: Effort				
When I have something unpleasant to do, I stick to it until I finish it.	1.000	0.840***	17.569	<.001
Failure makes me try harder	0.582	0.592***	6.832	<.001
Self-efficacy: Initiative				
If something looks too completed I will not even bother to try it.	1.000	0.844***	25.794	<.001
When trying to learn something new, I soon give up if I am not initially successful.	0.901	0.790***	22.178	<.001
I do not seem capable of dealing with most problems that come up in life.	0.966	0.780***	21.665	<.001
Self-efficacy: Time Management				
I often make lists of things to do.	1.000	0.940***	15.774	<.001
I usually mark important dates on my calendar.	0.796	0.743***	12.036	<.001
Social Capital				
Spend time just talking to you	1.000	0.721***	17.019	<.001
Work with you on your home work	0.984	0.663***	14.640	<.001
Discuss your progress in school with you.	1.422	0.965***	25.867	<.001
High School Experiences				
High school Science Courses	1.000	0.762***	3.274	0.001
High school Math Courses	1.374	0.804***	3.283	0.001
Transfer Readiness				
I researched various aspects of 4-year institutions...	1.000	0.655***	14.205	<.001
I visited the 4-year institutions at least once to learn where offices and departments were located.	1.469	0.836***	26.806	<.001
I spoke to academic counselors at 4-year institutions about transferring and major requirements.	1.446	0.839***	27.066	<.001
I spoke to former community college transfer students to gain insight about their transfer experiences.	1.194	0.696***	16.441	<.001
Self-efficacy (Second order factor)				
Effort	1.000	0.560***	8.829	<.001
Initiative	0.730	0.383***	4.054	<.001
Time Management	1.569	0.727***	15.128	<.001

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.6. Second-order CFA model results for international students



Note: effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, cc=community college support and barriers, trans=transfer readiness, hss=high school science courses, hsm=high school math courses, se=self-efficacy.

The self-efficacy constructs (i.e., effort, initiative and time management) had lower factor loadings on the second-order latent variable (i.e., self-efficacy; mostly between .3 and .6). Also, based on the correlation matrix, the lower order factors effort, initiative and time management were not substantially correlated with each other (most correlation coefficients were smaller than .5). These results indicated that the second-order model might not be appropriate and necessary for this study (Chen, Sousa, & West, 2005).

Structural Equation Modeling

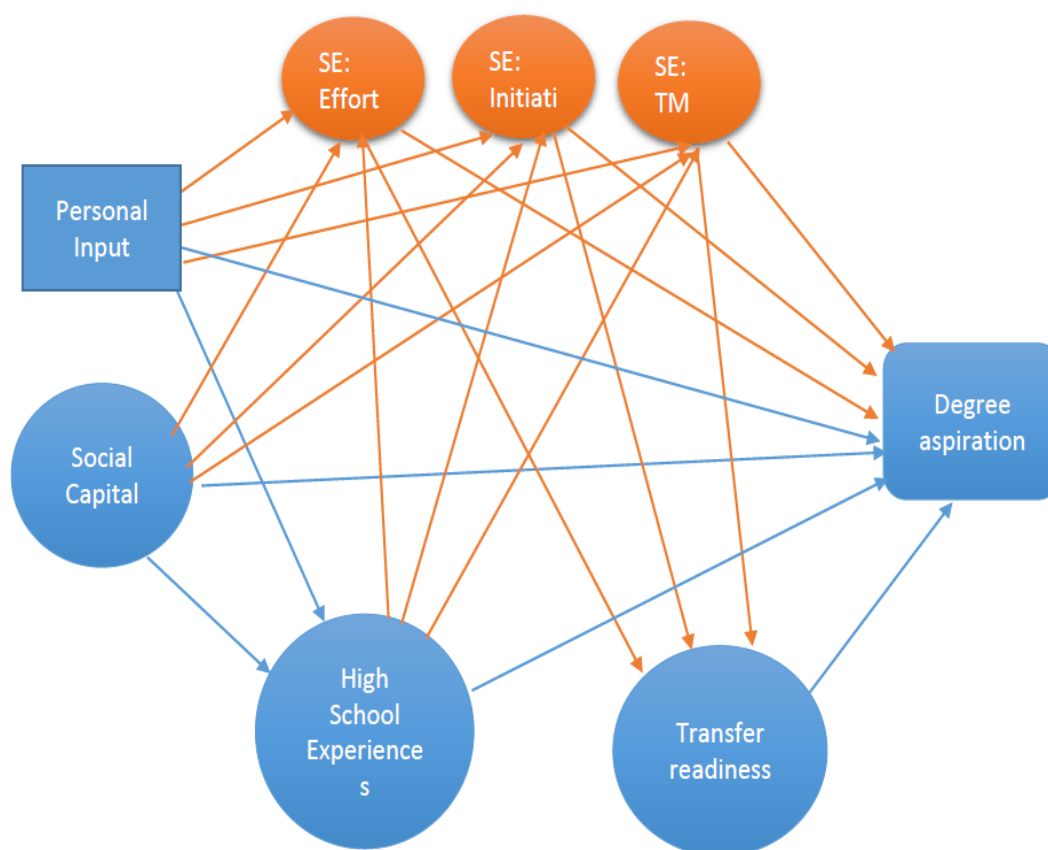
Structural equation modeling (SEM) techniques were utilized to examine multiple regressive relationships simultaneously in order to answer the fourth and the fifth research questions. In particular, the SEM analysis aimed at testing the general self-efficacy model for community college students (GSE-CC model) and investigating the psychosocial mechanism of how self-efficacy influenced degree aspiration both directly and indirectly. The GSE-CC model (Figure 4.7) was established based on the hypothetical GSE-CC model (Figure 3.1) and the first-order CFA results. The model was fitted to all students ($n=2,169$), domestic students ($n=1,938$), and international students ($n=218$) groups, respectively. A multi-group analysis was then conducted to conclude whether or not the model was invariant for international students and domestic students. It should be noted that the unequal sample size across groups affects the changes in goodness of fit indexes. Specifically, as the sample size becomes increasingly unequal across groups, the invariance test becomes less likely to detect the non-invariance nature (Kaplan & George, 1995; Chen, 2007). Since the sample sizes of international and domestic students were rather unequal (218 vs. 1,938), the invariance testing was conducted with international student group ($n=218$) and a reduced randomly selected sample of the domestic student group ($n=218$).

The General Self-efficacy Model for Community College Students

The hypothetical GSE-CC model (Figure 3.1) was revised and utilized to establish the finalized GSE-CC model (Figure 4.7). The construct of “community college support and barriers” was deleted. Also, the regressive relationship between high school experiences and transfer readiness was not included because the data availability made it unlikely to accurately examine this relationship. Specifically, transfer readiness was solely measured by survey items describing transfer-related activities (e.g., visit four-year colleges, consult with academic counselors, consult with former transfer students, etc.). No academic readiness contents (e.g., hours spent on studying per week, GPA in community college, transferrable credit hours taken, etc.) were captured in these items. On the other hand, high school experiences were measured only by the number of math and science courses taken in high schools. The relationship between high school experiences and transfer readiness might be misleading and difficult to interpret if analyzed based on the current constructs.

In the finalized GSE-CC model, self-efficacy was divided into three constructs (i.e., effort, initiative, and time management). Factors such as social capital, transfer readiness, and high school experiences were retained as latent exogenous variables. Although personal input was represented as one observed exogenous variable, it was operationalized by a series of demographic variables (e.g., age, gender, race, native language, mother’s education, etc.) in the actual testing. Moreover, the endogenous variable, degree aspiration, was an observed variable with a scale of 1 to 7 (aspire no degree to doctoral degree). Figure 4.7 graphically represented the GSE-CC model.

Figure 4.7. The General Self-efficacy model for Community College Students



Note: SE=Self-efficacy, TM=Time Management, Personal Input=Age, Gender, Race, Mother's Education, Native Language, Age first come to U.S. (International students only)

The SEM Analysis

The SEM analysis focused on operationalizing GSE-CC model and test it across three student groups: the all student group ($n=2,169$), the domestic student group ($n=1,938$), and the international student group ($n=218$). Before testing the model, the author dealt with the additional missing data issues. Although the missing data imputation was conducted prior to CFA and SEM analyses, the nature of several variables generated new missing data. For

example, the survey item of mother's education included a response option "I don't know". For treating this variable as a continuous variable, the author recoded the response "I don't know" as missing. Since the cases that involved these new missing data were limited. It was decided to adopt a list-wise deletion approach to deal with these new missing data issues. This resulted in a slight reduction (3.4%) of the sample size.

Overall, the model fitted well on all three groups. Table 4.12 summarized the model fit information. The RMSEA value was smaller than .06 for all three groups and the CFI was larger than .90.

Table 4.12 SEM model fit for all, domestic and international student groups

Model	<i>n</i>	Chi-square	RMSEA	CFI
All student group	2196	811.552(185)	.040	.944
Domestic student group	1938	754.458(185)	.040	.944
International student group	218	281.605(197)	.046	.936

In terms of the path coefficient results, the model results of all student group ($n=2196$) revealed the comprehensive relationships between self-efficacy constructs and other key factors, as well as between self-efficacy constructs and degree aspiration.

In particular, the three self-efficacy constructs were found significantly influenced by a series of personal input (or demographic) variables. For example, being a Black student ($\beta = .065, p < .05$), Social capital ($\beta = .115, p < .001$) and age ($\beta = .172, p < .001$) were found positively impacting self-efficacy levels on construct effort. Speaking English as native language ($\beta = -.015, p < .001$) had a very small negative impact on effort. For the self-efficacy construct "initiative", high school experiences ($\beta = .130, p < .001$), age ($\beta = .131, p < .001$), and speaking English ($\beta = .084, p < .01$) were found having positive impact; while being an Asian student had negative influence on initiative levels ($\beta = -.114, p < .001$). For the self-efficacy construct time management, social capital ($\beta =$

.073, $p < .01$), and mother's education level ($\beta = .057, p < .05$) had positive, but relatively small influence. Female ($\beta = -.333, p < .05$) and older ($\beta = .129, p < .001$) students were proved to have better scores on time management levels.

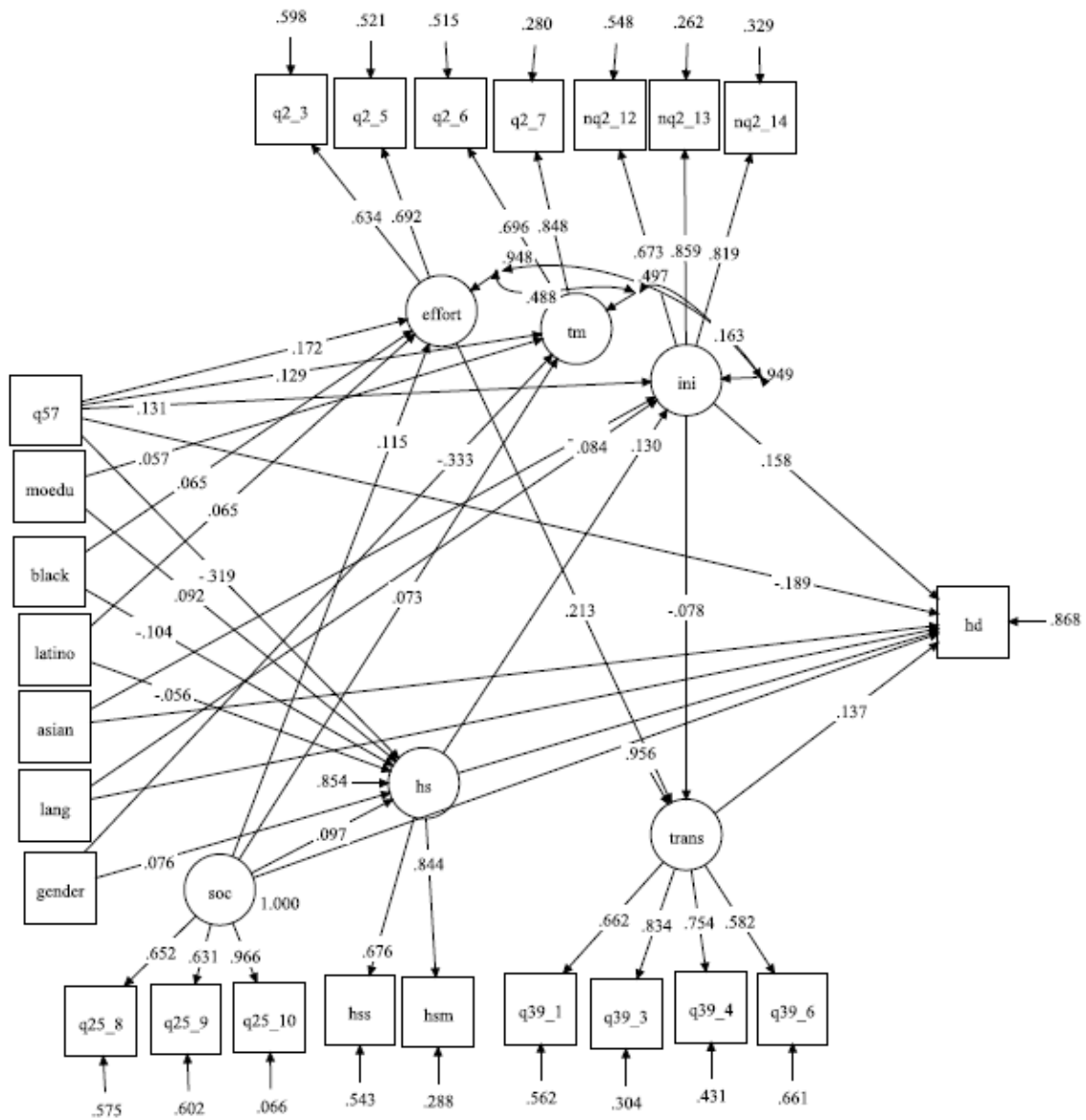
High school experiences were also influenced by a group of personal input variables such as gender, age, ethnicity (Black), mother's education, and social capital. These variables had a relatively small influence ($\beta < 0.1$) with the exception of age. Younger students were found have significantly better high school experiences ($\beta = -.319, p < .001$).

Transfer readiness was significantly influenced by effort ($\beta = .213, p < .001$) and initiative ($\beta = -.078, p < .05$). The impact of time management was not statistically significant.

The only self-efficacy construct that directly influenced degree aspiration was initiative ($\beta = .158, p < .001$). The degree aspiration was also impacted by transfer readiness ($\beta = .137, p < .001$) and high school experiences ($\beta = .136, p < .001$). It should be noticed that the significant impact of transfer readiness also demonstrated the indirect impact of effort and initiative on degree aspiration. In addition, social capital ($\beta = -.077, p < .01$), age ($\beta = -.189, p < .001$), native language ($\beta = -.061, p < .01$), and being an Asian student ($\beta = -.051, p < .05$) also had statistically significant influences on degree aspiration.

Figure 4.8 graphically presented the SEM model results. Only the standardized and statistically significant estimates were reported in the figures. Table 4.13.A summarized the path coefficients results for all student group in details.

Figure 4.8. The SEM Model Results for All Students



Note: q57=age, lang=native language, moedu=mother's education, effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, trans=transfer readiness, hss=high school science courses, hsm=high school math courses, hd=degree aspiration

Table 4.13.A SEM model results for all student ($n=2,169$)

	Estimate	Std. Estimate	S.E.	<i>p</i> -value
Self-efficacy: Effort				
Social Capital	0.093	0.115***	0.029	<.001
High School Experiences	-0.007	-0.011	0.035	0.756
Gender	0.023	0.016	0.028	0.558
Age	0.012	0.172***	0.030	<.001
Native Language	-0.024	-0.015*	0.030	0.614
Black	0.106	0.065*	0.031	0.035
Latino	0.099	0.065	0.033	0.050
Asian	0.033	0.014	0.030	0.638
Mother's Education	-0.012	-0.033	0.029	0.252
Self-efficacy: Initiative				
Social Capital	0.055	0.045	0.025	0.073
High School Experiences	0.125	0.130***	0.029	<.001
Gender	-0.071	-0.032	0.023	0.176
Age	0.014	0.131***	0.026	<.001
Native Language	0.205	0.084**	0.025	0.001
Black	0.024	0.009	0.026	0.716
Latino	0.045	0.019	0.028	0.493
Asian	-0.406	-0.114***	0.025	<.001
Mother's Education	-0.021	-0.038	0.025	0.121
Self-efficacy: Time Management				
Social Capital	0.089	0.073**	0.026	0.004
High School Experiences	0.024	0.026	0.030	0.388
Gender	-0.732	-0.333***	0.023	<.001
Age	0.014	0.129***	0.026	<.001
Native Language	-0.062	-0.026	0.026	0.311
Black	-0.008	-0.003	0.026	0.908
Latino	0.075	0.032	0.029	0.260
Asian	-0.004	-0.001	0.026	0.965
Mother's Education	0.031	0.057*	0.025	0.023
High School Experiences				
Social Capital	0.124	0.097***	0.026	<.001
Gender	0.177	0.076**	0.024	0.001
Age	-0.035	-0.319***	0.024	<.001
Native Language	-0.110	-0.043	0.025	0.089
Black	-0.272	-0.104***	0.027	<.001
Latino	-0.136	-0.056	0.028	0.050

Table 4.13.A (continued)

Asian	-0.132	-0.035	0.025	0.165
Mother's Education	0.054	0.092***	0.025	<.001
Transfer Readiness				
Self-efficacy: Effort	0.391	0.213***	0.045	<.001
Self-efficacy: Initiative	-0.093	-0.078*	0.034	0.021
Self-efficacy: Time Management	0.053	0.043	0.034	0.199
Degree Aspiration				
Self-efficacy: Effort	0.045	0.028	0.043	0.512
Self-efficacy: Initiative	0.165	0.158***	0.030	<.001
Self-efficacy: Time Management	0.065	0.062	0.033	0.061
Transfer Readiness	0.119	0.137***	0.024	<.001
High School Experiences	0.136	0.136***	0.027	<.001
Social Capital	-0.100	-0.077**	0.023	0.001
Gender	0.011	0.005	0.024	0.837
Age	-0.021	-0.189***	0.023	<.001
Native Language	-0.156	-0.061**	0.023	0.006
Black	-0.025	-0.009	0.023	0.684
Latino	-0.023	-0.009	0.025	0.704
Asian	-0.190	-0.051*	0.023	0.024
Mother's Education	0.007	0.012	0.022	0.598

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

In general, the model results for the overall domestic student ($n=1,938$) group showed a lot similarities with all student group ($n=2,196$). For example, high school experiences ($\beta = .130, p < .001$), age ($\beta = .129, p < .001$), being an Asian ($\beta = -.097, p < .001$), and native speakers ($\beta = .065, p < .05$) were also found significantly impacting domestic students' self-efficacy levels on initiative. Nevertheless, it was necessary to highlight the different model results for domestic student group. Specifically, for the self-efficacy construct initiative, social capital showed a small significant impact ($\beta = .061, p < .05$). For the transfer readiness, only effort showed a positive significant impact ($\beta = .207, p < .001$), initiative did not have significant influence for domestic students. In terms of the influence

on degree aspiration, speaking English as native language did not show significant impact compared to the all student group. However, the self-efficacy construct time management showed a significant, though relatively small effect ($\beta = .073, p < .05$). Overall, the model results differences between all student group and domestic student group were limited. In most cases, the differences involved marginal p-values and/or small path coefficients ($\beta < .1$). Table 4.13.B. summarized the path coefficients results for domestic student group in details. Figure 4.9 graphically presented the SEM model results. Only the standardized and statistically significant estimates were reported in the figures.

Table 4.13.B SEM model results for domestic student ($n=1,938$)

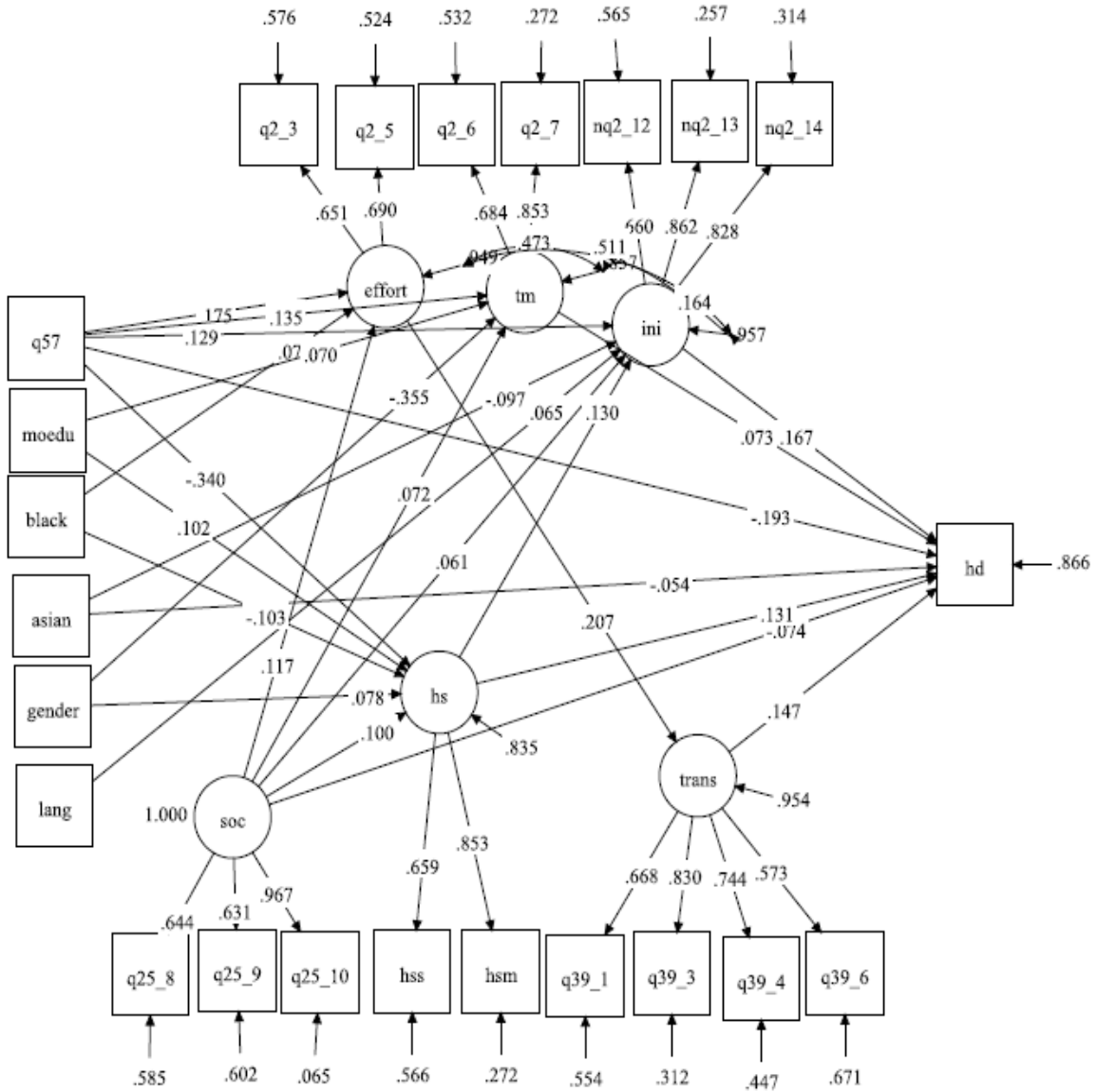
	Estimate	Std. Estimate	S.E.	p-value
Self-efficacy: Effort				
Social Capital	0.096	0.117***	0.031	<.001
High School Experiences	0.003	0.005	0.037	0.894
Gender	0.007	0.005	0.029	0.866
Age	0.012	0.175***	0.032	<.001
Native Language	0.007	0.004	0.032	0.906
Black	0.118	0.072*	0.032	0.025
Latino	0.094	0.060	0.035	0.083
Asian	0.009	0.004	0.031	0.905
Mother's Education	-0.011	-0.029	0.031	0.337
Self-efficacy: Initiative				
Social Capital	0.075	0.061*	0.027	0.022
High School Experiences	0.128	0.130***	0.031	<.001
Gender	-0.029	-0.013	0.025	0.589
Age	0.013	0.129***	0.028	<.001
Native Language	0.174	0.065*	0.027	0.015
Black	0.015	0.006	0.027	0.819
Latino	0.054	0.023	0.030	0.439
Asian	-0.349	-0.097***	0.026	<.001
Mother's Education	-0.016	-0.028	0.026	0.286
Self-efficacy: Time Management				
Social Capital	0.087	0.072**	0.027	0.007
High School Experiences	0.041	0.042	0.031	0.182

Table 4.13.B (continued)

Gender	-0.763	-0.355***	0.024	<.001
Age	0.014	0.135***	0.028	<.001
Native Language	-0.127	-0.048	0.027	0.073
Black	-0.007	-0.003	0.027	0.914
Latino	0.009	0.004	0.030	0.893
Asian	-0.010	-0.003	0.027	0.919
Mother's Education	0.039	0.070**	0.026	0.008
High School Experiences				
Social Capital	0.124	0.100***	0.027	<.001
Gender	0.171	0.078**	0.025	0.002
Age	-0.036	-0.340***	0.025	<.001
Native Language	-0.025	-0.009	0.027	0.735
Black	-0.256	-0.103***	0.028	<.001
Latino	-0.107	-0.045	0.030	0.127
Asian	-0.100	-0.027	0.026	0.297
Mother's Education	0.058	0.102***	0.026	<.001
Transfer Readiness				
Self-efficacy: Effort	0.379	0.207***	0.048	<.001
Self-efficacy: Initiative	-0.076	-0.062	0.036	0.089
Self-efficacy: Time Management	0.069	0.056	0.035	0.112
Degree Aspiration				
Self-efficacy: Effort	0.012	0.008	0.045	0.862
Self-efficacy: Initiative	0.179	0.167***	0.032	<.001
Self-efficacy: Time Management	0.079	0.073*	0.035	0.034
Transfer Readiness	0.128	0.147***	0.025	<.001
High School Experiences				
Social Capital	-0.098	-0.074**	0.024	0.002
Gender	0.029	0.012	0.025	0.625
Age	-0.021	-0.193***	0.025	<.001
Native Language	-0.085	-0.030	0.024	0.210
Black	-0.057	-0.022	0.024	0.369
Latino	-0.048	-0.019	0.026	0.465
Asian	-0.208	-0.054*	0.024	0.022
Mother's Education	0.004	0.006	0.023	0.784

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Figure 4.9 The SEM Model Results for Domestic Students

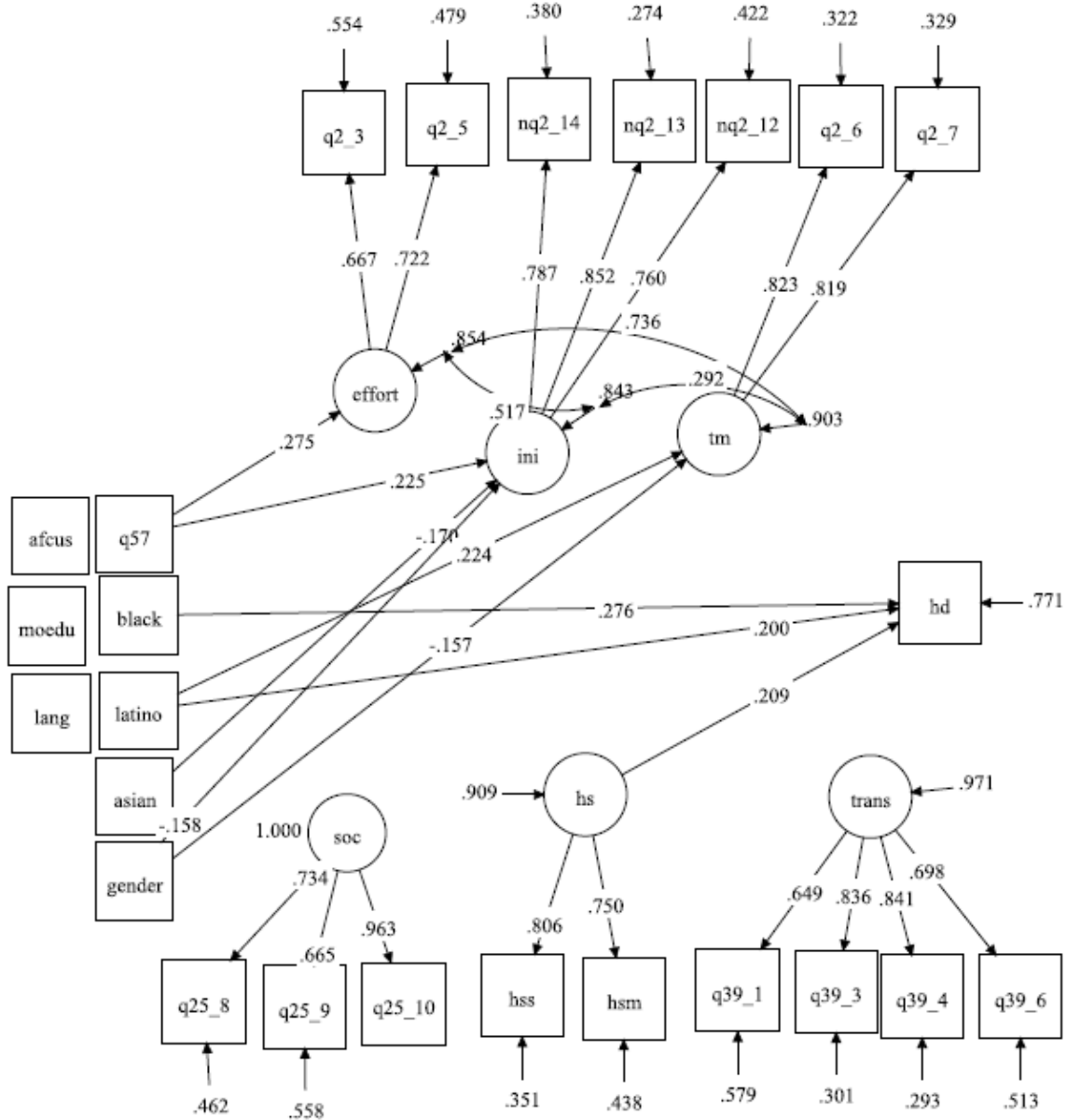


Note: q57=age, lang=native language, moedu=mother's education, effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, trans=transfer readiness, hss=high school science courses, hsm=high school math courses, hd=degree aspiration

Compared to the all student group and domestic student group, the modeling results for the international student group ($n=218$) indicated some differences. Far fewer significant paths were identified from the model results with international student group. Specifically, only one personal input variable, age was found significantly impact effort level for international students ($\beta = .275, p < .01$). Age also impacted international students' imitative level positively ($\beta = .225, p < .01$). Two more personal input variables, Asian ($\beta = -.170, p < .05$) and gender ($\beta = -.158, p < .01$) were found negatively impacting initiative. It was unique for international student group that female students had higher scores on initiative. For time management, like domestic students, gender had a negative impact ($\beta = -.157, p < .05$). It was unique to find that being a Latino/a international student would positively influence international students' time management levels ($\beta = .224, p < .05$). Lastly, three predictors had significant impact on degree aspiration. High school experiences ($\beta = .209, p < .05$), being a Black student ($\beta = .276, p < .01$), and being a Latino student ($\beta = .200, p < .05$) positively influenced international students' degree aspiration. It was very interesting to discover that all three self-efficacy constructs as well as transfer readiness had no significant impact on degree aspiration for international students.

Figure 4.9 graphically presented the SEM model results. Only the standardized and statistically significant estimates were reported in the figures. Table 4.13.C summarized the path coefficients results for international students in details.

Figure 4.10. The SEM Model Results for International Students



Note: q57=age, lang=native language, moedu=mother's education, effort=effort, ini=initiative, tm=time management, soc=social capital, hs=high school experience, trans=transfer readiness, hss=high school science courses, hsm=high school math courses, hd=degree aspiration, afcus=age first come to the U.S.

Table 4.13.C SEM model results for international student ($n=216$)

	Estimate	Std. Estimate	S.E.	<i>p</i> -value
Self-efficacy: Effort				
Social Capital	0.095	0.114	0.096	0.237
High School Experiences	-0.041	-0.073	0.102	0.476
Gender	0.178	0.095	0.084	0.259
Age	0.027	0.275**	0.091	0.003
Native Language	-0.062	-0.026	0.088	0.768
Black	0.051	0.023	0.105	0.827
Latino	0.337	0.192	0.105	0.066
Asian	0.295	0.120	0.098	0.220
Mother's Education	-0.005	-0.013	0.092	0.885
Age first come to U.S.	0.036	0.069	0.093	0.459
Self-efficacy: Initiative				
Social Capital	-0.034	-0.028	0.081	0.730
High School Experiences	0.132	0.159	0.087	0.068
Gender	-0.438	-0.158*	0.072	0.028
Age	0.033	0.225**	0.078	0.004
Native Language	0.496	0.141	0.075	0.062
Black	0.273	0.083	0.088	0.347
Latino	0.144	0.056	0.091	0.541
Asian	-0.615	-0.170*	0.084	0.043
Mother's Education	-0.018	-0.030	0.079	0.702
Age first come to U.S.	0.029	0.037	0.080	0.644
Self-efficacy: Time Management				
Social Capital	0.177	0.144	0.084	0.088
High School Experiences	-0.004	-0.005	0.092	0.960
Gender	-0.433	-0.157*	0.079	0.046
Age	0.016	0.109	0.084	0.195
Native Language	0.156	0.045	0.082	0.588
Black	0.061	0.019	0.096	0.845
Latino	0.575	0.224*	0.100	0.025
Asian	0.160	0.044	0.093	0.632
Mother's Education	-0.044	-0.074	0.083	0.373
Age first come to U.S.	-0.033	-0.043	0.085	0.609
High School Experiences				
Social Capital	0.197	0.133	0.092	0.150
Gender	0.267	0.080	0.079	0.312
Age	-0.026	-0.146	0.085	0.087

Table 4.13.C (continued)

Native Language	-0.589	-0.139	0.081	0.088
Black	-0.439	-0.111	0.096	0.248
Latino	-0.179	-0.058	0.101	0.568
Asian	-0.368	-0.084	0.092	0.361
Mother's Education	0.001	0.002	0.087	0.983
Age first come to U.S.	-0.082	-0.088	0.087	0.315
Transfer Readiness				
Self-efficacy: Effort	0.178	0.123	0.179	0.493
Self-efficacy: Initiative	-0.046	-0.047	0.100	0.637
Self-efficacy: Time Management	0.076	0.077	0.156	0.622
Degree Aspiration				
Self-efficacy: Effort	0.492	0.403	0.222	0.069
Self-efficacy: Initiative	0.039	0.047	0.116	0.681
Self-efficacy: Time Management	-0.073	-0.087	0.173	0.614
Transfer Readiness	0.031	0.037	0.077	0.631
High School Experiences	0.143	0.209*	0.099	0.034
Social Capital	-0.071	-0.070	0.076	0.358
Gender	-0.148	-0.064	0.090	0.475
Age	-0.005	-0.038	0.081	0.639
Native Language	0.150	0.051	0.075	0.493
Black	0.749	0.276**	0.083	0.001
Latino	0.426	0.200*	0.086	0.020
Asian	0.112	0.037	0.086	0.664
Mother's Education	0.067	0.137	0.074	0.064
Age first come to U.S.	0.021	0.032	0.077	0.673

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

Multi-group Analysis

The multi-group analysis was conducted after the SEM analysis. The goal was to investigate whether or not the psychosocial mechanism of self-efficacy influencing degree aspiration differed significantly between domestic student and international students. In a technical sense, the multi-group analysis was to compare the structural weights (path

coefficients and factor loadings) of the SEM model across international and domestic student groups. In order to avoid the influence of unequal sample size, the author randomly selected 218 students from the 1,938 domestic students; and used this 218 domestic student group to compare with the 218 international students.

The Baseline Model. First of all, the author combined international students and 218 randomly selected domestic students to generate a merged data set; and fitted the GSE-CC model to these two groups with all structural weights to be freely examined. This model was served as the baseline model in this study for the invariance testing. The model fit of the baseline mode was adequate: RMSEA=. 052, CFI= .905. The Chi-square statistics of the baseline model was 618.897 with a degree of freedom of 394. This Chi-square statistic for the baseline model was used to compare with the Chi-square statistics of the subsequently tested models (i.e., via Chi-square difference tests).

Structural Path Invariance Testing. A total of 52 structural weights (10 factor loadings of measurement model and 42 path coefficients) were tested. In each test, only the tested structural weight was constrained to be the same across the groups. All the other structural weights were remained freely examined. The Chi-square statistics of the tested models were compared with the baseline model. If the Chi-square difference was significant, then it can be concluded that the structural weight was different across the groups and should be freely examined in the finalized model. Otherwise, the tested structural weight was the same across groups and can be constrained in the finalized model.

Two structural paths were proved to be statistically significantly different between the international and the domestic student groups. Table 4.14 summarized the Chi-square difference testing results of these two paths in the finalized model.

Table 4.14 Chi-square difference tests for invariance testing

	Chi-square value	Degrees of freedom	Chi-square difference	<i>df</i> difference	<i>p</i> -value
Baseline model	618.897	394	-	-	-
Gender ---> Initiative	625.895	395	6.996**	1	0.008
Black---> Degree aspiration	624.186	395	5.209*	1	0.02
Finalized model	679.096	443	60.199	49	.0131

*** $p < .001$, ** $p < 0.01$, * $p < 0.05$

In the finalized model, the two paths were freely examined and all the other structural paths were constrained to be equivalent across the groups. The finalized model fit the data well: RMSEA= .051, CFI= .90. According to the results, gender was found significantly influencing international students' initiative. Specifically, female international students had higher scores on initiative levels. But no such impact was detected for domestic students. Moreover, black international students were found having significantly higher degree aspiration. The black domestic students, on the other hand, had no significantly different degree aspiration compared with non-Black domestic students. Table 4.15 presented the detailed results of the finalized model

Table 4.15 Model results of the finalized model by invariance testing

Path	International Students ($n=218$)			Domestic Students ($n=218$)		
	Estimate	Std. Estimates	Standard Error	Estimate	Std. Estimates	Standard Error
Self-efficacy: Effort						
Social Capital	0.086	0.120	0.072	=	0.104	0.063
High School Experiences	-0.037	-0.073	0.086	=	-0.050	0.058
Gender	0.075	0.051	0.062	=	0.049	0.059
Age	0.013	0.170**	0.065	=	0.178**	0.066
Native Language	-0.044	-0.023	0.064	=	-0.023	0.063
Black	0.053	0.031	0.070	=	0.030	0.068
Latino	0.068	0.049	0.081	=	0.042	0.069
Asian	-0.123	-0.063	0.077	=	-0.047	0.058
Mother's education	-0.031	-0.098	0.072	=	-0.081	0.060
Self-efficacy: Initiative						

Table 4.15 (continued)

Social Capital	0.006	0.005	0.054	=	0.006	0.062
HS Experiences	0.107	0.122	0.065	=	0.111	0.060
Gender	-0.443	-0.173*	0.072	0.191	0.095	0.068
Age	0.014	0.103*	0.045	=	0.144*	0.062
Native Language	0.054	0.016	0.047	=	0.022	0.061
Black	0.051	0.017	0.049	=	0.022	0.064
Latino	-0.102	-0.042	0.058	=	-0.049	0.067
Asian	-0.503	-0.149*	0.058	=	-0.148**	0.056
Mother's education	-0.065	-0.118*	0.054	=	-0.130*	0.060
Self-efficacy: Time Management						
Social Capital	0.192	0.145*	0.059	=	0.159*	0.065
HS Experiences	0.041	0.045	0.070	=	0.039	0.062
Gender	-0.657	-0.241***	0.051	=	-0.294***	0.064
Age	0.005	0.033	0.052	=	0.044	0.069
Native Language	-0.035	-0.010	0.053	=	-0.012	0.066
Black	-0.133	-0.042	0.057	=	-0.052	0.071
Latino	0.156	0.061	0.069	=	0.067	0.075
Asian	-0.389	-0.108	0.066	=	-0.103	0.064
Mother's education	-0.045	-0.076	0.060	=	-0.081	0.063
Transfer Readiness						
Self-efficacy: Effort	0.205	0.109	0.085	=	0.132	0.103
Self-efficacy: Initiative	-0.024	-0.022	0.073	=	-0.020	0.066
Self-efficacy:TM	0.046	0.045	0.084	=	0.043	0.080
Degree Aspiration						
Self-efficacy: Effort	0.286	0.199*	0.099	=	0.194*	0.093
Self-efficacy: Time Management	-0.030	-0.038	0.094	=	-0.029	0.071
Transfer Readiness	-0.005	-0.007	0.076	=	0.033	0.076
HS Experiences	0.151	0.210**	0.068	=	0.139**	0.047
Social Capital	-0.070	-0.069	0.058	=	-0.057	0.049
Gender	-0.114	-0.054	0.056	=	-0.050	0.053
Age	-0.016	-0.146**	0.053	=	-0.149**	0.054
Native Language	0.052	0.019	0.051	=	0.018	0.049
Black	0.381	0.154*	0.077	-0.025	-0.010	0.071
Latino	0.145	0.073	0.066	=	0.061	0.054
Asian	0.125	0.045	0.063	=	0.032	0.046
Mother's education	0.032	0.070	0.059	=	0.057	0.047

*** $p < .001$, ** $p < .01$, * $p < .05$, = constrained to be the same across groups

Summary

This chapter summarized the results of this study. Specifically, descriptive results illustrated the demographic characteristics of students who participated in this study. Further, the comparative analysis results provided findings that can be used to describe the characteristics of high self-efficacy students. Third, the exploratory factor analysis emerged constructs and provided a base for the confirmatory factor analysis (CFA). The CFA, then, finalized and tested a measurement model on all students, domestic students, and international students. Through examining the first-order CFA and second-order CFA results, the author decided to adopt the first-order CFA model as the measurement model for SEM analysis. It was due to a) the low loadings of three self-efficacy constructs on the second-order self-efficacy factor, and b) the relatively weaker correlation coefficients among three first-order self-efficacy constructs. Last, but not least, the structural equation modeling results revealed the psychosocial mechanism of how self-efficacy influenced degree aspiration. A multi-group analysis tested the path differences of such mechanism between international and domestic students. In the next chapter, the author will discuss the meanings of these findings. This study will then be concluded by implications for practice and future research.

CHAPTER FIVE. DISCUSSIONS, IMPLICATIONS, AND CONCLUSIONS

Overview

This chapter focused on a) interpreting the findings presented in Chapter Four, and b) developing implications and recommendations based on the findings. Specifically, the discussion of the findings was organized by the types of analyses used. In the discussion section, the author provided answers to all the six research questions. The most critical and important findings were emphasized and discussed in depth. Further, implications for practice and future research were summarized. The author generated practical implications for community college leaders, administrators, and educators. Several recommendations for future studies were based on the research findings, analysis process, and research limitations. This chapter concluded with a summary of the entire study.

Discussion of the Findings

Discussion of Descriptive Analysis Findings

The descriptive analysis allowed us to understand the demographic characteristics of participants in this study. In general, students who participated in this study consisted of more females and younger adults (18 to 24 years old). More of them were White and Hispanic students, speaking English as native language. Most of their parents did not have Bachelor or above degrees, which indicated that most of them might be first-generation college students. In contrast, more than half of the students had high degree aspiration (aspired to obtain a graduate degree). On the other hand, international students distinguished themselves from the majority of the domestic students with much more being female, younger adults (18 to 24 years old), non-native English speakers, and having higher degree

aspiration. Moreover, Hispanic and Asian were the two most represented ethnicity groups among international students, instead of White and Hispanic.

Although the survey had a relatively low response rate, the sample of this study adequately represented most of the Sunshine College students' characteristics. Specifically, the enrollment data of Sunshine College revealed the similar demographic characteristics (National Center for Education Statistics, 2013). For example, in the fall 2012 enrolment, there were more than half female students. And, the two largest ethnicity groups were White and Hispanic. However, the age information of participated students was not consistent with the institutional data. In particular, IPEDS data reported that in fall 2012, Sunshine College had 68% students younger than 24 years old. In this study, however, the sample consisted of more students who are older than 25 years old (55%) and less students who are 24 years old and younger (44%). This inconsistency implied that more older students (older than 25 years old) responded to the SSSL survey compared to younger students (24 years old and younger). This fact should be kept in mind when interpreting other findings.

The demographic characteristics of the international students, on the other hand, were less studied in an institutional level. It was known that international students represented a very small proportion of the student body in Sunshine College. In particular, there were 471 international students enrolled in Sunshine College during the 2012/13 academic year (Institute of International Education, 2013b). Although it was not a substantial percentage, Sunshine College was listed as one of the top 40 leading associate institutions in terms of enrolling international students (Institute of International Education, 2013b). The lack of information regarding international enrollment further emphasized the significance of this study that focused on international students.

Discussion of Comparative Analysis Findings

The comparative analysis provided a data-orientated portrait of high self-efficacy students in this study. First of all, the first null hypothesis of this study was successfully rejected. That means, there were statistically significant differences between high self-efficacy and low self-efficacy students in variables including age, gender, social capital, degree aspiration, and academic achievements. Based on findings of t-test and cross-tabulation analyses, the high self-efficacy students comprised of more females, older students, students with higher social capital level and higher degree aspiration, and those with higher GPA in college.

It is not surprising to find that high self-efficacy students had higher GPA. Many previous studies demonstrated that self-efficacy had positive influence on students' academic achievements (Caprara, et al., 2008; Ferla, et al., 2009; Zajacova, et al., 2005; Lent, 1984; Starobin, 2004; Starobin & Laanan, 2005). However, it should be noted that the self-efficacy measure used in this study referred to the general self-efficacy scale developed by Sherer and colleagues (Sherer, et al, 1982). In most previous studies, domain-specific or task-specific self-efficacy measures such as math self-efficacy, science self-efficacy, writing self-efficacy, etc. were often examined. The above finding from this study, hence, adds to the extant literature by demonstrating general self-efficacy also has positive influence on academic achievement.

Further, it is critical to emphasize that high self-efficacy students had higher social capital. In this study, social capital was measured by a series of items representing interactions between parents/significant others and students. It followed Coleman's theory and conceptualization of social capital (Coleman, 1988); and can be categorized as the

process segments of social capital (Byun, et al., 2012). While previous studies demonstrated that process segments of social capital positively related to educational aspirations (Byun et al., 2012), this finding revealed that it might also be positively related to self-efficacy. In fact, the positive influence of social capital on educational aspirations might include an indirect effect mediated through self-efficacy.

No difference was found in any of the three self-efficacy constructs (effort, initiative, and time management) between international and domestic students. Therefore, we failed to reject the second null hypothesis of this study. This finding was based on the t-test analysis of the international student group and a randomly selected domestic student group. It is important to understand that the focus of this study was to examine the psychosocial mechanism of how self-efficacy interacts with other key factors and influences degree-aspiration. The difference of this mechanism has nothing to do with the mean differences of self-efficacy levels. However, it is still noteworthy to know that in this study, international students did not show significantly lower self-efficacy compared to domestic students. In some global comparative statistics, international students, especially those from East Asian countries, were described as a group of hard-working students who had low self-efficacy but higher skills/scores on math and science (Stigler, et. al., 1985; Yan & Gaier, 1994; Scholz et. al, 2002). This study demonstrated that although international students might have higher academic achievements (see Table 4.1 & 4.2), the two groups (international and domestic) of students actually had similar levels of general self-efficacy (shown by effort, initiative, and time management).

Discussion of Factor Analysis Results

The exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) emerged and confirmed a measurement model including six first-order latent variables (effort, initiative, time management, social capital, transfer readiness, and high school experiences).

In these latent variables, effort, initiative, and time managements represented the general self-efficacy in this study. The emergence of these three factors was consistent with previous studies (Choi, 2005; Bosscher & Smit, 1998; Starobin et al, 2014). However, according to the hypothetical general self-efficacy model for community college students (GSE-CC model) (Figure 3.1), the three self-efficacy factors might work as a whole to influence degree aspiration and interact with other factors. The thought of conducting a second-order CFA was herein originated. Although the second-order CFA demonstrated an acceptable model fit (Table 4.10), it was not as good as the first-order CFA model (Table 4.8). Furthermore, the factor loadings of three self-efficacy factors to the second-order factor self-efficacy were not ideal (Tables 4.10). Therefore, the author decided not to adopt the second-order structure; instead, the first-order CFA was adopted as the measurement model for the subsequent SEM analyses.

Next, as mentioned above, the latent variable social capital represented the process segments, or the parent-children interaction aspect of social capital (Coleman, 1988; Byun et al., 2012). By doing so, the findings regarding social capital and its interaction with other factors were comparable with previous studies. Further, since the items of social capital were specified to be parent-children interaction in high school, it was reasonable to test the

influence of social capital (obtained in high school) on self-efficacy levels (measured in community college).

The latent variable - high school experiences - comprised of the numbers of math courses and science courses taken in high school. Apparently, although provided critical academic information, these measures were not enough to cover the comprehensiveness of high school experiences. This nature limits the power of the measurement model, the SEM model, and the entire study.

The construct of community college support and barriers were emerged in EFA. However, due to the model fit information, this construct was deleted from the CFA and SEM analyses. The deletion of this construct helped not only improve the model fit significantly, but also enabled the author to focus on the relationship between self-efficacy and degree aspiration.

Last but not the least, the construct - transfer readiness - included items that describe community college students' involvement in transfer preparation. It is crucial to distinguish transfer readiness in this study from the academic readiness upon transfer, since there were no academic items such as study hours, academic achievements, etc. involved. Due to the nature of items that constructed high school experience and transfer readiness, the author decided not to include the path denoting to the influence of high school experiences on transfer readiness in the GSE-CC model.

Overall, the EFA and CFA provided a measurement model for SEM analysis. Although there were some limitations (e.g., deletion of community college support and barriers, not using the second-order structure, etc.), it was the optimal model based on both theoretical and realistic considerations.

Discussions of Structural Equation Modeling Findings

SEM Model Results. The SEM model of all student group (n=2169) provided solid evidence for understanding the psychosocial mechanism of how self-efficacy influences degree aspiration. First of all, the direct effect of self-efficacy on degree aspiration was tested to be significant and positive. Among the three self-efficacy constructs, initiative impacted degree aspiration directly. Students who had higher initiative level had higher degree aspiration. This finding was important on at least two aspects. One aspect was that it demonstrated that the general self-efficacy construct did have significant influence on academic aspiration, just like domain-specific or task-specific self-efficacy factors such as academic self-efficacy, math self-efficacy, literacy self-efficacy, etc. (Zimmerman, 1990, 1995; Lent, 1984). The other aspect was that this finding was based on analyzing community college student data. The above finding adds to the research literature of community college in regards to the effect of self-efficacy on students' academic aspiration and success.

Second, the indirect effect of self-efficacy on degree aspiration was significant through the mediation of transfer readiness. In particular, self-efficacy constructs (i.e., effort and initiative) influenced transfer readiness positively. Such effects transferred to degree aspiration through the significant effect of transfer readiness on degree aspiration. This finding specifically contributed to the literature about the function of general self-efficacy. Previous studies inferred that the general self-efficacy might not be a significant predictor to a task-specific criterion variable such as GPA. Rather, the effects may exist through its relation with other factors (Choi, 2005). The indirect effect of self-efficacy constructs, especially effort, demonstrated that this argument was true.

Third, self-efficacy (e.g., initiative) mediated the effects of a series of variables on degree aspiration. These variables include age, ethnicity, native language, and high school experiences. For example, high school experiences significantly impacted students' initiative levels. Through this impact, high school experiences indirectly influenced degree aspiration in addition to its positive and direct impact. The similar paths held true for native language, age and ethnicity (Asian). Specifically, it was demonstrated that age might have a negative and direct effect on degree aspiration (younger students had higher degree aspiration). The indirect effect of age on degree aspiration, on the other hand, was positive via the mediation of initiative levels. Additionally, age had another indirect and negative effect route via the mediation of high school experience. Similarly, a complete understanding of being an Asian's effect on degree aspiration includes a) the negative and small direct effect towards degree aspiration, b) the negative indirect effect through the mediation of initiative. Lastly, speaking English as native language had a small negative direct effect on degree aspiration. The indirect effect of native language through initiative levels was positive, but much smaller than high school experiences, age, and ethnicity (Asian).

This series of findings helped to deepen our understanding about how the influence of personal input variables took place. These personal input variables internalized themselves via influencing psychological factors such as self-efficacy, and then projected their effects out through the effect of these psychological factors. Further, it was intricate to look at the complex effects of age and native language. Age had a negative direct effect, a negative indirect effect (via high school experiences) and a positive indirect effect (via self-efficacy) on degree aspiration. Through calculation, the negative direct effect was the biggest, while the other two indirect routes delivered very limited influence. However, this finding might

inspire future studies and provide a new perspective to examine the psychological effects of adult students. The similar arguments held true for the native language. In terms of the effect magnitude, it should be noticed that native English speakers only had a very small advantage on displaying higher initiative levels and higher degree aspiration. It should be cautious and conservative when generating implications and recommendations based on the findings regarding native language's effects. Moreover, although with a limit magnitude, it was very interesting, but not surprising to discover that Asian students had lower self-efficacy levels (initiative) and lower degree aspiration compared to non-Asian students. Previous studies reported that Asian students tend to have lower self-efficacy beliefs even though sometimes they are showing better academic achievements (Stigler, et. al., 1985; Scholz, et. al, 2002). One explanation might be that hard work and personal effort are more valued than high ability in collectivistic cultures. The Asian students, both citizens and noncitizens, grew up within such cultural environments. Therefore, they rated self-efficacy lower than those grew up in a more individualistic culture background.

The SEM model results for all student group demonstrated that, the three self-efficacy constructs (i.e., effort, initiative, and time management) had different mechanisms in regards to interacting with other factors and impacting degree aspiration. It might be another supportive evidence of not using the second-order measurement model. By using an integrated, second-order factor self-efficacy, we might not be able to discover the specific relationship structures for each of these three constructs.

The SEM model findings helped us to reject the third and the fourth null hypotheses of this study. That is, self-efficacy had interactions with key factors (e.g., social capital, personal input, high school experiences, transfer readiness, etc.) that were critical in affecting

degree aspiration. Also, self-efficacy and these factors had significant influences on degree aspiration. These two null hypotheses for domestic and international student groups respectively were also rejected since the SEM models for these two groups also revealed some meaningful significant paths.

In terms of the last null hypothesis (differences between domestic and international student groups), it was not sufficient to conclude that the SEM results were different from the comparison between domestic student group (n=1,938) and international student group (n=218). Although the two SEM models showed a great difference on both quantity and magnitude of significant paths (Table 4.12.B and Table 4.12.C, or Figure 4.8 and Figure 4.9), we should not make our conclusion without an invariance testing procedure. Moreover, in order to avoid the bias caused by the huge sample size of domestic student group, a random sample of domestic students, instead of all domestic students, were included in the invariance testing.

Invariance Testing. As reported in Chapter four, the invariance testing found two significantly different paths between international (n=218) and domestic (n=218) student groups. The two different paths referred to a) the effect of gender on self-efficacy construct initiative, and b) the effect of ethnicity (Black) on degree aspiration.

The effect of gender on initiative was significant for international students but not domestic students. Specifically, female international students had higher initiative levels than their male counterpart. But the same effect was not significant for domestic students. One possible explanation to this difference related to the proportion of female participants in this study. The comparative analysis indicated that high self-efficacy students contained more female. And, a large proportion of international students (70%) were female. However, this

interpretation was not sufficient since domestic students also contained a large proportion (66.5%) of female students. An alternative way to consider this difference involved the gender roles in different cultures. Female international students might come from cultures where obedience, diligence, persistence, etc. were considered as the essential parts of female paradigm. Such cultural effects might have resulted in a higher rate on general self-efficacy (initiative) levels for female international students.

Furthermore, the effect of Black on degree aspiration was significant and positive for international students, but negative and not significant for domestic students. In previous studies, under-represented minority students (e.g., Black, Latino/a, etc.) were often found having lower academic aspiration. One explanation referred to the ethnicity identification and stereotype threat of minority students. Specifically, under-represented minority students might maintain their beliefs and values in the context of home and/or same-ethnicity peers. These beliefs and values might feel contrasted and swayed when these students enter the school culture or environments that are permeated by the mainstream norms. They might doubt their ability and define academic success as White (sometimes Asian as well) students' prerogative. Therefore, they may discourage their peers and themselves from emulating White ("acting White") students in academic success. Because of such ambivalence, many minority students demonstrated lower self-efficacy (especially academic self-efficacy) and lower academic aspiration (Fordham & Ogbu, 2011; Gonzalez, Stein, & Hug, 2013).

These interpretations, however, cannot be directly applied to international students. Instead, the notion of critical mass (Hagedorn, Chi, Cepeda, & McLain, 2007) might be a better tool to understand this finding. In educational studies, the critical mass refers to a level of representation which brings a specific student group comfort or familiarity (i.e., minority

students enrolled in a “minority-majority” college). The critical mass was viewed to have a positive influence on minority students’ success. (Hagedorn, Chi, Cepeda, & McLain, 2007). In this study, most international students came from countries where the society and culture were more homogenous compared to the U.S. The Black international students, particularly, might be the majority, or the critical mass in their home environment. In fact, based on the Black international students’ responses to the SSSL survey, many of them were from countries such as Bahama, Jamaica, Rwanda, Haiti, and so on. These Black international students might be very confident about their academic skills and abilities based on the comparison with the counterparts in their home country. And because of this, they demonstrated higher degree aspiration.

Although the fifth null hypothesis was successfully rejected (that is, there were differences between international and domestic student groups regarding the psychosocial mechanism of how self-efficacy levels influence their degree aspiration), only two paths were found significantly different across groups. It was substantially less than what could be visualized based on the SEM model results for domestic student group ($n=1,938$) and international student group ($n=218$) (Figures 4.8 and 4.9). This might be due to some methodological issues and limitations of this study. For instance, many paths followed a similar pattern: they had significant but very small effect ($\beta < .10$) for domestic students but not significant effect for international students. These paths were not significantly different across the groups in the invariance testing. The practical limitation of SEM techniques might be responsible for this inconsistency. Since SEM is based on covariance matrix analysis, it is very sensitive to the sample size and preferred to larger samples (Tabachnick, B. G., & Fidell, L.S., 2007). The sample size difference between the entire domestic student group

(n=1,938) and a random sample of domestic student group (n=218) might be the reason for fewer significant findings in invariance testing. Another explanation relates to characteristics of the Sunshine College students. As a large, mainly two-year institution, Sunshine College attracted international students from all over the world. In this study, the nationality of Sunshine international students was not controlled. It might be possible that the domestic students (identified by citizenship) were raised up in immigrant families and shared some important social/psychological characteristics with international students (noncitizen students). Therefore, the significant differences between these two groups were not as much as hypothesized.

Implications for Practice and Future Research

Implications for Practice

The findings of this study provide a solid base to generate implications for community college leaders, administrators, and educators. These implications can be summarized as follow.

First, the findings of this study can facilitate the knowledge change of students' self-efficacy and academic aspiration. It can help community college leaders, administrators, and educators to better serve domestic and international students. This study provides new knowledge of a) how self-efficacy affects students' educational aspiration by its own, b) how self-efficacy relates to other key factors proved to be critical to students' experiences, and c) how self-efficacy functions as a piece of a comprehensive mechanism that affects community college students' educational aspiration. Practitioners are expected to further understand the importance of students' self-efficacy and strive for a better learning environment in order to nourish positive self-efficacy among students, regardless of their origins.

One possible strategy is to promote cooperative learning activities into community college classrooms. As Bandura (1977; 1995) indicated, self-efficacy may derive from symbolic experience through verbal persuasion as well as emotional arousal. These information sources are often available through social relationships. For most community college students, their social relationships mainly occur in classrooms (Karp, et al, 2010/2011). By creating a collaborative learning environment and student-centered pedagogy, instructors can facilitate in-class interactions and promote students' self-efficacy in a supportive, encouraging environment.

In addition to building cooperative classroom, another strategy is to introduce more role models to students. By looking at a "model person" who is similar to themselves succeeding in a desirable field, students will feel more self-efficacious through the information sources of vicarious experience (Bandura, 1977; 1995). For community college students in particular, this model person can be someone who has successfully transferred to a four-year institution, obtained a Bachelor degree, or had a successful career with the earned community college degree. The essential part of providing the model person is to find someone who is similar with community college students. Considering the diverse characteristics of community college students, practitioners should pay more attention to those potential model persons who are female, under-represented minority, adult learners, non-native language speakers, and immigrants. Besides, international office practitioners should spend extra time looking for potential "model person" among former international community college students.

Second, this study provided a statistical profile of high self-efficacy students. Practitioners can then distinguish high self-efficacy students from others and target the

potential low self-efficacy students in order to provide extra support to them. Specifically, lower degree aspiration and lower GPA in college might be adopted as two possible indicators to identify potential low self-efficacy students. It should be noticed that these two indicators should not be used as the only means to identify lower self-efficacy students. It should be adopted with other known variables and practitioner's comprehensive understanding of particular students. For example, low self-efficacy may associate with lower self-esteem, anxiety, helplessness, and even depression. Students having lower self-efficacy might possess pessimistic thoughts about their academic goals and personal development (Scholz, et al., 2002). Community college practitioner may use these additional indicators to identify potential low self-efficacy students and help them enhance self-efficacy levels.

A third implication to practitioners relates to the understanding of unique psychological characteristics of international community college students. Community college practitioners should avoid applying stereotypic thinking on international students. For example, the Black international students might not have lower aspiration compared to the international student from other ethnicity groups. It is recommended to provide seminars, workshops focusing on the cultural differences and needs of international students to administrators, counselors, and instructors. International office or experts of international student affairs may be the ideal hosts of such activities. The topics of these seminars and workshops should be carefully selected based on the investigation of international students' demographic, psychological, cultural and academic characteristics in specific campuses.

Fourth, community colleges should provide learning community opportunities, counseling, orientation, and academic planning tailored to the needs of international students.

Learning community can provide international students with plenty of sources for building up and facilitating positive self-efficacy. It can help international students establishing social relationship with peers, looking for model persons, and interacting with domestic friends. Such activities will not only help develop positive self-efficacy, but also help international students better adjust to the campus life. High quality counseling and academic planning are especially important. The risks international students are facing such as unexpected delay in school process are often caused by the confusions and misunderstanding of the college administrative requirements in U.S. These unexpected difficulties might harm international students' self-efficacy and academic aspiration. The community college administrators, especially those working at the international office, need to provide extra service to help international students navigate the U.S. higher education system. Through these endeavors, community colleges can establish a friendly and supportive environment that would eventually improve international students' academic success.

Implications for Future Research

This study examined the psychosocial mechanism of how self-efficacy influences degree aspiration with a focus on self-efficacy's interactions with other key factors. One important product of this study was the GSE-CC model (Figure 4.7). Another product is the comparison between international and domestic student group via the multi-group invariance testing process. These two products contributed to the existing research literature with new knowledge and presented a series of implications for future research.

First, it is desirable for future research to continuously explore the model fit and model results by applying the GSE-CC model to different student groups. For example, it will be beneficial to test the model with students from different community college systems,

from different states, using ideally nationally representative data set. These attempts will broaden the utility of GSE-CC model.

Also, future studies may replicate the comparison process of this study. They may compare the psychological mechanism described in this study across different ethnicity groups, gender groups, or age groups. Moreover, future study can test the model and compare the model results between community college students and four-year college students. Such comparison might add new knowledge to the effectiveness of community college as a pathway towards Bachelor degree. Future studies may adopt advanced matching techniques when conducting their comparison process. Specifically, techniques such as propensity score matching and weighted sampling can help to create a comparison group that has both equal size and similar characteristics with the control group.

Second, this study can be extended by modifying the model structure. One way to do this is to replace domain-specific or task-specific self-efficacy measurements with the general self-efficacy constructs. This model then can be used to examine the process of how domain-specific or task-specific self-efficacy influence students' academic aspiration. Similarly, future studies may add supplemental measurements for latent factors such as high school experiences and transfer readiness. In this study, high school experiences only contained information about high school math and science course taking patterns. Additional measurements may include standardized test scores, AP course information, and school level information (e.g., free/reduced lunch percentage, geographic location of high school, etc.). Some supplemental measurements for transfer readiness may include students' personal effort on academic learning (e.g., hours spent in studying), interaction with faculty, and number of transferrable credits taken. In such scenario, the influence of high school

experiences on transfer readiness (Figure 3.1) might be tested in the model. Another approach of building upon this study is to test the model with an alternative endogenous variable. Instead of degree aspiration, self-efficacy was also found influencing students' actual academic achievement (e.g., retention, graduation, GPA, etc.) in previous studies. Future studies may revise the model by choosing alternative endogenous variable, and then investigate how self-efficacy influences these new endogenous variables.

The approaches of extending this study by revising the model require re-examining the survey items and obtaining administrative data from participated college. Methodologically, it requires researchers to go through the EFA and CFA process again and reach a new measurement model. Also, it may require researchers to obtain additional IRB approvals in order to link the survey data to the administrative data (e.g., actual degree attainment, test scores, credits taken information, etc.)

Third, this study revealed the unique psychosocial mechanism of international students studying at community colleges. This may call for additional studies, both quantitative and qualitative, to focus on the psychological aspects of international students. For instance, some future studies may need to pay attention to the internal diversity within the international community college students. In this study, international students came from different countries and cultures around the world. The diverse origins yielded limited homogenous background. A qualitative research might be especially suitable in investigating and revealing background and cultural differences among international students. The findings of such qualitative research may inspire further examination and modeling on international students' psychological aspects. The quantitative approach, on the other hand, might require the data sharing from federal agencies that deal with international education affairs (e.g., the

U.S. Department of State Bureau of Educational and Cultural Affairs, Institute of International Education, etc.). Such national level data can provide a holistic understanding of the country origins of international students. The future quantitative studies, therefore, can develop innovative statistical analyses and models to illustrate the interaction between international students' psychological formation and their diverse nationality/cultural background.

Future studies may also develop further investigation beyond solely focusing on the self-efficacy of international students studying at community colleges. This study can serve as a first step to explore international students' academic development and social adjustment process at community colleges. How does self-efficacy level influence international students' academic and social experiences at two-year institutions? Does international students' self-efficacy level changes over time? Will these changes influence their actual academic achievement and/or social experiences? Will these changes affect their post-graduation plan?

Lastly, there is a need to develop a survey instrument designed for international students in community college to investigate their academic aspiration, self-efficacy, adjustment process, and acculturation. International student group has been a unique student group in community colleges. Most of them have strong aspiration towards bachelor degree, for this is usually the reason why they decided to study abroad. However, compared to their domestic counterparts, they might encounter more challenges in terms of adjusting to the learning environment, navigating through a foreign higher education system, adapting to a different culture, etc. Every aspect of these challenges may be influenced by and contribute to international students' psychological processes. Therefore, a survey designed for all community college students might not be able to gather all critical information from

international students. Developing a survey instrument for international community college students requires researchers to not only learn from the existing survey instrument, but also explore the necessary adds-on elements through an extensive literature review. Also, interviewing international community college students and collecting information from experts of international students affairs may also help with the survey instrument development. With the steady increment of the international enrollment in community colleges (Institute of International Education, 2013), such surveys will shed lights on collectively and statistically studying international students' aspiration, adjustment, self-efficacy, and other social /psychological aspects of their lives.

Conclusions

This study aimed at investigating the psychosocial mechanism of how self-efficacy influences community college students' degree aspiration; and examining whether or not this mechanism had significant differences between domestic and international community college students. This study accomplished the research goals by establishing GSE-CC model, which depicts the self-efficacy constructs, the prediction of self-efficacy constructs on degree aspiration, and the interaction between self-efficacy and other key factors. This study also demonstrated that there were significant differences in the model structure between domestic and international students. Findings of this study are informative to community college leaders, administrators, educators, and researchers who are interested in studying community college students.

This study contributed to the existing literature of self-efficacy and academic aspiration by a) adopting the perspective of general self-efficacy instead of domain-specific or task-specific self-efficacy; b) focusing on the community college student group, and

especially the international community college students; and c) adopting and revising the SCCT model to develop GSE-CC model that was more applicable to community college students.

Self-efficacy is a complex and critical variable that impacts students' academic lives in a variety of ways. The GSE-CC model provides a new approach to understanding how self-efficacy influences degree aspiration. It can shed lights on future studies on community college students' self-efficacy and academic aspiration. The focus of international community college students may inspire more researchers to study this unique student group. The psychosocial mechanism revealed by GSE-CC model can help us better understand community college students' (both domestic and international students) psychological world, and eventually facilitate their success in community colleges, four-year colleges/universities, and future career.

APPENDIX A: STEM STUDENT SUCCESS LITERACY SURVEY INSTRUMENT
(SPRING 2013)

STEM Student Success Literacy Survey

Dear Student,

On behalf of the research team, our sincere thank you for your time in responding to the following questions.

This survey will take approximately 15 minutes to complete. Your responses will inform research that will guide instructional practice, student services, and academic support programs to maximize student success! Your participation is critical to the project. We thank you for your attention to the questions and for completing the survey.

Directions for filling out the survey:

- The survey is divided into four sections. Scroll through each section to answer the questions.
- Please complete the entire survey (Plan on approximately 15 minutes).
- When reviewing questions, respond to each with what first comes to mind as the appropriate responses.
- Please click on NEXT at the bottom of each page to advance to the next page.
- If you need to leave the survey temporarily, simply close your web browser. You can come back to complete the survey through the same link within 7 days.
- Please click on NEXT at the end of the survey to submit your answers. You will NOT be able to make any changes once you submit.

Upon completion of the survey, you will be automatically entered in a lottery for a random drawing. If you are selected as one of the winners in the lottery, you will be required to sign a receipt form documenting receipt of the prize. Please know that payments are subject to tax withholding requirements, which may vary depending upon whether you are a legal resident of the U.S. or another country. If required, taxes will be withheld from the prize you receive. You will need to provide your social security number (SSN) and address on a receipt form. This information allows the University to fulfill government-reporting requirements. Confidentiality measures are in place to keep this information secure. You may forgo receipt of the prize and continue in the study if you do not wish to provide your SSN and address.

All answers will become part of a larger data set, and responses are not identifiable to you as a student responder.

Again, we thank you for your time and effort.

Best Regards,

Soko S. Starobin, Ph.D.

Assistant Professor, School of Education

Director, Office of Community College Research and Policy

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Section 1: Self-Efficacy

Q1. The following questions are a series of statements about your personal attitudes and traits. For each item below, please indicate the extent to which you disagree or agree with the statement.

	Disagree strongly	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Agree strongly
1. If I can't do a job the first time, I keep trying until I can.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. When I have something unpleasant to do, I stick to it until I finish it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Failure makes me try harder.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I often make lists of things to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I usually mark important dates on my calendar.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I do not seem capable of dealing with most problems that come up in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. If something looks too complicated, I will not even bother to try it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. When trying to learn something new, I soon give up if I am not initially successful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I wish I could have more respect for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. On the whole, I am satisfied with myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2. The following questions are a series of statements about your personal attitudes and traits in various social aspects. For each item below, please indicate the extent to which you disagree or agree with the statement.

	Disagree strongly	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Agree strongly
1. It is difficult for me to make new friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. If I see someone I would like to meet, I go to that person instead of waiting for him or her to come to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I do not handle myself well in social gatherings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3. Since you began attending this college, how often do you engage in the following?

	Never	Rarely	Sometimes	Often	Always
1. Worrying about what others think of me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Doing things so that others will like me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Worrying about being called a “nerd” or “brainiac”	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Worrying about being accused of not being myself (e.g., “acting white” or being a “sell out”)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4. Compared to the students at your campus, where the average student is at the 50th percent, rate your confidence about your level of skill according to the following scale.

	I'm in the bottom 10%	I'm below average but not in the bottom 10%	I'm about average	I'm above average but not in the top 10%	I'm in the top 10%	Not applicable
1. Math skill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Writing skill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Public speaking skill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Social skill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Computer skill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5. Please think about the most challenging class you have taken in this college, and answer the following questions based on your experiences in this class.

Q6. What subject does this most challenging class belong to?

- Biology
- Chemistry
- English
- Mathematics
- Physics
- Other, please specify _____

Q7. Why was this class the most challenging?

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
1. Did not know how to study for the exams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Did not get enough feedback from the professor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Professor was not available to answer questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Professor did not encourage interaction with him/her	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Professor expected a low performance from me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The course required a large amount of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8. On a scale of zero to ten (0: No Anxiety - 10: Extreme anxiety), what was your level of anxiety in this class?

_____ Anxiety (0: No Anxiety - 10: Extreme Anxiety)

Q9. To what degree did your anxiety negatively impact your class performance? Please mark the negative impact on a scale of one to five (1= no negative impact, 5=extremely negative impact).

_____ Negative Impact

Q10. When you were working at a challenging task in that class, how confident were you that you would succeed? Please mark the degree of your confidence on a scale of one to five (1= extremely confident - 5= not at all confident)

_____ Confidence

Q11. If you succeeded at a challenging part of this class, would you say it was because of:

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
1. Your high ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Good luck	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The task was easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. You worked hard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12. If you failed (or were less successful) at a challenging part of this class, would you say it was because of:

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
1. Your low ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Bad luck	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The task was hard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. You didn't work hard enough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.

	Did no use/not applicable	Used, not helpful	Used, somewhat helpful	Used, very helpful
1. Spent more time studying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Taught myself to study more effectively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Did all of the assigned reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Increased lecture attendance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Received a sample test from a friend or club/organization to study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Studied by myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Cheated on assignments or exams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Withdrew from the course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Studied with other students in the class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Received informal tutoring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Received academic support outside the class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Used feedback from Teacher Assistant or professor on a regular basis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14. For this most challenging class, how helpful was the encouragement or advice you received from the following?

	Did not receive/ not applicable	Received, not helpful	Received, somewhat helpful	Received, very helpful
1. Family member or friend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Fellow resident or Resident Assistant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Fellow classmate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Upper-class student who had taken the class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Staff person or administrator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Professional counselor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Advisor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Professor or Teacher's Assistant for this class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Academic dean	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Another faculty member	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15. In a typical week (not exam week), how many hours did you spend studying and preparing for this class?

- 0 or None
- Less than 1 hour
- 1-2 hours
- 3-5 hours
- 6-10 hours
- 11-20 hours
- 21-35 hours
- 36-45 hours
- 46 hours or more

Section 2: Social Capital

Q16. What is the highest level of education completed by your parents?

	Elementary school or less	Some high school	High school graduate	Some college	Associate degree from two year college	Bachelor's degree	Some graduate school	Graduate degree	Don't know
1. Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q17. Are you financially independent (your college expenses are paid by someone other than your parents, e.g., yourself, your employer.)?

- Yes
 No

If Yes Is Selected, Then Skip To How much of your first year's educati...

Q18. What is your best estimate of your parents' total income last year? Consider income from all sources before taxes.

- Less than \$20,000
 \$20,000---\$39,999
 \$40,000---\$59,999
 \$60,000---\$79,999
 \$80,000 or more
 I don't know
 Prefer not to answer

Q19. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below?

	None	Less than \$1,000	\$1,000 to \$2,999	\$3,000 to \$5,999	\$6,000 to \$9,999	\$10,000 +	Don't know
1. Family resources (parents, relatives, spouse, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My own resources (savings from work, work-study, other income)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Employer contributions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Aid which need not be repaid (grants, scholarships, military funding, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Aid which must be repaid (loans, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Other sources than above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20. Do you have any concern about your ability to finance your college education?

- None (I am confident that I will have sufficient funds)
 Some concerns (but I probably will have enough funds)
 Major concerns (not sure I will have enough funds to complete college)

Q21. Excluding yourself, how many people (children, grandchildren, brothers, sisters, parents, etc.) are you financially supporting?

- None
- 1 - 2
- 3 - 4
- 5 or above

Q22. Are you currently working?

- Yes, I am currently working on campus.
- Yes, I am currently working off campus.
- No, I am not looking for working opportunities.
- No, I am currently unemployed, but I am looking for working opportunities.

If No, I am not looking for wo... Is Selected, Then Skip To During high school, how often did you... If No, I am currently unemployed... Is Selected, Then Skip To During high school, how often did you...

Q23. During your time at the community college, about how many hours a week did you usually spend working on a job for pay?

- 1 to 10 hours
- 11 to 15 hours
- 16 to 20 hours
- 21 to 30 hours
- More than 30 hours

Q24. During high school, how often did your parents or other adults:

	Never or very rarely	A few times a year	About once a month	Several times a month	Several times a week
1. Discuss book, films, or television programs with you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Eat the main meal with you around a table	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Spend time just talking to you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Work with you on your homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Discuss your progress in school with you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Participate in school related activities (e.g., Parent-Teacher Association)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Spend time talking with your friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25. If you were to compare yourself to your parents or guardian, would you say that you are:

- Much more thrifty and likely to save what I can
- Somewhat more thrifty and likely to save what I can
- About as thrifty
- Somewhat less thrifty and more likely to spend what I can
- Much less thrifty and much more likely to spend what I can

Q26. What is your mother's occupation?

- Biological/Life Scientists
- Clerical/Administrative Support occupations
- Clergy/Other religious workers
- Consultants
- Counselors
- Engineers/Architects
- Engineering Technologists/Technicians/Surveyors
- Farmers/Foresters/Fishermen
- Health occupations
- Lawyers/Judges
- Librarian/Archivists/Curators
- Managers and Supervisors, First-line
- Managers, top-level executives/Administrators
- Manager, other (People who manage other managers)
- Management-related occupations
- Mathematical scientists
- Physical scientists
- Research associates/Assistants
- Service occupations, except health
- Social scientists
- Social workers
- Teachers-precollege
- Teachers/Professors-postsecondary
- Teachers-other
- Writers/Editors/Public relations specialists/Artists/Entertainers/Broadcasters
- Other professions/Other occupations
- Unemployed
- Retired
- Not applicable

Q27. What is your father's occupation?

- Biological/Life Scientists
- Clerical/Administrative Support occupations
- Clergy/Other religious workers
- Consultants
- Counselors
- Engineers/Architects
- Engineering Technologists/Technicians/Surveyors
- Farmers/Foresters/Fishermen
- Health occupations
- Lawyers/Judges
- Librarian/Archivists/Curators
- Managers and Supervisors, First-line
- Managers, top-level executives/Administrators
- Manager, other (People who manage other managers)
- Management-related occupations
- Mathematical scientists
- Physical scientists
- Research associates/Assistants
- Service occupations, except health
- Social scientists
- Social workers
- Teachers-precollege
- Teachers/Professors-postsecondary
- Teachers-other
- Writers/Editors/Public relations specialists/Artists/Entertainers/Broadcasters
- Other professions/Other occupations
- Unemployed
- Retired
- Not applicable

Q28. What is your probable career occupation?

- Biological/Life Scientists
- Clerical/Administrative Support occupations
- Clergy/Other religious workers
- Consultants
- Counselors
- Engineers/Architects
- Engineering Technologists/Technicians/Surveyors
- Farmers/Foresters/Fishermen
- Health occupations
- Lawyers/Judges
- Librarian/Archivists/Curators
- Managers and Supervisors, First-line
- Managers, top-level executives/Administrators
- Manager, other (People who manage other managers)
- Management-related occupations
- Mathematical scientists
- Physical scientists
- Research associates/Assistants
- Service occupations, except health
- Social scientists
- Social workers
- Teachers-precollege
- Teachers/Professors-postsecondary
- Teachers-other
- Writers/Editors/Public relations specialists/Artists/Entertainers/Broadcasters
- Other professions/Other occupations

Q29. Since arriving at this college, has your occupational expectation changed?

- Yes
- No

If No Is Selected, Then Skip To If there were no obstacles, what is t...

Q30. Please indicate WHY your career choice changed:

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
1. Lack of high school preparation for career choice requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Academic difficulty in the major course requirements for the career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Academic interests and values have changed since arriving at this college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Career interests have changed since arriving at this college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Career values have changed since arriving at this college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Lack of pre-professional learning opportunities available (e.g., internships, research opportunities)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q31. If there were no obstacles, what is the highest academic degree you would like to attain in your lifetime?

- Will take classes, but do not intend to earn a degree
- Vocational certificate/Diploma
- Associate degree (A.A. or equivalent)
- Bachelors' degree (B.A., B.S., etc.)
- At least a Bachelor' degree, maybe more
- Master's degree (M.A., M.S., etc.)
- Doctoral degree (Ph.D., Ed.D., J.D., etc.)
- Medical degree (M.D., D.D.S., D.V.M., etc.)

Q32. How likely would each of the following be to prevent you from obtaining your college degree?

	Not at all likely	Probably not likely	Somewhat likely	Very likely
1. Child care issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Health issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Debt-need to work more hours because of bills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Inability to balance home and school responsibilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Inability to balance work and school responsibilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Insufficient financial aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Lack of money	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Poor or failing grades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Transportation issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Unprepared for college coursework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Lack of support services or resources, i.e. tutoring/mentoring/counseling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q33. Realistically, what do you expect will be your annual income in the first full year after leaving this college?

- Less than \$20,000
- \$20,000---\$39,999
- \$40,000---\$59,999
- \$60,000---\$79,999
- \$80,000 or more

Section 3: Transfer knowledge

Q34. About how many hours a week do you usually spend on the community college campus, not counting time attending classes?

- None
- 1 to 3 hours
- 4 to 6 hours
- 7 to 9 hours
- 10 to 12 hours
- more than 12 hours

Q35. Have you taken any developmental courses in the following subjects? (check all that apply)

- Math
- Reading
- Writing
- None

Q36. About how many hours a week do you usually spend studying or preparing for your classes?

- 1 to 5 hours
- 6 to 10 hours
- 11 to 15 hours
- 16 to 20 hours
- more than 20 hours

Q37. The following items address your use of academic advising/counseling services at your community college. Please indicate the extent to which you disagree or agree with each statement.

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
1. I consulted with academic advisors/counselor regarding transfer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Information received from academic advisors/counselors was helpful in the transfer process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I met with academic advisors /counselors on a regular basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I talked with an advisor/counselor about courses to take, requirements, and education plans.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I discussed my plans for transferring to a four-year college or university with an academic advisor/counselor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Advisors/counselors identified courses needed to meet the general education/major requirements of a four-year college or university I was interested in attending.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q38. The following items pertain to your perceptions about the “transfer process” while you were enrolled at the community college. Please indicate the extent to which you disagree or agree with each statement.

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly Agree
1. I researched various aspects of 4-year institutions to get a better understanding of the environment and academic expectations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I visited the 4-year institutions at least once to learn where offices and departments were located.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I spoke to academic counselors at 4-year institutions about transferring and major requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I spoke to former community college transfer students to gain insight about their transfer experiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q39. How often did you do each of the following at your community college?

	Never or very rarely	A few times per semester	About once a month	Several times a month	Several times a week
1. Visited faculty and sought their advice on class projects such as writing assignments and research papers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Approaching faculty outside class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Discussed career plans and ambitions with a faculty member.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Asked my instructor for comments and criticisms about my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q40. Have you ever felt that the faculty, staff, or administration in this college treated you poorly?

- Yes
 No

If No Is Selected, Then Skip To To what extent do the following gener...

Q41. Have you ever felt that the faculty, staff, or administration in this college treated you poorly because of your: (Check all that apply).

- Gender
 Race or ethnicity
 English-language proficiency
 Sexual orientation
 Religion
 Social class
 Other, please specify _____

Q42. To what extent do the following generally characterize the classroom environment you have experienced at this college?

	Never	Rarely	Sometimes	Often	Always
1. I felt I was treated respectfully in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Class size made it difficult to ask questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I felt isolated in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Instructor expressed a lack of confidence in my ability to succeed in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Instructor or students made prejudiced comments that made me uncomfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I felt like I did not fit in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I was ignored when I tried to participate in class discussions or ask questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q43. In your opinion, how successful has this college been at providing:

	Not at all successful	Somewhat successful	Successful	Very successful	Extremely successful
1. Faculty role models similar to you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Administrative/staff role models similar to you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Clubs and organizations that match your interest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Classroom environments that encourage your academic success	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. A sense of being a valued member of the community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Opportunities to interact socially with your friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q44. At this college, what is your overall grade point average (GPA)?

- 3.75-4.00 (mostly As)
- 3.25-3.74 (about half As and half Bs)
- 2.75-3.24 (mostly Bs)
- 2.25-2.74 (about half Bs and half Cs)
- 1.75-2.24 (mostly Cs)
- 1.25-1.74 (about half Cs and half Ds)
- Less than 1.25 (mostly Ds or below)
- Have not taken courses for which grades were given
- Prefer not to answer

Q45. As things stand today, do you intend to transfer to a:

- 4-year public university
- 4-year private college or university
- Private 2-year college
- Public 2-year college
- Not intend to transfer

If Private 2-year college Is Selected, Then Skip To Section 4: Demographic informationIs ...If Public 2-year college Is Selected, Then Skip To Section 4: Demographic informationIs ...If Not intend to transfer Is Selected, Then Skip To Section 4: Demographic informationIs ...

Q46. Are you planning to major in STEM (Science, Technology, Engineering, and Mathematics) upon transfer?

- Yes
- No

If Yes Is Selected, Then Skip To Which STEM major are you planning to ...

Q47. Which STEM major are you planning to choose upon transfer?

- Biological Science (includes Biology, Biochemistry/Biophysics, Botany, Environmental Science, Marine Science, Microbiology/Bacteriology, Zoology, etc.)
- Computer Science
- Engineering (includes Aeronautical/Astronautical Engineering, Civil Engineering, Chemical Engineering, Computer Engineering, Electrical/Electronic Engineering, Industrial Engineering, Mechanical Engineering, etc.)
- Forestry
- Health Related Professional (includes Health Technology, Medicine, Dentistry, Veterinary Medicine, Nursing, Pharmacy, Therapy, etc.)
- Military Science
- Physical Science (includes Astronomy, Atmospheric Science, Chemistry, Earth Science, Marine Science, Mathematics, Physics, etc.)
- Technology (includes Building Trades, Computer Programming or Data Processing, Drafting or Design, Electronics, Mechanics, etc.)
- Other STEM major

Section 4: Demographic information

Q48. Is this your first semester in this college?

- Yes
 No

Q49. Thinking about this current academic term, how would you characterize your enrollment at this college?

- Full-time (12 or more credit hours)
 Part-time (less than 12 credits)

Q50. Including this semester, what mathematics courses have you taken? Include courses in high school or previous college work. (Check all that apply)

	High School	College	Did not take
1. Basic math, Business math, or Pre-algebra	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Algebra I	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Geometry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Algebra II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Trigonometry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Pre-calculus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Calculus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Integrated/Applied Mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Probability/Statistics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q51. Including this semester, what science courses have you taken? Include courses in high school or previous college work. (Check all that apply)

	High School	College	Did not take
1. General Biology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Chemistry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Physics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Biology specialty (i.e., microbiology, genetics, botany, cell biology, marine biology, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Other Earth Sciences (i.e., geology, meteorology, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Physical Science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q52. Have you participated in Project Lead The Way (PLTW)?

- Yes
 No

Q53. Have you ever attended a four-year college/university?

- Yes
- No

Q54. What academic credentials have you earned? (Check all that apply)

- None
- High school diploma or GED
- AA (Associate of Arts)
- AS (Associate of Science)
- AGS (Associate of General Studies)
- AAA (Associate of Applied Arts)
- AAS (Associate of Applied Science)
- Diploma
- Certificate
- Other

Q55. What is your gender?

- Male
- Female

Q56. Are you Hispanic/Latino?

- Yes
- No

If Yes Is Selected, Then Skip To What is your age?

Q57. How would you identify your race/ethnic background?

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic
- Native Hawaiian or other Pacific Islander
- White
- Two or more races
- Race/Ethnicity Unknown

Q58. What is your age?

- 17 and younger (17)
- 18 (18)
- 19 (19)
- 20 (20)
- 21 (21)
- 22 (22)
- 23 (23)
- 24 (24)
- 25 (25)
- 26 (26)
- 27 (27)
- 28 (28)
- 29 (29)
- 30 (30)
- 31 (31)
- 32 (32)
- 33 (33)
- 34 (34)
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- 40 (40)
- 41 (41)
- 42 (42)
- 43 (43)
- 44 (44)
- 45 (45)
- 46 (46)
- 47 (47)
- 48 (48)
- 49 (49)
- 50 (50)
- 51 (51)
- 52 (52)
- 53 (53)
- 54 (54)
- 55 (55)
- 56 (56)
- 57 (57)
- 58 (58)
- 59 (59)
- 60 (60)

- 61 (61)
- 62 (62)
- 63 (63)
- 64 (64)
- 65 and older (65)

Q59. What is your marital status?

- Married
- Living together (not married)
- Single, never married
- Divorced/separated/widowed

Q60. Are your parent(s):

- Both alive and living with each other
- Both alive
- Divorced or living apart
- One or both deceased

Q61. What is your current religious preference?

- Catholic
- Protestant
- Jewish
- Islam
- Hindu
- Buddhist
- Other, please specify _____
- None
- Prefer not to answer

Q62. How many miles is this college from your permanent home?

- 5 miles or less
- 6---10 miles
- 11---50 miles
- 51---100 miles
- 101---500 miles
- Over 500 miles

Q63. Currently, what is your citizenship status?

- U.S. Citizen, native born
- U.S. Citizen, naturalized
- Non-U.S. Citizen, with a permanent resident visa/green card
- Non-U.S. Citizen, with a temporary U.S. resident visa
- Living outside the United States
- Prefer not to answer

If U.S. Citizen, native born Is Selected, Then Skip To Is English your native language? If U.S. Citizen, naturalized Is Selected, Then Skip To Is English your native language? If Prefer not to answer Is Selected, Then Skip To Is English your native language?

Q64. If you were born outside of the U.S., in what country were you born? Please specify.

Q65. At what age did you first come to the U.S. for an extended period of time (i.e., more than 1 month)? Please specify.

- Birth to 3
- 4 to 7
- 8 to 12
- 13 to 17
- 18 to 21
- older than 21
- Not applicable

Q66. Is English your native language?

- Yes
- No

Section 5: Institution Questions

Please click the "NEXT" button to complete the survey. By completing the survey, you will be automatically entered in a lottery for a random drawing for winning one of the five iPad 2. Good Luck!

Thank you very much for taking the time to complete this survey.

Soko S. Starobin, Ph.D.
School of Education
Director, Office of Community College Research and Policy
starobin@iastate.edu

APPENDIX B: THE INVITATION E-MAIL FOR SSSL SURVEY POTENTIAL
PARTICIPANT

Subject: Invitation to Participate in a Community College Student Survey

Dear [Student First Name],

On behalf of [Name of Institution], I would like to invite you to participate in the STEM Student Success Literacy Project (SSSL). This research study consists of a web survey that asks about the academic and social experiences to ascertain the level of literacy among community college students regarding their transfer readiness for obtaining a baccalaureate degree in STEM fields. [Name of Institution] has been selected, and has agreed to participate in this important study researching various factors associated with student success.

The survey is being conducted by the researchers from the Office of Community College Research and Policy (OCCRP) at Iowa State University as a part of a study of community college STEM student success literacy. By participating in this survey, you will provide us with information that will be valuable for improving the quality of student success practices at both two-year and four-year higher education institutions. Your assistance is crucial to this project.

You have been identified and invited to participate in this study. The survey can be completed online in approximately 15 minutes.

To thank you for your time and assistance, you will have a chance to win one of five grand prizes, iPad 2 for free!

Insert Qualtrics Link Here

Your responses will be kept confidential and we will not identify you by name in any report coming from this research. Moreover, the survey data will be reported only in aggregate

form. Your individual answers to the survey questions will not be provided to anyone at [Name of Institution] and individual institutions will not be identified in reports related to this survey. Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in penalty or loss of benefits to which you are otherwise entitled.

Should you have any questions or concerns about this survey, please contact Dr. Soko Starobin by email (starobin@email.iastate.edu) or phone (515-294-9121).

If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office of Responsible Research, Iowa State University, Ames, Iowa 50011.

Thank you for your consideration,

[Contact person]

APPENDIX C. INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTER

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

DATE: March 23, 2012
TO: Soko Starobin
N243 Lagomarcino Hall
FROM: Office for Responsible Research
TITLE: Measuring Constructs of STEM Student Success Literacy: Community College Students' Self-Efficacy, Social Capital, and Transfer Knowledge
IRB ID: 12-124
Submission Type: New **Exemption Date:** March 23, 2012

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.
- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any *modifications to the research procedures* (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the *inclusion of participants from vulnerable populations*, and/or any *change that may increase the risk or discomfort to participants*. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. **Only the IRB or its designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

ORR 08/2011

APPENDIX D. CODEBOOK OF THE STUDY

Variable Description	Code	Purpose
Q2_2: If I can't do a job the first time, I keep trying until I can	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither agree nor disagree 5=Slightly Agree 6=Agree 7=Strongly Agree	Item for EFA construct Self-efficacy: Effort
Q2_3: When I have something unpleasant to do, I stick to it until I finish it.	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither agree nor disagree 5=Slightly Agree 6=Agree 7=Strongly Agree	Item for EFA and CFA construct Self-efficacy: Effort
Q2_5: Failure makes me try harder.	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither agree nor disagree 5=Slightly Agree 6=Agree 7=Strongly Agree	Item for EFA and CFA construct Self-efficacy: Effort
Q2_6: I often make lists of things to do.	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither agree nor disagree 5=Slightly Agree 6=Agree 7=Strongly Agree	Item for EFA and CFA construct Self-efficacy: Time management
Q2_7: I usually mark important dates on my calendar.	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither agree nor disagree 5=Slightly Agree 6=Agree 7=Strongly Agree	Item for EFA and CFA construct Self-efficacy: Time management
NQ2_12: I do not seem capable of dealing with most problems that come up in life (reversed).	1= Strongly Agree 2=Agree 3=Slightly Agree 4=Neither agree nor disagree 5=Slightly Disagree 6=Disagree 7=Strongly Disagree	Item for EFA and CFA construct Self-efficacy: Initiative
NQ2_13: If something looks too complicated, I will not even bother to try it. (Reversed).	1= Strongly Agree 2=Agree 3=Slightly Agree 4=Neither agree nor disagree	Item for EFA and CFA construct Self-efficacy: Initiative

	5=Slightly Disagree 6=Disagree 7=Strongly Disagree	
NQ2_14: When trying to learn something new, I soon give up if I am not initially successful. (Reversed)	1= Strongly Agree 2=Agree 3=Slightly Agree 4=Neither agree nor disagree 5=Slightly Disagree 6=Disagree 7=Strongly Disagree	Item for EFA and CFA construct Self-efficacy: Initiative
Q17_1:What is the highest level of education completed by your parents?-Mother	1=Elementary 2=Some high school 3=High school graduate 4=Some college 5=Associate degree 6=Bachelor's degree 7=Some grad school 8=Graduate degree 9=Don't know	Demographic analysis
Q17_2:What is the highest level of education completed by your parents?-Father	1=Elementary 2=Some high school 3=High school graduate 4=Some college 5=Associate degree 6=Bachelor's degree 7=Some grad school 8=Graduate degree 9=Don't know	Demographic analysis
Q25_6: During high school, how often did your parents or other adults-Discuss book, films, or television programs with you.	1=Never or very rarely 2=A few times a year 3=About once a month 4=Several times a month 5=Several times a week	Item for EFA construct Social Capital
Q25_7: During high school, how often did your parents or other adults-Eat the main meal with you around a table.	1=Never or very rarely 2=A few times a year 3=About once a month 4=Several times a month 5=Several times a week	Item for EFA construct Social Capital
Q25_8: During high school, how often did your parents or other adults-Spend time just talking to you.	1=Never or very rarely 2=A few times a year 3=About once a month 4=Several times a month 5=Several times a week	Item for EFA and CFA construct Social Capital
Q25_9: During high school, how often did your parents or	1=Never or very rarely 2=A few times a year 3=About once a month	Item for EFA and CFA construct Social Capital

other adults-Work with you on your homework.	4=Several times a month 5=Several times a week	
Q25_10: During high school, how often did your parents or other adults-Discuss your progress in school with you.	1=Never or very rarely 2=A few times a year 3=About once a month 4=Several times a month 5=Several times a week	Item for EFA and CFA construct Social Capital
Q25_4: During high school, how often did your parents or other adults-Participate in school related activities.	1=Never or very rarely 2=A few times a year 3=About once a month 4=Several times a month 5=Several times a week	Item for EFA construct Social Capital
Q25_5: During high school, how often did your parents or other adults-Spend time talking with your friends.	1=Never or very rarely 2=A few times a year 3=About once a month 4=Several times a month 5=Several times a week	Item for EFA construct Social Capital
Q33. If there were no obstacles, what is the highest academic degree you would like to attain in your lifetime?	1=Will take classes, but do not intend to earn a degree 2=Vocational certificate/Diploma 3=Associate degree (A.A. or equivalent) 4=Bachelors' degree (B.A., B.S., etc.) 5=At least a Bachelor's degree, maybe more 6=Master's degree (M.A., M.S., etc.) 7=Doctoral degree (Ph.D., Ed.D., J.D., etc.) 8=Medical degree (M.D., D.D.S., D.V.M., etc.)	Demographic analysis
Q33. If there were no obstacles, what is the highest academic degree you would like to attain in your lifetime?	1=Will take classes, but do not intend to earn a degree 2=Vocational certificate/Diploma 3=Associate degree (A.A. or equivalent) 4=Bachelors' degree (B.A., B.S., etc.) 5=At least a Bachelor's degree, maybe more 6=Master's degree (M.A., M.S., etc.) 7=Doctoral degree (Ph.D., Ed.D., J.D., etc.) 8=Medical degree (M.D., D.D.S., D.V.M., etc.)	Original variable of endogenous variable in SEM analysis
	1= Strongly Disagree	

Q39_1: I researched various aspects of 4 year institutions to get a better understanding of the environment and academic expectation.	2=Disagree 3=Slightly Disagree 4=Neither 5=Slightly Agree 6=Agree 7=Strongly Agree	Item of EFA and CFA construct: Transfer Readiness
Q39_3: I visited the 4-year institutions at least once to learn where offices and departments were located.	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither 5=Slightly Agree 6=Agree 7=Strongly Agree	Item of EFA and CFA construct: Transfer Readiness
Q39_4:I spoke to academic counselors at r-year institutions about transferring and major requirements;	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither 5=Slightly Agree 6=Agree 7=Strongly Agree	Item of EFA and CFA construct: Transfer Readiness
Q39_6: I spoke to former community college transfer students to gain insight about their transfer experiences.	1= Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Neither 5=Slightly Agree 6=Agree 7=Strongly Agree	Item of EFA and CFA construct: Transfer Readiness
Q44_1: In your opinion, how successful has this college been at providing-Faculty role models similar to you	1=Not at all successful 2=Somewhat successful 3=Successful 4=Very successful 5=Extremely successful	Item for EFA construct: Community College Support and Barriers.
Q44_2: In your opinion, how successful has this college been at providing-Administrative/staff role models similar to you.	1=Not at all successful 2=Somewhat successful 3=Successful 4=Very successful 5=Extremely successful	Item for EFA construct: Community College Support and Barriers.
Q 44_3: In your opinion, how successful has this college been at providing-Providing clubs/orgs to interests	1=Not at all successful 2=Somewhat successful 3=Successful 4=Very successful 5=Extremely successful	Item for EFA construct: Community College Support and Barriers.
Q44-4: In your opinion, how successful has this college been at providing-Classroom environments that encourage your academic success	1=Not at all successful 2=Somewhat successful 3=Successful 4=Very successful 5=Extremely successful	Item for EFA construct: Community College Support and Barriers.

Q44_5: In your opinion, how successful has this college been at providing--A sense of being a valued member of the community	1=Not at all successful 2=Somewhat successful 3=Successful 4=Very successful 5=Extremely successful	Item for EFA construct: Community College Support and Barriers.
Q 44_6: In your opinion, how successful was your college at providing-Opportunities to interact with friends.	1=Not at all successful 2=Somewhat successful 3=Successful 4=Very successful 5=Extremely successful	Item for EFA construct: Community College Support and Barriers.
Q45: As things stand today, do you intend to transfer to a:	1=4 year public univ./college 2=4 year private univ/college 3=Private 2 year college 4=Private 2 year college 5=Do not intend to transfer	Descriptive Analysis
Q 46: Are you planning to major in STEM upon transfer?	1=Yes 2=No	Descriptive Analysis
Q50_1_1-Math courses completed -Basic math-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q 50_2_1-Math courses completed-Algebra 1, high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q50_3_1-Math courses completed-Geometry-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q50_4_1-Math courses completed-Algebra 2, high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q 50_5_1-Math courses completed-Trigonometry, high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q50_6_1-Math courses completed-Pre-Calculus-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q 50_7_1-Math courses completed-Calculus-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSM
Q51_1_1-Science courses completed -General Biology-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSS
Q51_2_1-Science courses completed -Chemistry-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSS
Q51_3_1-Science courses completed-Physics-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSS
	0=Not checked	Original variable for HSS

Q51_4_1-Science courses completed-Biology specialty-high school	1=Checked-agree with statement	
Q 51_5_1-Science courses completed-Other Earth Sciences- high school	0=Not checked 1=Checked-agree with statement	Original variable for HSS
Q51_6_1-Science courses completed-Physical Sciences-high school	0=Not checked 1=Checked-agree with statement	Original variable for HSS
Q55: What is your gender?	1=Male 2=Female	Descriptive analysis, original variable of Gender
Q 57: What is your age?	<17-Not included 18=18 19=19 20=20 ... 64=64 65=65 and older	Observed exogenous variable for SEM model, original variable for Age
Q 62: Currently, what is your citizenship status?	1=U.S. Citizen native born 2=U.S. Citizen, naturalized 3=Non-U.S. Citizen-Permanent 4=Non-US Citizen Temp 5=Living outside U.S. 6=Prefer not to answer	Original variable for Non-citizenship
Q65: Is English native language	1=Yes 2=No	Demographic, original variable for native language (Lang)
Q 68: Are you Latino/Hispanic?	1=Yes 2=No	Original variable for ethnicity
Q 56: If no, what race/ethnic background?	1=American Indian/Alaska 2=Asian 3=Black/African American 4=Native Hawaiian 5=White 6=Two or more races 7=Race/Ethnicity Unknown	Original variable for ethnicity
Q64: At what age did you first come to the U.S. for an extended period of time (i.e., more than a month)?	1=Birth to 3 2=4 to 7 3=8 to 12 4=13 to 17 5=18 to 21 6= older than 21 7= not applicable	Original variable for Age First Come to U.S., or AFCUS
	1=3.75-4.00 (mostly As) 2=3.25-3.74 (about half As and half Bs)	

Q69: At this college, what is your overall grade point average (GPA)?	3=2.75-3.24(mostly Bs) 4=2.25-2.74 (about half Bs and half Cs) 5=1.75-2.24 (mostly Cs) 6=1.25-1.74 (about half Cs and half Ds) 7=Less than 1.25 (mostly Cs and half Ds) 8=Have not taken courses for which grades were given 9=prefer not to answer	Original variable for self-reported GPA
MoEdu: Highest level of education for parent	1=Elementary 2=Some high school 3=High school graduate 4=Some college 5=Associate degree 6=Bachelor's degree 7=Some grad school 8=Graduate degree	Observed exogenous variable for SEM analysis, original variable Q17_1
Ethnicity	1= Hispanic/Latino 2=American Indian/Alaska 3=Asian 4=Black/African American 5= Native Hawaiian 6=White 7=two or more races 8=Race/Ethnicity Unknown	Combined new variable for imputation/weighting, demographic analysis, and comparative analysis, original variable for Asian, Black, Latino.
Noncitizenship (Noncit)	1=Noncitizen 0=Citizen	Descriptive analysis, grouping variable in comparative analysis.
Native language (Lang)	1=Yes 0=No	Observed Exogenous variable in SEM models
Age first come to U.S. (AFCUS)	1=Birth to 3 2=4 to 7 3=8 to 12 4=13 to 17 5=18 to 21 6= older than 21	Descriptive analysis, observed exogenous variable in SEM model for international student group
Self-reported GPA (recoded)	1=3.75-4.00 (mostly As) 2=3.25-3.74 (about half As and half Bs) 3=2.75-3.24(mostly Bs) 4=2.25-2.74 (about half Bs and half Cs) 5=1.75-2.24 (mostly Cs) 6=1.25-1.74 (about half Cs and half Ds) 7=Less than 1.25 (mostly Cs and half Ds)	Descriptive analysis, comparative analysis, Recoded from Q69
Gender	1=Male 0=Female	Observed exogenous variable

		for SEM model, original variable Q55
Age	1=18-24 2=25-39 3=40 and older	Descriptive analysis, original variable Q57
Asian	1=Asian 0= Not Asian	Observed exogenous variable for SEM model, original variable Ethnicity
Black	1=Black 0=Not Black	Observed exogenous variable for SEM model, original variable Ethnicity
Latino	1=Latino 0=Not Latino	Observed exogenous variable for SEM model, original variable Ethnicity
Number of High School Math Courses taken (HSM)	0=none 1=1 2=2 3=3 4=4 5=5 6=6 7=7	Item for construct high school experience, original variable Q50
Number of High School Science Courses taken (HSS)	0=none 1=1 2=2 3=3 4=4 5=5 6=6	Item for construct high school experience, original variable Q51
Highest degree aspired (HD)	1=Will take classes, but do not intend to earn a degree 2=Vocational certificate/Diploma 3=Associate degree (A.A. or equivalent) 4=Bachelors' degree (B.A., B.S., etc.) 5=At least a Bachelor's degree, maybe more 6=Master's degree (M.A., M.S., etc.) 7=Doctoral degree (Ph.D., Ed.D., J.D., etc.) 8=Medical degree (M.D., D.D.S., D.V.M., etc.)	Observed endogenous variable in SEM analysis, original variable Q333

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