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Academic engagement of international students at community colleges: a culturally sensitive measurement model

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Academic engagement of international students at community colleges: A culturally sensitive measurement model

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DEDICATION

To all those striving for the dream while managing daily life

I dedicate my dissertation work to my family.

To my wonderful husband, John, who beliefs in me and encourages me.

He brings happiness and adventure into my life. I am forever grateful for the gift of his love.

To my amazing exuberant and sweet son Alexander and daughter Nadezhda

who are my world and my never-ending source of energy and love for life.

To my precious angel baby Nikolai who I held in my arms only once

before saying goodbye. His short life matters. He taught me

the power of love beyond time and physical space.

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through life's challenges. They raised me to stay true to myself and stand up for my values.

They have always encouraged me to pursue my dreams and reach for the stars.

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who add meaning to the word "family" and who are always there for me

despite the distance and time difference.

I also dedicate this work to all brave men and women who cross borders and

cultures to pursue education. Cherish your cultural heritage and

value the lessons you learn as you achieve your dreams!

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When I entered the Ph.D. program I did not really know what to expect. All I knew was I was ready to set out on this journey. Four years later, I can tell that this has been a challenging and wonderful experience that has added a new dimension to my life and thinking about learning. There have been many people who have walked alongside me during these years. They have guided me, inspired me, and believed in me. And, most importantly, they have encouraged me and told me everything is going to work out and be ok. I would like to be able to recognize each every one of them, and I only wish there was enough space to mention all of them.

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ABSTRACT

The focus of this quantitative study was academic engagement of international students at community colleges. By highlighting the role of cultural heritage in students' engagement preferences, this study sought to create a culturally sensitive measurement model of academic engagement of international students linking research-based knowledge about college student engagement and the influence of culture on educational processes. The proposed culturally sensitive model of academic engagement of international students was tested against data from 184 international students at community colleges, and the results indicate a good fit. The findings suggest that academic engagement of international students can be defined as a construct of interactive and noninteractive academic engagement practices. The model also includes classroom experience, parental support, and persistence in academic pursuit as background factors linked to academic engagement of international students. The results are discussed with regard to their general theoretical implications for research on academic engagement of diverse student population and in relation to specific suggestions for educational leadership and practice.

CHAPTER 1. INTRODUCTION

> We are persuaded by a large volume of empirical evidence that confirms that strategizing ways to increase the engagement of various student populations, especially those for whom engagement is known to be problematic, is a worthwhile endeavor. The gains and outcomes are too robust to leave to chance, and social justice is unlikely to ensue if some students come to enjoy the beneficial byproducts of engagement but others do not.
>
> —Shaun R. Harper & Stephen John Quaye

Introduction

Although discussions of diversity in American higher education may have become commonplace, the fact that the student population in American colleges and universities is becoming increasingly diverse cannot be ignored (Harper & Quaye, 2009). Today, those involved in educational policy and practice face greater challenges addressing the needs of a more demographically diverse student body, including students of different age groups, socioeconomic status, and ethnic and cultural background. With the wave of globalization in American higher education, international diversity of student population adds an additional dimension to the kaleidoscope of issues, problems, and factors that policymakers, administrators, faculty, staff, and students have to consider on a daily basis.

International students have entered institutions of American higher education in growing numbers, and the wave is hardly expected to subside. According to the Institute of International Education ([IIE], 2014a), in the 2013–2014 academic year the number of international students at colleges and universities in the United States increased by 8.1% over the prior year to 886,052. International students represented 4.2% of the U.S. college student population (IIE, 2014a). Besides contributing to academic diversity and enriching the

campus intellectual and cultural environment, international students and their dependents contributed over $27 billion to the U.S. economy, making higher education one of the largest service sector exports (IIE, 2014b).

On the one hand, the presence and contributions of international students make them a valuable resource to campus communities and the American society overall (Anderson, Carmichael, Harper, & Huang, 2009; Andrade & Evans, 2009; Brennan & Dellow, 2013; Owens & Loomes, 2010; Spiro, 2014). On the other hand, the growing number of international students has created numerous challenges for students, faculty, and support staff at American colleges and universities (Anderson et al., 2009; Andrade & Evans, 2009). Studies have indicated that, in addition to the common challenges of navigating through higher education, international students experience problems unique to them. These problems may have an impact on international students' ability to succeed as well as the ability of educational institutions to recruit and retain international students through graduation (Anderson et al., 2009; Andrade & Evans, 2009).

Although the overall upward trend in international student enrollment in the United States has been persistent over time, preferences for pathways have changed. Today, a growing number of international students consider American community colleges as a gateway to a higher education degree (Behroozi-Bagherpour, 2010; Mamiseishvili, 2012; Sallie, 2008). According to data collected by the IIE (2014c), the number of international students enrolled in community colleges increased by 7.4% from 81,869 in 2004–2005 to 87,963 in 2013–2014. However, the majority of research work has tended to focus on international students at baccalaureate, master's, and doctorate degree-granting institutions.

Only recently have researchers turned attention to factors pertaining to international students' experiences and persistence at community colleges.

Problem

Student engagement in academic and social activities has long been recognized as a critical factor in shaping college outcomes (Astin, 1993; Burkholder, 2014; Harper & Quaye, 2009; Kuh, Cruce, Shoup, & Kinzie, 2008; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Kuh, Kinzie, Schuh, Whitt, & Associates, 2010; McClenney, 2006; Pascarella & Terenzini, 2005; Stebleton, Soria, Huesman, & Torres, 2014; Tinto, 1993; Ullah & Wilson, 2007; Zhao, Kuh, & Carini, 2005), however little is known about the patterns of academic engagement of international students at community colleges (Mamiseishvili, 2012).

A significant number of studies on international students in the United States, especially earlier studies, have emphasized issues pertaining to adjustment (Andrade, 2006; Galloway & Jenkins, 2005; Hechanova-Alampay, Beehr, Christiansen, & Van Horn, 2002; Hotta & Ting-Toomey, 2013; Kaczmarek, Matlock, Merta, Ames, & Ross, 1994; Ramsay, Jones, & Barker, 2007; Tas, 2013b; Yan & Berliner, 2011) acculturation (Bertram, Poulakis, Elsasser, & Kumar, 2014; Tan & Liu, 2014; Yan & Berliner, 2011; Zhang & Goodson, 2011; Zhou, Jundal-Snape, Topping, & Todman, 2008), and social integration (Hayes & Lin, 1994; Hendrickson, Rosen, & Aune, 2011) and have examined their link to international students' experience. Less attention appears to have been paid to the factors associated with engagement of international students in their academic pursuit (Zhao et al., 2005). Although these studies provide valuable information about campus experiences of international students and ways they mediate cultural differences, little is known about how international students actually engage in the process of learning. Moreover, existing research pertaining to

international student engagement has focused mostly on international students in the 4-year college or university environment.

The concept of student engagement encompasses an array of behaviors and attitudes that are characterized by students' conscious, intentional, active, and interested involvement in educational activities (Harper & Quaye, 2009; Krause & Coates, 2008; Kuh, 2009a; Pascarella & Terenzini, 2005). Only a handful of studies—for example, those by Behroozi-Bagherpour (2010), Mamiseishvili (2012) and Sallie (2008)—have focused on engagement of international students at community colleges and, then, mostly as it relates to persistence. These studies examined academic engagement of international community college students based on the approaches to student engagement in theories of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005). Today's classics in higher education research, these conceptual frameworks view student engagement in curricular and extracurricular activities as central to positive outcomes for individual students as well as for educational institutions.

At least two concerns may be raised when the classic approaches to student engagement are applied to research on international students in community colleges. First, as Barbatis (2010) and Braxton, Hirschy, and McClendon (2004) pointed out, these approaches were informed by the experiences of, and developed to support, traditional 4-year college students, and their relevance to any other student population group in different institutional environments, including international students at community colleges, cannot be established without further research.

Second, though acknowledging the role of student's specific demographic characteristics in shaping college outcome, the classic approaches to student engagement do

not take into account the impact of cultural background, which is critical in understanding underlying motivators in human behavior, communication, and interaction, in general, and educational settings in particular (Salili & Hoosain, 2007a). With this, the effects of home culture on international students' values, beliefs, behavior, communication strategies, and engagement preferences in the host cultural environment are outside the scope of studies employing the classic view of student engagement and its role. However, as studies in sociology, psychology, and anthropology have shown, culture mediates all aspects of human existence, including learning and education (Holtbrugge & Mohr, 2010; Pajares, 2007; Salili & Hoosain, 2007b; Vygotsky, 1978). Thus, models conceptualizing student engagement and emphasizing its positive role for domestic students at 4-year institutions are not necessarily applicable for international students at community colleges without accounting for student cultural background.

The concept of academic engagement is often discussed within a broader context of overall student engagement and is understood in terms of students' involvement in educational activities that support learning (Astin, 1984; Kuh, 2009; Kuh et al., 2008; McClenney, 2006, 2007; Pascarella & Terenzini, 2005). Though, the literature doesn't view academic engagement solely as a set of interactive educational activities, such as asking questions in class, participating in class discussions, discussing course work with faculty and academic advisors, or participating in group work, in practice the emphasis on interactive academic engagement practices prevail. Nora (1993) viewed academic engagement as mostly interactions with faculty, academic staff, and peers. Discussions of academic engagement and its role in student success are often dominated by a focus on interactive and collaborative learning and engagement of students with faculty in the contexts of both 4-year

institutions (Andrade, 2008; Bodycott, 2012; Burkholder, 2014; Kuh, 2009a; Zhao et al., 2005) and community colleges (Barbatis, 2010; Mamiseishvili, 2012; McClenney, 2006, 2007; Sallie, 2008).

The literature suggests that "educationally purposeful activities" (Kuh et al., 2008) that enhance and support learning may be noninteractive, or private, as well. In addition to involvement with faculty and peers, Astin's (1993) list of student involvement indicators includes, among others, indicators of academic involvement such as "attending classes or labs" and "studying or doing homework" (p. 71). The Academic Engagement Scale suggested by Krause and Coates (2008) includes such measures as "I am strategic about the way I manage my academic workload," "I regularly study on the weekends," "Time spent on private study," "I rarely skip classes," "I regularly borrow books from the university library," and "I usually come to class having completed readings or assignments" (p. 497). Literature shows that students coming from cultures where academic practice puts more emphasis on noninteractive engagement, such as lecture, private study, reflection, individual projects, and assignments, may actually find it difficult to integrate into the American academic practice that values and rewards interactive academic engagement (Kwon, 2009; Terzian & Osborne, 2011;Yu & Shen, 2012; Zhang & Goodson, 2011).

To draw meaningful conclusions about international students' academic engagement that would inform theory and practice, conceptual understanding and measurement models of academic engagement of international student at community colleges should reflect the sociocultural aspect. Assessing academic engagement of international students should be viewed from both educational and cultural perspectives. Therefore, there is a need for a

culturally sensitive model that incorporates both interactive and noninteractive elements of academic engagement.

Purpose

To address the gap in the literature discussed above, this study examined the academic engagement patterns of international students at community colleges from a cultural perspective. The purpose of the study was threefold: (a) to examine and compare background demographic characteristics and patterns of academic engagement of international and domestic students; (b) based on insights gained from an interdisciplinary literature review and preliminary data analysis, to develop a conceptual model of academic engagement of international community college students; and (c) to design a culturally sensitive measurement model of academic engagement of international students at community colleges and to conduct goodness-of-fit analyses of the model against SSSL data collected at the research site. The study viewed academic engagement holistically as a combination of interactive (collaborative) and noninteractive (private) academic practices.

Significance of the Study

This study was expected to make a significant contribution to research, policy, and practice in a number of ways. First, it contributes to current research and expands the knowledge on the ways international students at community colleges engage in academic activities. Gaining knowledge about learning created in social studies outside the educational context, this research was conducted from a culturally sensitive perspective that recognized the limitations of the approaches to student engagement in the theories of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005) and their interpretations in research practice, as discussed above. To address these limitations, a unique conceptual

perspective was introduced to educational research that blends educational theories highlighting the positive role of student engagement and sociocultural theories highlighting the impact of culture on learning patterns, styles, and preferences (Nishida, 1999; Salili, Chiu, & Lai, 2001; Salili & Hoosain, 2007b; Vygotsky, 1978).

Second, based on the culturally sensitive perspective, this study uncovered a complex structure of the concept of academic engagement. In educational research, academic engagement is often viewed in conjunction with involvement in social activities (Astin, 1993; Krause & Coates, 2008; Mamiseishvili, 2012; McClenney, Marti, & Adkins, 2010; Price & Tovar, 2014; Rienties, Beausaert, Grohnert, Niemantsverdriet, & Kommers, 2012; Sherry, Thomas, & Chui, 2010; Sontam & Gabriel, 2012; Ullah & Wilson, 2007; Zhao et al., 2005). This study isolated the concept of academic engagement and conceptualized it in terms of interactive academic engagement and noninteractive academic engagement. The dimension of interactive academic engagement practices includes interaction with faculty, interaction with academic advisors, and such ways of interactive academic pursuit as using tutoring and studying with peers. Examples of no-interactive engagement practices are private study, attending classes, participating in class discussion through listening and note taking, and reflection. The study adds to research and practice by highlighting the role of noninteractive engagement practices in international students' learning. As the literature suggests, noninteractive ways of engaging academically may be a preferred way of academic engagement for international students (Salili et al., 2001; Salili & Hoosain, 2007b; Terzian & Osborne, 2011; Zhang & Goodson, 2011).

Third, this study proposes a new culturally sensitive measurement model of academic engagement. Building on existing research and previously used measures of engagement

(Astin, 1993; Krause & Coates, 2008; Mamiseishvili, 2012; Myers, 2013; McClenney et al., 2010; Pascarella & Terenzini, 2005; Price & Tovar, 2014; Sherry et al., 2010; Sontam & Gabriel, 2012; Ullah & Wilson, 2007; Zhao et al., 2005), this study developed four measurement scales of academic engagement including interaction with faculty, interaction with academic advisors, interactive engagement practices, and noninteractive academic practices. The model is enhanced to include surrounding factors of English language proficiency (Anderson et al., 2009; Burkholder, 2014; Sherry et al., 2010; Teranishi, Suarez-Orozco, & Suarez-Orozco, 2011; Yu & Shen, 2012), persistence toward educational goals (Astin, 1993; Kuh, 2001, 2009b; McClenney, 2006, 2007; Pascarella & Terenzini, 2005), academic preparedness (Hatch, 2012; Mamiseishvili, 2012; Marti, 2009), socioeconomic background (Astin, 1993; Kim, 2012; Salili & Hoosain, 2007b; Schulz, 2006), and classroom experience (Astin, 1993; Mamiseishvili, 2012; Marti, 2009; Saenz et al., 2011). The surrounding factors account for the influence of sociocultural and academic background, as well as student effort, on academic engagement of international students at community colleges.

Fourth, the culturally sensitive model of academic engagement is expected to be instrumental for faculty, administrators, and academic staff in learning about patterns and assessing levels of international students' academic engagement. This information can assist in designing curricula and developing pedagogy that support learning for culturally diverse students in ways that best fit these students' educational needs. In addition, more accurate information on academic engagement of international students can be employed in evaluating overall institutional effectiveness in enhancing student learning. Last, the study adds to the literature that calls for recognizing and embracing cultural diversity in American higher

education (Howard-Hamilton, Cuyjet, & Cooper, 2011). It promotes awareness of cultural differences in higher education by emphasizing differences in patterns students may use to engage in educationally meaningful activities.

Research Questions

The study was framed around the following research questions:

1. What is the demographic profile of international students and domestic students who participated in the study?
2. Are there any differences in demographic and background characteristics between international students and domestic students?
3. Are there any differences in academic engagement between international and domestic students?
4. How can academic engagement of international students at community colleges be defined in measurement terms?
5. How can a new measurement model of academic engagement of international community college students be defined?

Conceptual and Theoretical Framework

To answer the research questions listed above, this study drew from two major areas of scientific knowledge: education and sociocultural studies. First, the study was conceptually framed by vast theoretical and empirical knowledge about the impact of culture on learning and personal development. Second, this study was informed by extensive theoretical and empirical research on student engagement and the related theories of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005) and their interpretations in research practice. The conceptual approach to the study is shown in Figure 1.1.

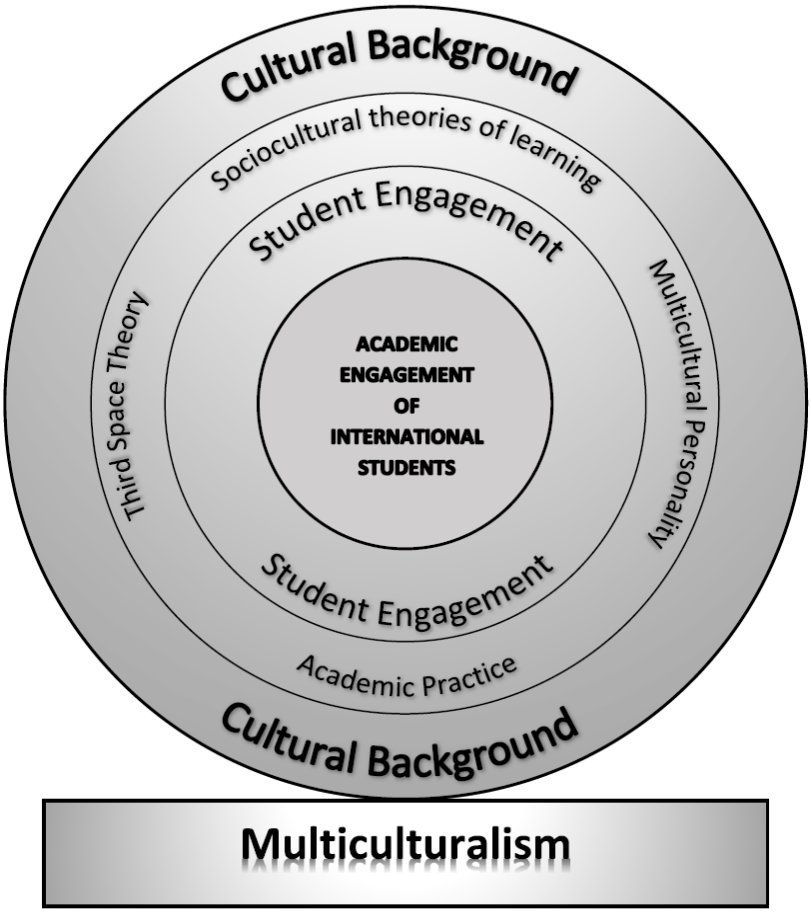

Figure 1.1. Conceptual model of academic engagement of international students.

Focused on international students at an American community college, this study stemmed from a theoretical assumption that cultural backgrounds of the participants of educational processes, as well as academic context, are vital aspects of academic engagement. Individuals are the products of their cultural background and experiences, and a student's preferred learning style does depend on his or her cultural background (Holtbrugge & Mohr, 2010; Pajares, 2007; Salili et al., 2001; Salili & Hoosain, 2007b; Vygotsky, 1978). Moreover, for most international students, cultural identity is preserved throughout their academic career in a different cultural environment (Andrade, 2009; Burkholder, 2014; Salili et al., 2001; Sugahara & Boland, 2010; Tas, 2013b).

The link between learning and culture has been examined in numerous sociological, psychological, and educational studies. This research relied on the work of Vygotsky (1978), which encompassed numerous empirical studies and provided a comprehensive theoretical description of sociocultural nature of learning. In particular, this study's theoretical foundation incorporated Vygotsky's postulate that culture determines not only what is learned but also how it is learned. In the context of this research, this implies that students who travel abroad to study bring with them a wealth of cultural resources and expectations—culturally predetermined interaction patterns and learning style preferences that shape their behavior in new environments. Although the ability to adapt and perform in the new context may be personal, shared cultural expectations have a significant impact on these students (Anderson et al., 2009; Bodycott, 2012). Moreover, for most international students, cultural identity is preserved throughout their academic career in a different cultural environment (Andrade, 2009; Sugahara & Boland, 2010). Bhabha (1994) introduced a "third space" theory, which explains the cultural transition that students undergo by development of a new, third culture at the intersection of a home and an adaptive culture, with the prevalence of a core cultural background. The theory highlights the central role of students' prior cultural knowledge, values, norms, and expectations in the process of learning.

As more students choose to study in the United States, American colleges and universities are becoming more culturally heterogeneous. In other words, cultural diversity in colleges and universities in the United States has become more complex. In light of the complex cultural diversity of American higher education, this study's research questions were viewed through the lens of multiculturalism. Multiculturalism is a perspective that promotes diversity and calls for social institutions to recognize, include, and reflect many

cultures (Howard-Hamilton et al., 2011). In a multiculturalist view, cultural differences should be understood and reconciled without attempts to oppress and/or assimilate. This perspective underscores the fundamental assumption of this study: that individuals are the products of their cultural backgrounds and experiences and that a student's preferred academic behavior and learning styles depend on his or her cultural background. It should be noted that the multiculturalist view originated in recognizing and embracing differences between representatives of various social groups and was translated into the educational context as a framework that promotes diversity. In educational institutions, the student population should be viewed as heterogeneous in terms of race, ethnicity, gender, age, cultural background, and other identifiers that are shared by a group of students and differ between the groups. From the multiculturalist perspective, each culture should be embraced and assimilation should neither be expected nor encouraged.

The choice of multiculturalism as a conceptual lens for this study seemed especially appropriate for a study focused on community college students who are just starting their higher educational journey. As was mentioned earlier, for most international students, as well as domestic students, community colleges are gateways to higher education and, for many, may mark the beginning of a cultural transition. As students progress through higher education, they learn to navigate the academic culture and may adapt, more or less, to its practices, requirements, and expectations. Yet, at those earlier stages in their academic careers, students at community colleges are more likely to rely on ways they have internalized their home culture environments, contributing to cultural diversity of learning style preferences and patterns of interaction. The multiculturalist lens allows one to view the

cultural differences in classroom behaviors as a foundation to build on and not an issue to overcome.

The central concept under study was academic engagement. Although the theoretical approaches to engagement in institutions of higher education may differ in the terminology used, conceptualization, and emphasis, they share a common understanding of the critical role engagement plays in college student development and educational outcomes. Broadly, Astin (1984, 1993), Pascarella and Terenzini (2005), and Tinto (1993) linked student involvement in academic, social, and extracurricular campus activities to student outcomes in many different forms, be it academic performance, degree attainment, persistence toward the achievement of educational goals, or satisfaction with colleges experiences. In addition, the proponents of student engagement believed that students best learn by doing and participating (Astin, 1984). This notion of students' conscious and meaningful involvement in college experiences is central to the educational theories emphasizing student engagement and should be kept in mind when engagement is discussed.

Research, however, has viewed engagement as a complex comprehensive concept that integrates and often blends academic and social activities that enhance and support learning. Although many definitions of student engagement can be found in the literature, definitions of academic engagement are hard to find. Most often, academic engagement is viewed as part of overall student engagement but with regard to academic matters, and its definition is implied rather than explicit. To understand academic engagement, it is important to understand what engagement in general means in the context of American higher education, especially given the different terminology used in the literature. Speaking about student engagement overall, Harper and Quaye (2009) broadly defined engagement as

"participation in educationally effective practices, both inside and outside the classroom, which leads to a range of measurable outcomes" (p. 3). In the community college context, the Community College Survey of Student Engagement (CCSSE) project suggested an understanding of student engagement that implies students' intentional effort and defined engagement as "the amount of time and energy that students invest in meaningful educational practices" (McClenney, 2006, pp. 47–48). Pascarella and Terenzini (2005) underscored the importance of individual effort saying that "the impact of college is largely determined by individual effort and involvement" (p. 602). Nora (1993) defined academic engagement as "a strong affiliation with the college academic environment both in the classroom and outside of class" (p. 235) that includes interactions with faculty, academic staff, and peers but of an academic nature (e.g., peer tutoring, study groups).

Most definitions of engagement, and academic engagement in particular, emphasize the interactive nature of student involvement with faculty, peers, and other college constituencies. Yet, students may invest time and effort to engage in academic pursuit through noninteractive ways such as individual study, reading, reflection, and projects. This study took into consideration different views of academic engagement and utilized a modified definition of academic engagement suggested by McClenney (2006) for community colleges. Academic engagement was defined as the amount of time and effort students intentionally and consciously invest in meaningful interactive and noninteractive academic activities and practices that enhance and support learning. This, broader definition was expected to capture ways of both intellectual and behavioral engagement in academic matters.

For the purpose of this study, the concept of academic engagement included four broadly defined areas: interaction with faculty, interaction with academic advisors, interactive academic practices (such as engaging with a tutor or studying with peers), and noninteractive academic practices (such as private study, doing homework, or reading course-related literature). Consistent with previous research involving student engagement (Astin, 1984, 1993; Kuh, 2001, 2009b; Kuh et al., 2010; McClenney et al., 2010; Pascarella & Terenzini, 2005; Tinto, 1993), surrounding factors, such as social and academic background, classroom experience, and persistence in academic pursuit, were considered to enhance a holistic understanding of academic engagement of international students.

Thus, the conceptual and theoretical foundation of this study was a unique combination of educational and sociocultural theories. Academic engagement of international students was viewed through the lens of multiculturalism and a culturally sensitive measurement model of academic engagement became the focus of this study.

Definition of Terms

Academic achievement: outcome of education, such as grade point average (Astin, 1993, p. 186).

Academic engagement/integration: the amount of time and effort students intentionally and consciously invest in meaningful interactive and noninteractive academic activities and practices that contribute to their intellectual development and attainment of educational goals (adapted from McClenney, 2006).

Academic practice: established ways of "knowing, doing, and being that constitute academic tasks" (Kettle, 2011).

Baccalaureate college or university: institutions where baccalaureate degrees represent at least 10% of all undergraduate degrees and where fewer than 50 master's degrees or

20 doctoral degrees were awarded during the update year, excluding special focus institutions and tribal colleges (Carnegie Foundation for the Advancement of Teaching, 2010).

Community college: publicly supported school that may offer programs of adult and continuing education; lifelong learning; community education; and up to two years of liberal arts, preprofessional, or occupational instruction partially fulfilling the requirements for a baccalaureate degree but confers no more than an associate's degree; or which offers as the whole or as part of the curriculum of up to two years of vocational or technical education, training, or retraining to persons who are preparing to enter the labor market (Iowa Community Colleges Act, 1990).

Culture: "historically created designs for living, explicit and implicit, rational, irrational, and non-rational, which exist at any given time as potential guides for the behavior of men" (Kluckhohn & Kelly, 1945, p. 97)

Doctorate-granting university: an institution that awards at least 20 research doctoral degrees during the update year, excluding doctoral-level degrees that qualify recipients for entry into professional practice, such as the J.D., M.D., Pharm.D., D.P.T., etc., and special-focus institutions and tribal colleges (Carnegie Foundation for the Advancement of Teaching, 2010).

Four-year college or university: an institution that offers baccalaureate degrees, which usually are completed in 4 years of full-time study (Kuh et al., 2006).

Institutional type/classification: traditionally determined by the level of highest degree offered (Astin, 1993, p. 33).

Institutional type/control: traditionally determined by the principal source of governance or control, public versus private (Astin, 1993, p. 33).

International students: nonimmigrant students in the United States on temporary visas at the postsecondary level (IIE, 2014d); in this study, international students were defined as non-U.S. citizens with permanent residency or on a temporary U.S. resident visa such as an F1/F2 visa or J1/J2 visa who spoke English as a second language.

Master's college or university: an institution that awarded at least 50 master's degrees and fewer than 20 doctoral degrees during the update year, excluding special-focus institutions and tribal colleges (Carnegie Foundation for the Advancement of Teaching, 2010).

Multiculturalism: an attitude related to the political ideology that refers to the acceptance of, and support for, the culturally heterogeneous composition of the population of a society (Van de Vijver, Breugelmans, & Schalk-Soekar, 2008, p. 93).

Social engagement/integration: a strong affiliation with the college social environment both in the classroom and outside of class; includes interactions with faculty, academic staff, and peers but of a social nature (e.g., peer group interactions, informal contact with faculty, involvement in organizations; Nora, 1993, p. 237).

Student engagement: the amount of time and effort students intentionally and consciously invest in meaningful academic, social and extracurricular activities, and practices that contribute to their intellectual development and attainment of educational goals (based on Kuh et al., 2006; McClenney, 2006; Pascarella & Terenzini, 2005).

Student outcomes: student characteristics after exposure to college (Astin, 1993, p. 7); may include values, attitudes, beliefs, satisfaction (affective-psychological outcomes);

personal habits, mental health, citizenship, interpersonal relations (affective-behavioral outcomes); knowledge, critical thinking abilities, basic skills, academic achievement (cognitive-psychological outcomes); and career development, level of educational attainment, vocational achievements such as income and awards or special recognition (cognitive-behavioral outcomes; Astin, 1993).

Student success: holistically defined as academic achievement, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of educational objectives, and postcollege performance (Kuh, 2009a).

Traditional college students: typically, residential, full-time, and first-year students who begin college immediately after high school (Harper & Quaye, 2009).

Summary

This study has attempted to add to the existing research on models of academic engagement of international students in American higher education from a multiculturalist perspective. It sought to expand current knowledge of engagement patterns of international students at community colleges and to suggest a culturally sensitive measurement model of academic engagement for this student population. The conceptual and theoretical framework for this study evolved from blending concepts from research in higher education with concepts from social and cultural studies.

Following the introduction in Chapter 1, Chapter 2 reviews prior research related to academic engagement of international students at community colleges and associated factors. It begins with a summary of trends in research related to international students in American higher education followed by an overview of theories of student engagement and academic engagement, in particular, and of the role academic engagement plays in shaping student outcomes at different educational settings including community colleges. Next, sociocultural

aspects of learning, multiculturalism in higher education, and views on cultural transition of international students are discussed.

Chapter 3 describes the methodological approach and methods and techniques used in designing and conducting the study, including the epistemological and theoretical perspectives, research questions, population and sample, data sources, data collection methods and procedures, variables in the study, data analysis procedures, and validity of study findings. Chapter 4 presents the results of the study. Chapter 5 summarizes the study's results and discusses conclusions, implications for policy and practice, as well as recommendations for further research.

CHAPTER 2. REVIEW OF THE LITERATURE

Introduction

Studying in a multicultural environment has become overwhelmingly popular all around the world. According to the UNESCO Institute of Statistics (UIS), the number of postsecondary students who chose to enroll in foreign educational institutions increased from about 2.1 million students in 2002 to about 4.0 million in 2012, representing 1.8% of all postsecondary enrollments, or 2 in 100 students globally (UIS, 2014a). Based on the same source, the United States remained the leading destination in absolute numbers and enrolled approximately one-fifth of all international students worldwide in 2012 (UIS, 2014b). The most recent data from the IIE (2014a) show that international student enrollment in the United States has been on the rise over the last few decades and increased by 8.1% (from 819,664 to 886,052) in the 2013–2014 academic year compared to the previous year.

Studies have indicated that many of the international students face challenges and barriers in integrating into American colleges and universities (Anderson et al., 2009; Evans, Carlin, & Potts, 2009; Sherry et al., 2010). This growing number of international students has, as well, created challenges for faculty, support staff, and peer students at American colleges and universities (Anderson et al., 2009; Andrade & Evans, 2009). The provision of support to international students and many agents with whom they interact while at college is a topic of continuing interest and debate that has created an important stream of research.

As the data from the IIE (2014c) show, a growing number of international students consider American community colleges as a starting point on the journey toward a higher education degree. Although the majority of studies on international students still tends to

focus on international students at baccalaureate, master's, and doctorate degree-granting universities (Anderson et al., 2009), research pertaining to international students' success, persistence, and experiences in the community college environment has been gaining momentum to meet the demands of students, administrators, faculty, and staff at community colleges.

This literature review was driven by this study's conceptual view of the issues related to academic engagement of international students, as shown in Figure 1.1. The primary goal of the literature review was to explore the foundations of research related to academic engagement of international students at community colleges as well as to summarize major trends and research findings in the areas of international student engagement, international students' experiences in the United States, and the role of cultural background in educational processes as they pertain to academic engagement. Research on international student academic engagement at community colleges appeared to be at the intersection of three main streams of higher education research area including international students in American higher education in general, student engagement as it pertains to student outcomes, and student engagement at community colleges.

Special interest was paid to the role of cultural background in shaping interaction and learning patterns of international students. Cultural influences and intercultural interactions in educational settings have long attracted researchers in education, psychology, communication, cultural studies, and other research domains (Bertram et al., 2014; Bodycott, 2012; Brown & Brown, 2013; Cheung & Chan, 2010; Holtbrugge & Mohr, 2010; Hotta & Ting-Toomey, 2013; Kim, 2012). The conceptual paradigm of multiculturalism and learning in the multicultural academic environment provided a theoretical foundation for this study.

Thus, the literature review begins with a summary of trends in research related to international students in American higher education overall followed by an overview of academic engagement in the context of student engagement theories. A discussion of the role engagement plays in shaping student outcomes at different educational settings, including community colleges, highlights research findings in this area. Next, the review focuses on issues related to academic engagement of community college students. Finally, a discussion of the cultural aspects of academic interactions sets this study's conceptual perspective.

International Students in American Higher Education

Trends in Research on International Students

Prior research has demonstrated that international students in the United States experience a vast array of issues that may foster or hinder their success at American colleges and universities (Anderson et al., 2009; Andrade & Evans, 2009; Brinson & Kottler, 1995; Galloway & Jenkins, 2005; Gebhard, 2010; Halic, Greenberg, & Paulus, 2009; Hechanova-Alampay et al., 2002; Misra & Castillo, 2004; Ramsay et al., 2007; Sherry et al., 2010; Tas, 2013b). Researchers have identified multiple factors that shape international students' college experience and contribute to persistence and college success. Although there is a general consensus among many researchers about common themes, including cultural identity (Anderson et al., 2009; Bodycott, 2012; Brown & Brown, 2013; Kim, 2012; Tan & Liu, 2014; Tas, 2013b), English language proficiency (Andrade, 2009; Burkholder, 2014; Halic et al., 2009; Mathews, 2007; Sherry et al., 2010; Teranishi et al., 2011; Wongtrirat, 2010), differences in academic systems and student–teacher interaction practices (Anderson et al., 2009; Arenas, 2009; Arkoudis & Tran, 2010; Crose, 2011; Kwon, 2009; Sawir, 2011; Tompson & Tompson, 1996), levels and types of engagement in academic and social

activities (Anderson et al., 2009; Andrade, 2008–2009; Deardorff, 2009; Gebhard, 2010; Kettle, 2011; Mamiseishvili, 2012; Ullah & Wilson, 2007; Zhao et al., 2005), social support systems (Anderson et al., 2009; Bertram et al., 2014; Gebhard, 2010; Hayes & Lin, 1994; Hendrickson et al., 2011; Rienties et al., 2012), health issues and financial issues (Anderson et al., 2009; Kwon, 2009; Olivas & Li, 2006; Sherry et al., 2010), specific studies may emphasize different factors that affect international students' college experience.

Broadly, there are a few distinct focal points in research on international students in American higher education, which include adjustment and acculturation, barriers to success, and empirical findings on the impact of intervention practices that educational institutions have put in place. It should be noted that the areas are distinguished for the purpose of the literature review only and that actual studies may address more than one clearly defined issue.

Adjustment and acculturation. A significant number of studies on international students, especially earlier studies, have emphasized adjustment (Andrade, 2006; Galloway & Jenkins, 2005; Hechanova-Alampay et al., 2002; Hotta & Ting-Toomey, 2013; Kaczmarek et al., 1994; Ramsay et al., 2007; Tas, 2013b; Yan & Berliner, 2011), acculturation (Bertram et al., 2014; Tan & Liu, 2014; Yan & Berliner, 2011; Zhang & Goodson, 2011; Zhou et al., 2008), and social integration (Hayes & Lin, 1994; Hendrickson et al., 2011; Hotta & Ting-Toomey, 2013) issues and have examined their link to international students' college experience. The theoretical background for these studies lies in the area of cross-cultural adjustment, acculturation, and adaptation whereby researchers identify different types of predictors that affect psychological and sociocultural adjustments of diverse populations. The most frequently adopted theoretical works include those by Ward (1996); Ward,

Bochner, and Furnham (2001); and Kosic (2004). Ward and his colleagues distinguished between two domains of adjustment—psychological and sociocultural—and found that each is affected by different set of factors. Psychological adjustment is influenced mostly by personality, life changes, shock, and social support, whereas sociocultural adjustment is influenced by the length of residence in the new culture, amount of interaction and identification with host nationals, language fluency, and acculturation strategies (Ward, 1996; Ward et al., 2001). Kosic (2004) examined the impact of different styles of coping and acculturation strategies on acculturation process outcomes. The research on international students in higher education has broadly adopted the works by Ward and Kosic to investigate adjustment and adaptation factors that affect international students (Zhou et al., 2008).

Researchers also have pointed out that adjustment issues, as well as overall integration of international students into the American educational system, may depend on students' ethnic and cultural background (Bodycott, 2012; Tan & Liu, 2014; Tas, 2013b). They have distinguished between different groups based on the country of origin within the international student body and have recognized issues specific to students of a particular ethnicity. For example, Kwon (2009) suggested that adjustment and integration differences are closely related to international students' ethnicity. With non-Western Confucian cultural heritage, Asian international students experience greater adjustment difficulties than do students in other ethnic groups (Bodycott, 2012; Poyrazli & Grahame, 2007; Yan & Berliner, 2011). Lefdahl-Davis and Perrone-McGovern (2015) and Heyn (2013) argued that Arab international students face serious acculturation stress in a new cultural context as well.

Research pertaining to international students' adjustment and acculturation often appear to view cultural differences as obstacles that students overcome as they let go of their

cultural heritage and blend in with the host culture. From this study's multiculturalist perspective, blending in is neither necessary nor desirable. Although international students should be encouraged to learn about cultural norms and engagement patterns of American educational institutions, it would be naïve to expect students to substitute these norms for their own. Studies suggest that cultural heritage continues to mediate social and academic interactions of international students who seem to be successfully integrated into the higher education systems of host countries (Andrade, 2009; Bartram, 2008; Heyn, 2013; Hotta & Ting-Toomey, 2013; Kim, 2012; Sugahara & Boland, 2010). As discussed later in the section focused on the role of cultural heritage in educational processes, this study relied on theoretical approaches that embrace cultural heritage and recognize the limited nature of cultural adaptation such as Bhabha's (1994) third space theory.

Barriers to success. Previous research has identified multiple barriers that international students may face on the way to achieving educational goals. Researchers have described numerous barriers including cultural differences (Anderson et al., 2009; Bodycott, 2012; Brown & Brown, 2013; Kim, 2012; Tan & Liu, 2014; Tas, 2013b), language challenges (Andrade, 2009; Burkholder, 2014; Halic et al., 2009; Mathews, 2007; Sherry et al., 2010; Teranishi et al., 2011; Wongtrirat, 2010), differences in academic systems and student–teacher interaction practices (Anderson et al., 2009; Arenas, 2009; Arkoudis & Tran, 2010; Crose, 2011; Kwon, 2009; Sawir, 2011; Tompson & Tompson, 1996), homesickness and loneliness (Anderson et al., 2009; Bertram et al., 2014; Hendrickson et al., 2011; Sherry et al., 2010), and health issues and financial issues (Anderson et al., 2009; Kwon, 2009; Olivas & Li, 2006; Sherry et al., 2010). Specific studies have emphasized different factors that affect international students' college experience. Most works distinguish between

academic, social, and personal factors. For example, in a theoretical overview of adjustment issues experienced by international students, Evans et al. (2009) identified two broad categories of academic issues and social and personal issues. Academic issues include language concerns, uncertainty about the academic environment, institutional expectations, and teacher–student relationships. Among social and personal issues that may affect international students' adjustment, Evans et al. listed social integration and support, cultural differences, the level of involvement with the host culture, and cocurricular involvement.

Informed by contemporary research findings, Anderson et al. (2009) provided a detailed inventory of the most common factors within the groups of psychological, academic, sociocultural, residential transition, and career development issues. These authors emphasized English language proficiency and communication skills, the knowledge about academic environment, and appropriate ways of student–faculty interactions, among the important academic factors that shape international students' college success, as factors that can either facilitate or hinder international students' adaptation to a new academic environment. Sociocultural factors include cultural differences, racial discrimination, and difficulty in adjusting to the new cultural environment. Health services and counseling, tuition costs, documentation issues, safety threats, and dietary restrictions grouped under the category of residential transition issues create additional obstacles that are linked to international students' college experience. Finally, professional and career needs of international students are different from those of domestic students and require special support efforts as well (Anderson et al., 2009).

A number of recent empirical studies have taken a closer look at the barriers that international students face that may negatively affect their engagement and academic and

social development. In an exploratory study on the experience of international students at a university in Texas, Sherry et al. (2010) found evidence to consider that adapting to a new culture, English language problems, financial problems, and lack of understanding from the campus community are pull factors that steer international students away from positive college experience and academic success of international students. Based on an empirical study of international students' experience at a large public university in the southwest United States, Lee (2010) suggested that one of the major negative factors that affect international students' college success is the perception of discrimination and unequal treatment.

Empirical evidence on the barriers related to academic and social integration of international students is also found in the studies by Poyrazli and Grahame (2007), Bartram (2008) and Kwon (2009). Through a series of focus group interviews of 60 international students at a British university, Poyrazli and Grahame identified barriers related to academic life, health insurance, living on or off campus, social interactions, transportation, and discrimination. Bartram argued that international students are mostly negatively affected by the lack of social support. Kwon's quantitative study identified needs of international students and factors influencing their transition to higher education in the United States from the perspective of the Office of International Students at an American middle-Eastern university. The findings of Kwon's research highlight language proficiency, homesickness, and loneliness as the major barriers international students face.

Intervention strategies and practices. Prior research has paid attention to practical implications of what colleges and universities actually do to assist international students at different stages of their educational journey. A vast array of intervention strategies and

practices found in the current research literature can be grouped into four major categories: (a) curricular and classroom interventions, (b) cocurricular and extracurricular interventions, (c) counseling and advising services, and (d) faculty and staff development initiatives.

Researchers have consistently listed student engagement in the classroom, including student–faculty interaction, peer interaction, and overall classroom experience, among the most critical factors that impact both domestic and international students' college success (Andrade, 2006, 2006–2007; Astin, 1993; Ellis, Sawyer, Gill, Medlin, & Wilson, 2005; Hayes & Lin, 1994; Kramer & Associates, 2007; Kuh et al., 2008, 2010; McCormick, Kinzie, & Gonyea, 2013; Pascarella & Terenzini, 2005; Poyrazli & Grahame, 2007; Ullah & Wilson, 2007; Zhao et al., 2005). A number of recent studies reviewed examined the effects of program-level and course-level curricular interventions in shaping international students' experience (Arkoudis & Tran, 2010; Crose, 2011; Leask, 2009; Tompson & Tompson, 1994). Findings suggest that international students' academic performance is improved through curricular interventions such as explicitly articulating learning objectives and expectations (Arkoudis & Tran, 2010; Leask, 2009) and enriching the curriculum with international and intercultural components (Andrade, 2008–2009; Arkoudis & Tran, 2010; Crose, 2011; Leask, 2009). Other ways to integrate international students into the academic environment include creating an involving classroom environment (Crose, 2011; Leask 2009; Tompson & Tompson, 1994) and designing learning activities that support the development of intercultural competencies (Crose, 2011; Leask 2009; Tompson & Tompson, 1994). Arkoudis and Tran (2010) emphasized introducing student learning assessment and feedback early in the course of study.

The research also provides evidence of the positive role of intentional engagement efforts including cocurricular and extracurricular interventions, such as cross-cultural peer mentoring programs and social integration programs, in assisting international students and improving their satisfaction and retention. Sakurai, McCall-Wolf, and Kashima (2010) examined the effects of a multicultural intervention program on social and cultural integration of international students. Both domestic and international students participated in a bus tour and visited local sights. A study of the bus tour participants and nonparticipants was conducted later. The study findings suggest that program participants compared to nonparticipants developed more social connections with domestic students and eventually were better adjusted to life on campus, which was linked to better overall college experience. Kim and Egan (2011) and Owens and Loomes (2010) also stressed the importance of peer interaction and the value of programs supporting social integration between domestic and international students. Kim and Egan conducted an exploratory case study of a formal cross-cultural mentoring program at a large American university. The program involved volunteer domestic and international mentors who were matched with new international students. The authors concluded that both mentors and protégés benefited from the program through gaining informative knowledge about cross-cultural behavior and developing intercultural competencies. As a result, Kim and Egan assumed that international protégés were better integrated into college life compared to nonparticipants. Results from Owens and Loomes's research provide strong evidence that university efforts to enhance social integration and involvement of international students through various extracurricular activities are linked to higher levels of student satisfaction, facilitate cross-cultural transition, and mitigate negative effects of culture shock.

Interventions through counseling and advising international students have gained a lot of research interest as well (Bertram et al., 2014; Brinson & Kottler, 1995; Yoon & Portman, 2004). Anderson et al. (2009), Hayes and Lin (1994), Olivas and Li (2006), and Yoon and Portman (2004) drew attention to the role counselors and advisors play in shaping international students' college experience and fostering their success. Literature suggests that counselors and advisers be familiar with the needs of international students, models of adjustment and adaptation and their impact on international students' college success, multicultural counseling and advising competences, and best practices in counseling and advising international students (Yoon & Portman, 2004). Yoon and Portman (2004) reviewed the related literature on effective counseling and advising strategies and concluded that universities and colleges should implement strategies at both the individual and institutional levels. At the individual level, successful intervention strategies help international students overcome barriers and achieve their educational goals. At the institutional level, counselors and advisors should attempt to change institutional policies, develop programs, and create a supportive environment (p. 37). Among successful intervention practices, Yoon and Portman listed cooperation between international student offices and academic departments, individual needs assessments for each international student, availability of a counselor who has a background as an international student, and continuous professional development of counselors and advisors.

Finally, the last group of intervention strategies identified in this literature review includes efforts focused on faculty and staff development in the areas of cultural awareness and sensitivity (Arenas, 2009; Arkoudis & Tran, 2010; Sawir, 2011; Tompson & Tompson, 1996), understanding specific needs of international students (Arenas, 2009; Arkoudis &

Tran, 2010; Sawir, 2011; Tompson & Tompson, 1996), and familiarity with existing research and practice (Arkoudis & Tran, 2010; Sawir, 2011). These strategies include faculty development programs for teaching practices that promote student-focused approaches to teaching and attention to specific needs of international students in higher education as well as cultural diversity awareness programs across campus. Although the authors discussed the strategies and suggested practical recommendations, empirical evidence to support the positive impact of the strategies discussed was not provided.

In addition to the four broad categories of research on intervention strategies discussed above (program-level and course-level interventions, extracurricular programs, counseling and advising, and faculty and staff support), the current research highlights the importance of a supportive environment, cultural sensitivity, and meaningful interactions between representatives of all groups in a campus community. Researchers have argued that colleges and universities must promote diversity awareness across campus and support intervention programs that result in expanded intercultural competence for all students, not only international students (Crose, 2011; Deardorff, 2009; Leask, 2009; Stebleton et al., 2014; Tompson & Tompson, 1996; Wang, Li, Wang, Hunt, & Yan, 2014). Thus, Leask (2009) suggested that the development of intercultural competencies is a key element in fostering student success in an internationalized campus environment, which requires a culture that motivates and rewards interaction between international and domestic students inside and outside the classroom.

In a study of successful intervention practices at American colleges and universities, Deardorff (2009) provided illustrative examples of programs that bring together American and international students and scholars to develop their intercultural competence, achieve

greater integration of these groups on campus, and eventually, support international students' college success. Examples include the International Students and Scholars Engaged in Reaching Out and Volunteering program at North Carolina State University, where international and domestic students volunteer in the community on a regular basis and interact with American students in a more meaningful way; the House Course at Duke University, which brings together American and international students for cultural learning in the classroom through cultural presentations with some required community engagement assignments; and the Building Relationships in Diverse Global Environments program at the University of Wisconsin, Madison, which partners international students with American students to participate in one-on-one and group activities (Deardorff, 2009).

The studies and research overviews discussed above provide substantial evidence that intervention strategies and practices focused on increasing international student engagement with peers, faculty, staff, and administrators have proven to be effective in helping international students overcome barriers and ultimately succeed in achieving their educational goals. This study sought to add to knowledge about international students' academic engagement by focusing on the construct of academic engagement and a measurement model fit for international students.

English Language Proficiency as a Critical Factor in International Student College Career

The issue of English language skills has been ubiquitous across all streams of research on international students in the United States. Informed by contemporary research findings, Anderson et al. (2009) provided a detailed inventory of the most common factors within the groups of psychological, academic, sociocultural, residential transition, and career development issues. These authors emphasized English language proficiency and

communication skills, the knowledge about the academic environment, and appropriate ways of student–faculty interactions among the important academic factors that shape international students' college success.

Although it remains a logical assumption that adequate English language proficiency is at least important, if not critical, for overall college experience and successful academic performance by international students, many studies have provided empirical evidence to support this assumption. It should be noted, however, that English language proficiency is more often linked to students' experiences, adjustment, interaction, persistence, satisfaction, and overall well-being than directly to course grades. For example, the results of the study by Sherry et al. (2010) indicated that English language skills were among the top factors that pertained to international students' college success. Mathews (2007) performed an exploratory study of the factors shaping Turkish students' success during their studies at American colleges and universities and found significant correlations between students' English language ability, their previous academic experience, and their sponsoring university and these students' academic performance and college outcomes. Based on quantitative and qualitative data analysis, Andrade (2009) testified that English language proficiency (measured by the Test of English as a Foreign Language, or TOEFL) affects not only academic and social adjustment of international students but also is crucial to student retention and overall college outcomes. At the same time, a large meta-analysis of over a decade's worth of studies that examined the correlation between TOEFL scores and grade point averages (GPAs) of international students indicated that the TOEFL had a rather small predictive ability on GPA and course completion of international students (Wongtrirat, 2010).

Teranishi et al. (2011) underscored the importance of English language programs focused on developing and supporting communication abilities of nonnative English speakers in community college settings. They argued that "academic language proficiency is *sine qua non* for academic engagement and success" (p. 161) of nonnative English speaking community college students and that attention to English language proficiency is essential to these students' learning, academic performance, and retention.

In Burkholder's (2014) qualitative study of international Turkish students' experiences at a midwestern university, one of the dominant themes was the importance of English language skills across all categories of the students' experiences, from academic to personal. The study participants mentioned that the level of English language proficiency affected decisions regarding academic choices—for example, which courses to take and interactions with faculty. Some students perceived that they were treated with disrespect due to their language skills, by way of, for example, "professors being highly critical or service providers being rude due to language difficulties" (p. 52). English language proficiency, in some cases, determined the level of academic engagement of the study participants (Burkholder, 2014).

The attention to English language proficiency as it relates to international students' academic and social integration is universal; however, approaches to defining and/or measuring English language proficiency or skills differed from study to study. Researchers used both quantitative (Andrade, 2009; Wongtrirat, 2010; Yu & Shen, 2012) and qualitative (Andrade, 2009; Burkholder, 2014; Mathews, 2007; Sherry et al., 2010) methods. The level of students' proficiency is often determined by the ability to listen, speak (oral communication), read, and write (written communication) in English. English language

proficiency is often measured by standardized tests, such as TOEFL, that directly evaluate students' skills in the four language areas mentioned above (Andrade, 2009; Wongtrirat, 2010). Other examples of quantitative measures include survey items that ask students to self-rate their ability to listen, speak, read, and write in English (Yu & Shen, 2012). In qualitative studies, interviews and surveys may include topics and open-ended questions related to level of satisfaction with English proficiency and influence of English language proficiency on adjustment and social and academic integration (Andrade, 2009; Sherry et al., 2010; Zhao et al., 2005) or the role of English language skills coming up as a recurring theme (Burkholder, 2014; Mathews, 2007).

Studies suggested that not only objective English language skills (that can be measured directly by proficiency tests such as TOEFL) but also students' confidence in their ability and willingness to communicate in a foreign language facilitate academic engagement. Confidence in English language proficiency was found to be the best predictor of academic adaptation of about 200 international students at a university in Australia (Yu & Shen, 2012). The researchers argued that it was through communication that international students learned to relate to the learning environment and were able to get academically engaged and fulfil various academic tasks. Consequently, successful academic engagement occurred only when international students were able to communicate with faculty and peers, which was facilitated by students' enhanced confidence in their English language skills.

The studies mentioned above are but a few examples of research that points to the importance of English language skills. Moreover, language and culture are closely interconnected, and one is indispensable in understanding the other. This aspect was taken into consideration in this study's design and methodological approach.

Academic Engagement in the Theoretical Framework of Student Engagement

Although academic institutions have recently become a venue for many functions with regard to students' development, the well-being and experiences of students and the creation and sharing of knowledge should still remain the primary focus. The core functions of colleges and universities are educational, and student learning should continue to be the focal point. Academic activities and interactions as factors enabling, mediating, and fostering learning have long come to the forefront of educational research and have been examined mostly within the framework of student engagement.

Theoretical Approaches to Student Engagement

An overview of related research literature shows that a significant number of studies on factors pertaining international students' success in American higher education have been framed using approaches to student engagement in theories of student involvement (Astin, 1984, 1993), college student development (Pascarella, 1985; Pascarella & Terenzini, 2005), and student integration (Tinto, 1993).

Tinto (1993) formulated the concepts of academic and social integration and their importance in understanding college students' retention and persistence. He argued that students' integration into both the social and academic systems on campus was positively linked to their decision to persist in college. Astin (1984, 1993), Pascarella (1985), and Pascarella and Terenzini (2005) supported the proposition that involvement in the academic and social lives on campus plays a key role in students' college experience. Astin (1984, 1993) suggested that student engagement and peer and faculty interactions inside and outside the classroom are positively linked to student outcomes. Pascarella and Terenzini affirmed that "student involvement—both generally and in an array of specific academic and social

areas or activities—is related in some fashion to intended or actual persistence into the next academic year" (p. 426).

The concept of student engagement. Research literature does not offer a uniform approach to defining student engagement. The concept of student engagement is multifaceted and complex, and it encompasses both individual the student perspective and the institutional perspective. Some researchers have defined engagement in terms of intentional and conscious effort that students make in order to achieve an educational goal. Thus, Harper and Quaye (2009) broadly defined engagement as "participation in educationally effective practices, both inside and outside the classroom, [that] leads to a range of measurable outcomes" (p. 3). They added, however, that engagement is more than just involvement or participation and requires feelings, sense making, and activity. Krause and Coates (2008) wrote about student engagement as "the extent to which students are engaging in activities that higher education research has shown to be linked with high-quality learning outcomes" (p. 493). Pascarella and Terenzini (2005) also pointed out the importance of individual effort and activity, saying that "the impact of college is largely determined by individual effort and involvement" (p. 602).

Others have added an emphasis on the role of institutions in shaping student outcomes. Kuh (2009a) defined student engagement as "the time and effort students devote to activities that are empirically linked to [the] desired outcome of college and what institutions do to induce student to participate in these activities" (p. 683). Thus, student engagement, as defined by the National Survey of Student Engagement (NSSE), an annual survey conducted in public and private institutions of higher education in the United States and Canada, has come to encompass academic and social aspects of college student

experiences as well as engagement-oriented institutional practices (Kuh, 2009b; McCormick, Kinzie, & Gonyea, 2013). According to the NSSE, the concept of student engagement is based on five facets including (a) the level of academic challenge, (b) active and collaborative learning, (c) student–faculty interaction, (d) supportive campus environment, and (e) enriching educational activities. Institutional structures, processes, and practices, along with the individual student effort, are viewed as an important facet of student engagement.

In the community college context, the CCSSE project suggests an understanding of student engagement that also implies students' intentional effort and defined engagement as "the amount of time and energy that students invest in meaningful educational practices" (McClenney, 2006, pp. 47–48). The CCSSE is an instrument and service developed by the Center for Community College Student Engagement to assist community colleges in evaluating educational practices related to student engagement, identifying areas for improvement, and engaging students in behaviors that are highly correlated with student learning and retention. It is based on the same theoretical foundations as the NSSE and, similar to the NSSE, CCSSE conceptualizes student engagement as a construct of five dimensions including active and collaborative learning, level of student effort, degree of academic challenge, student–faculty interaction, and support for learners.

Theoretical underpinnings to study student engagement. Three theoretical approaches discussed below dominate theoretical reasoning, conceptual modeling, and empirical research designs across various studies of student engagement.

Astin's model of student involvement. Astin (1984) asserted that students learn by becoming involved. He believed that student's learning and development are directly

proportional to student engagement in the academic, social, and extracurricular college experiences. Astin (1993) viewed engagement as an environmental factor affected by choices students make with regard to participating in academic and social activities on campus. According to Astin (1984), "in its broadest sense, the environment encompasses everything that happens to a student during the course of an educational program that might conceivably influence the outcomes under consideration" (p. 81). The input–environment–output (I–E–O) model developed by Astin situates engagement as both an environmental factor and as a student outcome manifested in student behavior. The model implies that students choose educational institutions based on certain environmental characteristics and that students' educational experiences and, ultimately, outcomes may vary depending on choices students make about participating in academic, social, and extracurricular activities available to them (Astin, 1984, 1993). The model also allows researchers to quantify and measure student experiences in terms of how, with whom, and how often students interact and which academic and social activities they choose to participate in or avoid. Testing his theory empirically, Astin (1993) concluded that student engagement with academics, faculty, and peers is positively associated with students' cognitive development, learning, academic performance, and retention.

Pascarella's framework of college student development. Pascarella (1985) developed a model of student persistence that focused on directly measured institutional and student background characteristics and their influence on college outcomes. Student effort and the quality of student input were considered important as well. In this model, student characteristics, institutional characteristics, and patterns of interaction with the college environment have direct impact on student learning and cognitive development.

This perspective was later translated into a theoretical approach to college student development that Pascarella and Terenzini (2005) discussed in their text *How College Affects Students*. The authors viewed engagement as students' academic and social experiences on campus that determined students' integration into the institutional environment. The focus of Pascarella and Terenzini's theoretical reasoning is on the way engagement contributes to college student development and determines college outcomes.

Pascarella and Terenzini's (2005) perspective was shared by Kuh et al. (2006), who similarly positioned engagement at the intersection of environmental factors and students' intentional efforts. In line with the previous research, they stressed the role of institutions in creating environmental factors with the power to affect behavioral choices students make.

Tinto's model of student integration. Another widely recognized framework in student engagement is Tinto's (1993) student integration model. He did not use the term engagement but focused on academic and social integration and its link to persistence and retention. Tinto proposed that students' experiences at an institution, mostly the extent to which they become socially and academically involved, have a direct impact on their commitment to educational goals and the institution, and consequently, retention. Academic integration is understood as students' satisfaction with their experiences with the academic systems at the college or university and the way they perceive their own intellectual development. Academic integration is also determined by the students' view of their interpersonal relationships with faculty and peers on campus as promoting intellectual growth and development. Social integration is defined by the extent of students' interaction with the social institutions at colleges and universities, including peer groups, faculty and administrators, and extracurricular activities. According to Tinto, the level of social

integration is determined by the extent to which students perceive others in the campus environment as caring about them and having interest in them as individuals. The integration model Tinto created assumes that students who are more integrated and feel more accepted and valued in the institutional environment are more likely to persist and achieve their educational goals. Likewise, Tinto asserted that leaving colleges occurs because students are insufficiently integrated into different aspects of college or university life.

It should be noted that, although Tinto's (1993) model is intended to explain persistence of students throughout college, rather than explain or predict student outcomes such as academic performance or degree attainment, quite a number of researchers have utilized Tinto's model constructs of academic and social integration to study the impact of engagement on student outcomes for diverse student populations in different educational settings. Also, research suggests that, in addition to explaining student persistence, academic and social integration may be linked to student adjustment and satisfaction as well as college GPA (Andrade, 2008–2009; Barbatis, 2010; DaPeppo, 2009; Mamiseishvili, 2012). Thus, in a quantitative study of the impact of participation in a first-year integration seminar on international student adjustment beyond the first year, Andrade (2008–2009) found that participation in the seminar positively influenced students' integration into the campus environment, fostered the development of active learning behaviors, and ultimately was linked to significantly higher persistence rates of seminar participants compared to nonparticipants. Mamiseishvili's (2012) findings also indicate that academic and social integration of international students at community colleges is associated with persistence through community college and transfer to 4-year institutions.

In addition, based on the premises of Tinto's (1993) student integration theory, Barbatis (2010) conducted a qualitative study of student integration of ethnically diverse underprepared community college students and its role in persistence and student success. His findings show that academic and social integration may shape student persistence and have an impact on college GPA. According to Barbatis, college graduates and persisters who commented on the positive role of academic integration and social involvement in their college experiences and achievements also frequently demonstrated higher GPAs. DaPeppo (2009) explored the link between integration in the college environment, measured as social integration and academic integration, and student persistence and academic success, measured by GPA of college freshmen with learning disabilities. The study findings suggest that integration is significant in predicting persistence and GPA; however, the association was not strong.

Defining Student Outcomes and the Role of Student Engagement

What helps students succeed has long been the focus of research and practice at educational institutions irrespective of their type, size, or demographic profile. Although research literature suggests various ways of defining student success, ranging from academic achievement and satisfaction with college experiences to degree attainment and employment-related outcomes (Kuh et al., 2006), student engagement has long been recognized as another indicator of student success (Astin, 1984, 1993; Harper & Quaye, 2009; Kuh, 2001, 2003; Pascarella, 1985; Pascarella & Terenzini, 2005; Tinto, 1993). Decades of theoretical and empirical studies have shown that campus environment and the extent to which students take part in educational activities in class and outside the classroom may affect students' ability to thrive and succeed in college (Kuh et al., 2010). The concept of student success is outside of this study's scope; however, it is important to briefly overview how success is defined in

research and practice in order to better understand the role engagement plays in students' academic career.

No universal definition of student success can be found in the literature. Views on defining student success range from academic achievement and satisfaction with college experiences to degree attainment and employment-related outcomes, and multiple constructs of the concept exist (Kuh et al., 2006; Laanan, Compton, & Friedel, 2006). The most commonly incorporated elements are quantifiable student outcomes such as enrollment, persistence from the first to the second year of study, length of time to graduation, and program completion. Degree attainment or completion of the program is often considered to be the most certain measure of student success. Another commonly used measure of student success has been GPA (Astin, 1993; DaPeppo, 2009; Ellis et al., 2005; Kuh et al., 2008; Mamiseishvili, 2012).

Community colleges define success in terms of their multiple missions. In the community college context, student success is often viewed as program completion (O'Banion, 2011, 2013). At the same time, O'Banion (2013) pointed out that the definition of student success can depend on whether success is regarded as a process or an outcome. Based on the process perspective, success is viewed as progress toward an educational goal, and students are considered successful as long as they stay enrolled and are not failing. The outcome perspective involves creating measures and indicators as achievement points of success. Consistent with this approach, the National Governors Association suggested a number of success measures for community colleges that include outcome metrics and progress metrics (Reyna, 2010). Outcome metrics may be degrees and certificates awarded, graduation rates, transfer rates, and time and credits to degree, whereas progress metrics may

include enrollment in remedial education, success beyond remedial education, success in first-year college courses, credit accumulation, retention rates, and course completion (Reyna, 2010).

Just as there are no uniform definitions of student engagement and student success, there is a wide range of perspectives on the aims and purposes of engagement as well as the ways student engagement can impact student success. First, student engagement has been linked to improved student learning. As asserted by Astin (1993), Kuh et al. (2010), Pascarella and Terenzini (2005), McClenney (2006), and others, improved student outcomes, including the key outcomes of student learning and development, is the ultimate goal of engaging students in academic and nonacademic activities on campus.

Second, from an institutional perspective, student engagement helps improve student retention and degree attainment rates (Kuh et al., 2006, 2008; Tinto, 1993). As Kuh et al. (2008) pointed out, "student engagement in educationally purposeful activities is positively related to academic outcomes as represented by first-year student grades and by persistence between first and second year of college (p. 555).

Third, student engagement facilitates equality and social justice, which is of paramount importance to underrepresented and underserved demographic groups of students including ethnic and cultural minority students and international students. Harper and Quaye (2009) noted that, according to solid empirical evidence, increasing student engagement of diverse student populations results in considerable gains and benefits for these students, especially for "those for whom engagement is known to be problematic" (p. 3). Kuh (2009a) argued that engagement is especially beneficial in terms of higher grades and improved

persistence for students who start college with a disadvantage of a lower socioeconomic status and/or poorer academic preparation.

Researchers have pointed out that institutions may benefit from student engagement as well and that benefits can be financial and reputational. Because research has linked student engagement to better student outcomes, student engagement data can play a valuable role in assuring student learning and educational quality, thus sending a message to the public and governing agencies. As Kuh (2009a) put it, "what the institution does to foster student engagement can be thought of as a margin of educational quality—sometimes called value added—and something a college or university can directly influence to some degree" (p. 685). He also noted that student persistence and success most likely lead to additional revenues from tuition and other fees, and he called for further research to examine the cost and benefit impact of institutional practices targeted at increasing student engagement. Pike, Smart, Kuh, and Hayek (2006) asserted that student engagement mediates the relationship between institutional expenditures and student outcomes after controlling for a variety of student and institutional characteristics.

Although student engagement can be listed among indicators of institutional effectiveness, the most important and desired effects of student engagement are better student outcomes and improved college experience. The value of student engagement for educational institutions lies in the fact that it represents both student behavior and institutional performance and, thus, is an area that colleges and universities may attempt to influence through policies and practices, whereas many other factors vital to student success, such as demographic characteristics and precollege experience, are outside the direct influence of students and institutions (Kuh et al., 2006). As was mentioned earlier, a high

level of student engagement is associated with a wide range of institutional practices and conditions, including student–faculty interaction, active and collaborative learning, and institutional environments perceived by students as being inclusive and affirming and where expectations for performance are clearly communicated and the level of academic challenge is reasonably high (Astin 1993; Kuh et al., 2010; Pascarella & Terenzini, 2005). Moreover, the researchers unanimously concluded that student learning persistence and degree attainment in college are strongly associated with student engagement. The more actively students engage in academic, social, and extracurricular activities, the more likely they are to persist in college studies and to achieve their educational goals. This connection has been emphasized in an array of studies and reports on the undergraduate experiences mentioned in this literature, starting with the classic works by Astin (1993), Pascarella (1985), Pascarella and Terenzini (2005), and Tinto (1993) and up to and including the recent report on the NSSE data by McCormick and colleagues (2013).

In this light, considering the uprising trends in international student enrollment at community colleges discussed earlier, research attention to engagement of international students at community colleges appears timely and beneficial for students as well as institutions.

Concept and Role of Academic Engagement

Academic engagement of students in higher education is often viewed within the broader framework of student engagement. It is understood in terms of cognitive functions and self-regulatory strategies to pursue learning tasks (Butler, 2011) or in terms of actual actions students undertake to enhance their learning (Astin, 1984; Kuh, 2009a; Pascarella & Terenzini, 2005). Another perspective indicates that academic engagement also occurs when "students take advantage of learning opportunities their institutions provide outside the

classroom" (Reason, Terenzini, & Domingo, 2006, p. 155). Furthermore, when Kuh et al. (2008) defined student engagement as "the time and energy students invest in educationally purposeful activities" (p. 542), they were, first of all, noting the engagement that enhances learning rather than supports the social well-being of students. In this study, academic engagement is viewed as, and encompasses, both unseen cognitive and metacognitive efforts and observable actions and behaviors students engage in while learning and for the purpose of academic pursuit.

It is important to underscore the role of individual commitment and active involvement in academic pursuit. Arum and Roksa (2011) brought attention to a lack of academic focus at today's colleges and, based on the analysis of recent trends in sociological research, noted the detrimental effects of peer culture on individual commitment to academic pursuit in general and student learning in particular. They argued that "a market-based logic of education encourages students to focus on its instrumental value—that is, as a credential—and to ignore its academic meaning" (p. 16). If academic institutions are to remain a place of learning, then educationally purposeful activities, programs, and measures should prevail. Yet, any effort on the part of institutions may be in vain if students do not share the effort and do not take individual responsibility for investing the time and energy, as Kuh et al. (2008) put it, in their learning. A better understanding of academic engagement in its many forms and ways, including cognitive and behavioral, collaborative and individual, culture-based and determined by individual commitment, as well as understanding the impact academic engagement has on student college outcomes, should provide a tool to help students find their own motivation. As Kuh pointed out, it may be time, to "re-channel, stop doing some of the things we are doing now that aren't working well" and seek for better ways (G. D. Kuh,

personal interview with Katherine Boswell, Center for Community College Student Engagement, University of Texas, Austin, March 2, 2011).

Academic Engagement and International Students

As was discussed earlier, studies on international students in the United States have touched the issue of academic engagement and the role it plays in fostering positive student outcomes. A growing body of research has focused specifically on the factors related to engagement of international students and the impact of engagement factors on international student outcomes.

For example, in an empirical study comparing international student and American student academic engagement and its link to academic and personal development, Zhao et al. (2005) utilized Pascarella and Terenzini's (2005) ideas of the impact academic and social interactions may have on student outcomes, along with related research by other authors, to develop a theoretical framework for their study and establish the importance of student engagement, both social and academic, for college success of international students. Though the primary goal of the study was to compare the levels and types of engagement in academic and social activities of international students with those of domestic students, the research results confirmed the correlation between higher levels of engagement in active and collaborative learning and student–faculty interaction and higher levels of academic and personal gain for both domestic and international students (Zhao et al., 2005).

A number of recent studies share empirical evidence on the correlation between the levels of academic engagement and student outcomes for international students. Kwon's (2009) quantitative study identified needs of international students and factors influencing their transition to higher education in the United States from the perspective of the Office of International Students at an American middle-Eastern university. The findings of Kwon's

research highlighted, among others, the impact of classroom involvement and student–faculty and peer interaction on international students' college experience and suggested that higher levels of academic engagement lead to more positive experiences (Kwon, 2009). Based on a qualitative study of senior students at a faith-based university, Andrade (2008) also provided evidence that academic and social engagement of international students was an important factor pertaining to international student persistence in American colleges and universities.

However, in discussing engagement factors of diverse student groups, Krause (2005) pointed out that some subgroups of students, including international students, older students, and students from economically disadvantaged backgrounds, perceive their experience with academic engagement at higher education institutions negatively. Krause's conclusions, along with the implications of many empirical studies on adjustment issues for and barriers to international students in American higher education discussed above, suggest that international students may experience unique issues and problems when attempting to engage in academic activities. Furthermore, patterns of meaningful engagement of international students may differ from those of other student populations. Although researchers have been unanimous on the positive role engagement plays in student success, research on engagement patterns, mediating effects of culture, and the impact of cultural background on international student engagement appears lacking.

Academic Engagement and Community College Students

Given the increased attention to this topic in higher education overall, student engagement has taken center stage in community college initiatives in the past decade as well. Although the relationship between student engagement and desired student outcomes is clear, the body of research supporting the connection is based on the experiences of students at 4-year institutions, and study results may not always be generalizeable to students other

than traditional 4-year students. According to Pascarella (1997), out of approximately 2,600 studies reviewed for the first edition of his book *How College Affects Students*, only 5% at most focused on community college students and factors related to their success. Moreover, only 8% of articles published in five major higher education journals between 1990 and 2003 mentioned community college students (Townsend, Donaldson, & Wilson, 2004). However, in the fall of 2013, community college students represented about 46% of all undergraduate students in the United States (American Association of Community Colleges, 2015). At a time when community college students comprise nearly half of all American undergraduates, and taking into consideration that there are substantial differences in the institutional missions, environmental characteristics, and student populations served by community colleges and 4-year institutions, research on issues related to student engagement of community college students has become most important.

The study of student engagement, including academic and social aspects, and its relationship to student outcomes at community colleges is facilitated by the introduction of the CCSSE, which was developed specifically to capture the experiences and activities of community college students (McClenney, 2007; McClenney et al., 2010; McCormick et al., 2013; Nora, Crisp, & Matthews, 2011). The reliability and validity of the CCSSE instrument have been confirmed in a number of studies; for example, Marti (2009) conducted a confirmatory factor analysis (CFA), which demonstrated that factor analytical models of the CCSSE adequately represented the underlying engagement constructs. CCSSE data have been widely utilized in empirical research. CCSSE benchmarks—active and collaborative learning, student effort, academic challenge, student–faculty interaction, and support service—have exhibited a positive impact on many college outcomes. Engagement has been

found to be critical to the success of community college students, be it persistence, academic achievement, or program completion (McClenney, 2006; McClenney et al., 2010, Nora et al., 2011; O'Banion, 2011).

McClenney (2007) provided details about the effects of different aspects of academic engagement on measurable student outcomes. According to McClenney (2007), studies of large-scale samples of community college students confirmed that active and collaborative learning, one of the five benchmarks of student engagement, is the most consistent predictor of student success. Active and collaborative learning, or involvement in educational activities, is linked to higher grades, higher course completion rates, number of terms enrolled, credit hours completed, long-term persistence, and degree completion. Student–faculty interaction is related to academic outcomes and persistence of community college students. In addition, the level of academic challenge has been found to have the strongest effect on academic outcomes, whereas support for learners is strongly correlated with persistence.

Sontam and Gabriel (2012) examined student engagement at an extra-large community college based on CCSSE data on 1,620 community college students. Specifically, they investigated possible individual differences in student engagement and explored how it mapped to student achievement measured by GPA. Their findings indicated that there were race and gender differences in patterns of academic engagement. Female community college students showed greater engagement than did males, and African American students appeared more engaged than did students of other races. Price and Tovar (2014) examined the statistical relationship between student engagement, measured by CCSSE constructs, and institutional graduation rates reported to the Integrated Postsecondary

Education Data System. The results of their study reinforced the role of student engagement, especially in academic matters, as an important predictor of college completion. Specifically, CCSSE student engagement benchmarks of active and collaborative learning and support for learners are positive predictors of institutional graduation rates (Price & Tovar, 2014).

Overall, researchers have underscored the importance of purposefully designed engagement opportunities for community college students. Thus, based on CCSSE data, McClenney (2006, 2007) noted that community college students are much more likely to engage inside the classroom than outside the classroom. This finding is not surprising, as community college students typically juggle many responsibilities, including family and work, that often substantially limit their opportunities to interact with faculty, staff, and other students outside of the classroom, especially compared to traditional students at 4-year institutions. This suggests that, for community college students, engagement should be intentionally fostered through the design of curricula, syllabi, in-class and home assignments, and other educational experiences.

Although researchers do not disagree when it comes to the role of academic engagement in community college student success, there is a debate about the depth of this research and the validity of the findings based on the analysis of CCSSE data. Much of the literature on student engagement at community colleges still relies on the model developed by Kuh (2001, 2009a, 2009b), which in turn, is rooted in theories of student involvement (Astin, 1984, 1993) and student integration (Tinto, 1993) developed for traditional college students. Traditional understanding of student engagement does not apply to all. Recent critiques have focused on the construct validity of CCSSE measurement scales and their level

of intercorrelation, suggesting they may not measure the distinct aspects of student engagement at community colleges that they propose to and that, in addition, surveys of student engagement measures in general, including NSSE and CCSEE, are culturally specific and socially exclusionary (Angell, 2009; Campbell & Cabrera, 2011; Dowd, Sawatzky, & Korn, 2011; Nora et al., 2011).

On the contrary, Hatch (2012), argued that CCSSE benchmarks serve the purpose of providing a broad picture of engagement levels, especially in comparative terms between different groups of students. The scales have a simple and utilitarian purpose to serve as tools for fostering conversations among educators and other stakeholders that focus on teaching, learning, and outcomes of the college experience. In this sense, they cannot be treated similarly to scales and constructs in the sciences, such as psychology or biology, or even educational research. Hatch pointed out that validation of the research based on the CCSSE is necessary from other sources.

A number of non-CCSSE studies, in turn, also have testified to the importance of academic engagement for community college students' success; however, they provide evidence that patterns of student engagement of community colleges students may differ from those of students at 4-year institutions. Moreover, factors other than student engagement may play at least an equally important role in student outcomes of community college students. For example, Barbatis (2010) looked at factors affecting the persistence of ethnically diverse underprepared students in an urban community college in the southeastern United States. His study was based on the proposition that student persistence can be linked to academic and social integration and participation in various in- and out-of-classroom activities. Barbatis's findings suggest that factors related to social involvement and academic

engagement of community college students play an important role in supporting their persistence; however, the success factors for diverse underprepared community college students go beyond these two themes and include a rigorous high school curriculum, access to financial aid, and a match between student learning styles and teaching styles (Barbatis, 2010).

In a study of engagement patterns of diverse groups of community college students, Saenz et al. (2011) applied cluster analysis to examine similarities and differences in student engagement among diverse groups of community college students. The researchers' major finding was that demographic characteristics do not define the engagement clusters. In their words, clusters did not arise from "who the students are but from the activities students choose to engage in" (p. 255). The utilization of student support structures and engagement opportunities was the most distinguishable feature. However, further analysis revealed that certain groups of students were more consistently involved on campus. Thus, students who were well prepared for assignments and who reported that coursework emphasized performing and applying knowledge ranked highest on engagement. The findings of this study are consistent with previous research showing that academic integration inside the classroom is more significant than are traditional forms of social engagement for student success at community colleges (Braxton et al., 2004; Deil-Amen, 2011). The implication of these research findings for community colleges is that academic engagement can be encouraged by well-designed curricula and pedagogical methods (Saenz et al., 2011).

Academic Engagement of International Students at Community Colleges

Studies dedicated to international students at community colleges are scarce. Among those, only a handful of publications focus on international student engagement and factors correlating with international students' success in community colleges.

In a quantitative research study focused specifically on international student persistence in community college settings, Mamiseishvili (2012) explored the link between international students' academic and social engagement and persistence. The researcher used the data from the Beginning Postsecondary Student Longitudinal Study, a national study, to analyze factors relevant to persistence of international students enrolled at 2-year colleges. The findings of this research suggest that student–faculty interactions and academic advising are significant factors in first-to-second year persistence of international students at community colleges (Mamiseishvili, 2012).

Behroozi-Bagherpour (2010) conducted research on international student retention in a large community college in Texas. Research findings summarized in a publicly available dissertation abstract indicate that international community college student departure can be linked to inadequate advising and counseling, poor engagement with the learning environment, and overall lack of information provided to this group of students (Behroozi-Bagherpour, 2010). An earlier study of student support services available to international students at 40 top U.S. community colleges, which account for about 44.7% of international community college student enrollment (Sallie, 2008), revealed a gap between community colleges with a full range of support services for international students and those with minimal or no support. According to Sallie (2008), academic engagement and, consequently, program completion by international students at community colleges with minimal support services and programs are at risk.

It can be argued that academic engagement of international students in the community college setting will depend on recognizing this group of students among diverse community college student populations and developing focused support systems and engagement

strategies based on research findings. Moreover, research should take into account issues related to culture and the impact cultural background has on educational processes, including learning and pedagogy.

Role of Cultural Heritage in Educational Processes

Another important theoretical assumption in this study has to do with the concept of culture. It almost comes as common sense that cultural backgrounds affect interactions at all levels in educational settings. The influence of culture on learning and motivation has been the topic of much educationally focused research in recent years, especially in educational psychology (Bodycott, 2012; Crose, 2011; Gebhard, 2010; Pajares, 2007; Rienties et al., 2012; Salili et al., 2001). The attention to this topic came from the awareness, now shared by educational and psychological researchers, that the findings of their studies may not apply to other cultures and that, in this age of globalization in education and learning in diverse cultural contexts, it is very important to examine the applicability of educational constructs and models to other cultures. However, in the context of education and research on international students, cultural heritage is mostly the topic of studies on adjustment (Andrade, 2006; Galloway & Jenkins, 2005; Hechanova-Alampay et al., 2002; Hotta & Ting-Toomey, 2013; Kaczmarek et al., 1994; Ramsay et al., 2007; Tas, 2013b; Yan & Berliner, 2011), acculturation (Bertram et al., 2014; Tan & Liu, 2014; Yan & Berliner, 2011; Zhang & Goodson, 2011; Zhou et al., 2008), social integration (Hayes & Lin, 1994; Hendrickson et al., 2011; Hotta & Ting-Toomey, 2013), the link between integration challenges of international students and their overall college experience (Burkholder, 2014; Halic et al., 2009), and persistence (Mamiseishvili, 2012).

Less attention appears to have been paid to the link between cultural heritage and academic matters, including academic engagement of international students. Studies that

have focused on the issues of international student engagement at American colleges and universities were framed predominantly based on the approaches to student engagement by the theories of student involvement by Astin (1993), college student development by Pascarella and Terenzini (2005), and student integration by Tinto (1993). Some examples of recent studies include Korobova (2012), Mamiseishvili (2012), and Zhao et al. (2005). The fundamental underlying assumption was that a student who is positively engaged in the academic process will both achieve more and be more satisfied with the college experience than will a student who is disengaged. The problem with utilizing solely the traditional theories in research on international students is that the concept of engagement, understanding of college student development processes, and factors that promote success, including engagement, for college students assumes a homogeneous student population. Moreover, these theories emerged from and were construed for a specific academic cultural environment: a mainstream American college or university. Due to limited research concerning diverse students, understanding of student engagement in higher education is based on White, traditional-age students who attend 4-year institutions. Barbatis (2010), Braxton et al. (2004), and other researchers have questioned the practical relevance of the above theories to any groups of students other than traditional American students at 4-year institutions.

This study assumes that cultural backgrounds of the participants in educational processes, as well as in an academic context, are vital aspects of academic engagement. Literature offers numerous definitions of culture. Useem, Useem, and Donoghue (1963) defined culture as "the learned and shared behavior of a community of interacting human beings" (p. 169), and this definition, along with the one provided in Chapter 1, guided this

study. Students who travel abroad to study bring with them a wealth of cultural resources and expectations, culturally predetermined interaction patterns, and learning style preferences that impact their behavior in new environments. Although the ability to adapt and perform in the new context may be personal, shared cultural expectations have a significant impact on these students (Bodycott, 2012). Moreover, for most international students, cultural identity is preserved throughout their academic career in a different cultural environment (Andrade, 2009; Kim, 2012; Sugahara & Boland, 2010). As more students choose to study in the United States, American colleges and universities are becoming more culturally diverse.

Multiculturalism as a Conceptual Lens in Higher Education

In this research, the issue of cultural heterogeneity of educational settings that host international students was addressed by incorporating the theoretical perspective of multiculturalism. Academic engagement of international students was viewed through the lens of multiculturalism. Multiculturalism is a perspective that promotes cultural diversity in social institutions when many cultures coexist in institutional settings and all are equally valued and respected (Howard-Hamilton et al., 2011). From a multiculturalist viewpoint, cultural differences should be celebrated as an opportunity for learning and growth rather than seen as a problem to solve, and cultural assimilation is undesired. This view is broader than just recognizing and embracing cultural differences between domestic and international student populations. Students are different in terms of race, ethnicity, gender, age, cultural background, and other identifiers, and multiculturalism calls for recognition and social justice for all identity-based groups of students. Although not specific to international students, multiculturalism assigns value and voice to this group of the student population. The multiculturalist approach allowed this study to move beyond issues related to

international student adjustment and acculturation to other factors that may affect engagement of international students at community colleges.

A few theories relevant in the multicultural environments provided insights into factors related to academic engagement of international students. Intercultural communication and intercultural competence were considered of paramount importance, as both require awareness of cultural differences and explain why expectations for students of different cultural backgrounds cannot be and should not be the same. Nishida (1999) argued that, when people interact with members of the same culture in certain situations many times or talk about certain information with them many times, cultural schemas are created and stored in people's brain. Cultural schemas guide behaviors in familiar situations. When international students find themselves in a new cultural context, familiar links are disrupted and schemas are not applicable. The challenge is to find a substitute for a schema, which may or may not happen within a certain period of time, and many students, in addition to preserving their cultural identity, resort to familiar ways of responding to the environment. An implication for educational practice is that several culture-based schemas may coexist in the same educational context without undermining the academic purpose or disrupting academic processes. Students do not need to conform to the practices of the dominant culture but, like other agents (e.g., faculty), are expected to be aware of the cultural inclusiveness and be open to intercultural interactions. From the multiculturalist viewpoint, this adds to the richness of the educational environment and results in more informed, more involved individuals and groups who are better prepared to interact with each other.

Sociocultural Aspects of Learning

Another important theoretical assumption underlying this study underscored a link between approaches to learning and culture. Sociocultural aspects of learning have remained

a topic of research in education and psychology for decades since Vygotsky (1978) asserted that learning is contextual and cultural because cognitive development co-occurs with other forms of development and that all take place in a social and cultural context. According to Vygotsky, human psychological functions develop in a sociocultural context before they are internalized and used by people. Cultural mediation determines not only what is learned but also how it is learned. Learning is crucially bound with social factors and human activities, and different models of approaches to learning exist in different cultures. This study draws from Vygotsky's view of the impact culture has on content and ways of learning by assuming that international students may learn more effectively through educational practices and activities that are closer to those they have been exposed to in their home culture.

There is a range of research that focuses on international students' approaches to learning and learning practices; most of it focuses on students' perceived challenges when adapting to educational practices in another country (Galloway & Jenkins, 2005; Kwon, 2009; Tas, 2013a; Zhang & Goodson, 2011). Researchers have noted that explicit and implicit expectations in different educational systems may vary and that students may find it difficult to keep up with the standards in a foreign country. The most often cited example is Asian international students in American colleges and universities. Various studies have found that Asian students show apprehension about speaking up in class and voicing their opinion in a class discussion (Yu & Shen, 2012). This behavior may result, in part, from a lack of confidence in English language skills, but it also may reflect differences in educational systems and cultural values. In many Asian educational systems, the predominant class format is lecture, students are expected to remember the information, and professors are viewed as unquestionable authorities in their discipline area. Thus, silence is a

sign of following the lecture and of respect (Terzian & Osborne, 2011). However, some researchers have cautioned against cultural stereotyping and labeling. For example, Liu (2001) argued that perceiving Asian students as passive individuals, whatever the motivation, would be shortsighted. The researcher concluded that, in many cases, Asian students are eager to participate in class discussions but just do not have enough time to formulate their comment, response, or question in English before American students take the opportunity to speak up. Montgomery (2010) called for recognizing the fact that learning styles, or ways of acquiring knowledge, of international students are diverse and rooted in various philosophical perspectives, and it would be wrong to assume that international students coming from the same country necessarily share one learning style.

However, based on the assumption that individuals are the product of their cultural background and experiences, several studies have shown that a student's preferred learning style does depend on his or her cultural background (Holtbrugge & Mohr, 2010; Salili et al., 2001; Sugahara & Boland, 2010; Zhao et al., 2005). In an empirical study of the relationship between cultural factors and student learning styles, Sugahara and Boland (2010) found that preferences for learning by doing versus learning by watching were significantly associated with the Western or non-Western cultural background of students in the study. Holtbrugge and Mohr (2010) conducted a quantitative study of 939 university students from Germany, the United Kingdom, the United States, Russia, Ireland, Spain, the Netherlands, Poland, China, and the United Arab Emirates. The researchers utilized Hofstede's (2001) concept of cultural dimensions, which include power distance, individualism/collectivism, masculinity, uncertainty avoidance, and long-term orientation. The results revealed that learning style preferences varied with individuals' cultural values; for example, students coming from

relatively individualistic cultures were more likely to prefer a learning style characterized by active experimentation and abstract conceptualization.

Studies also have shown that students of different cultures attach different values and meaning to academic achievement and that they approach their achievement tasks in different ways, thus engaging differently in academic activities. In cross-cultural studies comparing British and Chinese students, Salili et al. (2001) found that, although the dimensions of achievement were similar for both groups, the meaning students attached to achievement and the way they went about achieving their academic goals were significantly different. That is, both cultural groups considered personal and social (in this context, driven by social expectations of achievement) goals important, but for the Chinese students, social goals and personal goals were highly correlated, whereas no association was found between the two for British students. Achieving excellence in academic work and career was important for both Chinese and British students, but academic achievement was significantly more important for Chinese students than for British students, and career was significantly more important for British students. Other studies have suggested that Asian students were likely to spend more time studying individually than were their Western peers (Zhao et al., 2005).

Academic Practice as a Cultural Phenomenon

In addition to the cultural background of students, it is important to consider cultural dimensions of academic institutions. For international students, studying and learning occurs in the academic context of the educational institutions they have chosen to attend, and the academic context may be characterized by a set of distinct features, or ways things are done. In research literature, these ways of doing things, or academic processes, are conceptualized through the concept of practice. Practice is viewed as a nexus between a person, an activity, and society (Marx, 1975). It is a habitual and individual interconnection of various

contextualized elements such as identities, values, roles, relations, interactions, and language. Nicolini, Gherardi, and Yanow (2003) regarded practice as a system of activities in which knowing is not separable from doing and learning is social and not merely a cognitive activity (p. 8).

In the educational context, academic practice can be understood as established ways of "knowing, doing, and being that constitute academic tasks" (Kettle, 2011). What is most important is that academic practice is socially and culturally sensitive. Different academic practices in different cultures emphasize different features. For example, according to Kettle (2011), Western educational systems place a greater emphasis on thinking and prioritize critical thinking skills. Asian academic cultures facilitate good students and prioritize mastery of discipline knowledge. Thus, the theoretical perspective of academic practice underscores cultural values embedded in educational systems, now from the institutional point of view. In the institutional cultural context, student academic engagement can be viewed differently in terms of mental penetration and learning expected. For international students, this may mean that getting to know academic practices in the new cultural environment may be an important step in academic well-being.

Adjustment, Assimilation, or Something Else?

The review of literature revealed that cultural background may affect students' academic behavior and learning styles and that academic practices at colleges and universities across the world are shaped by cultural and social values. Researchers have continued investigating the link between international student academic engagement and learning and institutional academic requirements and expectations and searching for best practices in facilitating and enhancing international student outcomes and experiences. As discussed earlier, research that focuses on how international students actually go about living

and learning in the new cultural context has evolved around the issues of adjustment, acculturation, cross-cultural transition, and assimilation issues as they pertain to international students in American college and universities.

This study was framed from the multiculturalist perspective and assumed that academic context can include multiple values, visions, and practices that coexist, interact, and impact all agents involved in a given academic context. From the same perspective, this study recognized the limited nature of cultural adaptation that students undergo. Rather than treating international students as either constrained by the values of their home cultures or substituting them with the values of the host culture (in this case, the U.S. culture), students were viewed as active human agents who creatively dealt with various cultural and personal values as they settled into the American educational context. Students were expected neither to have assimilated nor to have remained untainted by their new cultural environment but, instead, to have hit a middle ground. Two theoretical perspectives, "third space" theory and multicultural personality, were found useful in explaining complex interrelations between home and host cultures in personal identity development and were integrated into this study's theoretical framework.

Third space theory. The concept of third space in cultural adaptation was developed within a broader cross-cultural transition theory and posits that the process of cross-cultural adaptation results in the creation of a "third space," or a new culture, that is formed by the meeting and mingling of the home and host cultures (Bhabha, 1994). The theory seeks to explain the personal and cultural development by assuming that cultures are dynamic systems that involve constant negotiations and reconciliations of norms, expectations, and social relations. Cultural meaning is created through interactions with other people. Most

importantly, the third space theory puts personal identity at the center of the culture, and in terms of educational processes, it suggests that students' prior knowledge, beliefs, and values are central, or primary, to the process of learning. However, these primary elements of personal cultural identity can be influenced and altered by the beliefs, values, and practices of the new culture.

Multicultural personality. The multicultural personality perspective is another theoretical approach that seeks to explain what happens to individuals who were born and raised in one cultural context and attempt to establish their lives in a different culture, by defining a new aspect of personal identity, which is called their "multicultural personality." Ponterotto, Mendelsohn, and Belizaire, (2003) defined someone with a strong multicultural personality as

> a person who embraces diversity in his/her personal life; makes active attempts to learn about other cultures and interact with culturally different people (e.g., friends, colleagues); effectively negotiates and copes with multiple cultural contexts; possesses the ability to live and work effectively among different groups and types of people; understand[s] the biases inherent in his/her own worldview and actively learns about alternative worldviews; and is [a] social activist, empowered to speak against all forms of social injustice (e.g., racism, homophobia, sexism, ageism, domestic violence, religious stereotyping). (p. 200)

In other words, multicultural personality is a set of characteristics that may predict positive cross-cultural adjustment (Yakunina, Weigold, Weigold, Hercegovac, & Elsayed, 2013).

Empirical studies have explored the influence of the five main multicultural personality traits—including social initiative, emotional stability, open-mindedness,

flexibility, and cultural empathy—on international student adjustment. Thus, Yakunina, Weigold, Weigold, Hercegovac, and Elsayed (2012) examined the role of the five multicultural personality traits in predicting international students' openness to diversity and cross-cultural adjustment. Based on the data from 341 international students in the United States, the researchers concluded that emotional stability and social initiative contributed directly to international students' adjustment. In addition, the data also supported indirect effects of open-mindedness, flexibility, and cultural empathy via their influence on openness to diversity. Kagnici (2012) found that multicultural personality variables predicted the adjustment of international students at a university in Turkey as well. However, it is not clear from the research literature if international students are predisposed to possess multicultural personality traits or if multicultural personality is developed through experiences of intercultural communication.

Summary

As the discussion of the reviewed studies shows, researchers have identified academic, social, and personal factors that affect international student experience in American colleges and universities. Building on theoretical frameworks of student involvement (Astin, 1984, 1993), college student development and student engagement (Pascarella, 1985; Pascarella & Terenzini, 2005), and student integration (Tinto, 1993), researchers have linked international college student outcomes to levels of academic and social engagement with various groups on campus including faculty, peers, administrators, and staff (Andrade, 2008; Kwon, 2009; Owens & Loomes, 2010; Sherry et al., 2010; Zhao et al., 2005). Academic engagement of international students is often viewed and discussed as part of student engagement.

Although the majority of literature has tended to focus on international students at baccalaureate, master's, and doctorate degree-granting institutions, researchers have recently turned their attention to factors pertaining to academic engagement of international students at community colleges. Research findings provide evidence of a link between academic engagement of international students and desired college outcomes such as persistence and academic performance (Mamiseishvili, 2012), retention (Behroozi-Bagherpour, 2010), and intention to pursue higher education (Chen, 2014). Research has found an overall positive influence of student engagement, both academic and social, on college experience, satisfaction, and persistence of international students at community colleges (Sallie, 2008).

However, studies on academic pursuit of international students at community colleges are very limited. Moreover, most studies lack attention to students' cultural background as a critical factor in shaping academic engagement and learning styles of international students. There is a shared understanding that international students comprise a unique group and that this group is also very diverse; however, analytical models employed in the studies did not account for cultural differences between domestic and international students. The sociocultural theory of learning (Vygotsky, 1978), the third space theory of cross-cultural transition (Bhabha, 1994), and the academic practice theory (Kettle, 2011) were found instrumental in defining a comprehensive explanatory foundation for the role of culture in academic engagement of culturally diverse college students. The concept of multiculturalism and its role in higher education framed the theoretical perspective of this study.

CHAPTER 3. RESEARCH METHODOLOGY

Introduction

Chapter 3 provides an overview of this study's methodology, research questions, epistemology and theoretical perspective, and conceptual and theoretical frameworks. It describes the setting of the research, sample selection, data collection procedures, and instrumentation. Variables in the study and statistical methods employed in the data analysis are presented for each research question. The chapter concludes with discussions of the study's validity, ethical issues, and limitations and delimitations of the research results.

Methodological Approach

The purpose of this study was to examine measurement scales for academic engagement of international students at community colleges. Specifically, the goal was to propose and test a measurement model of academic engagement of international community college students. Several constructs and their scales were theorized to operationalize the complex concept of academic engagement and measure it from the international student perspective.

Quantitative Research

In this study, the focus was on reviewing the dimensions of the academic engagement construct for international students at community colleges. Relationships between the variables related to and surrounding academic engagement of international students were examined, underlying structures were analyzed, and scales were proposed to measure the construct of academic engagement of international students. According to Creswell (2009), problems of this type that seek to summarize relationships among variables and create

measureable constructs most often fall within the domain of quantitative inquiry. Thus, the study utilized quantitative research design.

There are both strengths and limitations to using quantitative methodology. The limitations of quantitative research include the possibility that results may be removed from reality and that potential phenomena and/or nuances may be missed because of the focus on theory (Krenz & Sax, 1986). At the same time, quantitative research findings can be generalized, even with limitations, from a sample to a population for samples of sufficient size. In quantitative studies, it is often quicker to collect data, especially for large numbers of people, and statistical significance in quantitative research is relatively independent of the researcher, which reduces researcher bias (Creswell, 2009).

Epistemological Perspective

Quantitative research is grounded in a positivist paradigm; however, educational quantitative research is most often rooted in the postpositivist worldview. Postpositivism recognizes the impossibility of pure objectivity but holds to the philosophy that causes probably determine outcomes. These causes can be identified by observation and experiment to test theories and advance the relationship among variables (Creswell, 2009). It accepts that reality exists and that it is possible to create knowledge about reality through collecting and analyzing empirical evidence; however, that knowledge would be relative and probabilistic rather than absolute and unchallengeable (Merriam, 2009). Context adds meaning to known facts; therefore theory, on the one hand, cannot "be ignored for the sake of just facts" (Ryan, 2006, p. 12) and, on the other hand, cannot be separated from practice in the form of absolute truth (Ryan, 2006). This study was anchored in the postpositivist worldview, which recognizes the complexity of life and experience and possible effects of researcher biases. The research sought to learn more about international students, academic

engagement, and community colleges, rather than purely empirically test the existing theories of student engagement. Relationships among the variables defining and surrounding academic engagement were the focal point. At the same time, the aim of the study was to produce empirical results that could be potentially applied to some larger population.

Conceptual and Analytical Perspectives

Conceptual lens: multiculturalism. Because this research focused on international students at an American community college, the concept of academic engagement was viewed through the conceptual lens of multiculturalism. According to Howard-Hamilton et al. (2011), in a multiculturalist view, cultural diversity is recognized and embraced. Multiculturalism allows for various cultures to interact with each other without losing their distinct identities. Cultural differences become important factors that should be reconciled through communication and involvement.

This theoretical perspective is broader than just recognizing the differences between domestic and international student populations. It emphasizes the values of equality, justice, and opportunity. In educational settings, multiculturalism means justice and equal educational opportunities for all students of diverse cultural backgrounds. A student population should be viewed as heterogeneous in terms of race, ethnicity, gender, age, cultural background, and other identifies that are shared by a group of students and distinguish between groups. From a multicultural perspective, each culture should be embraced, and students should not be expected to assimilate into the host culture worldview and leave behind all that they hold as an integral part of their person. Although not specific to international students, multiculturalism assigns value and voice to each group of the student population.

Education based on the principle of multiculturalism allows students of all races, ethnicities, and national origins to reach their highest academic potential by allowing multiple ways of thinking and negating stereotyping and prejudice (Ameny-Dixon, 2004). It is expected that faculty and other essential personnel develop an understanding of the different communication and learning styles students develop from their own cultural upbringing so that alternative instructional and interaction strategies can be employed to help all students. Cultural awareness and multicultural competence, defined as "the process in which a person develops competencies in multiple ways of perceiving, evaluating, believing and solving problems" (Ameny-Dixon, 2004, p. 5), become vital to educating culturally diverse student groups.

Analytical framework. The central concept under study was academic engagement of international students at community colleges. Analyzing any aspect of student engagement in a campus environment is a complex task that requires an "overarching explanation" of variables in the analysis (Creswell, 2009, p. 52) or a solid theoretical framework. Researchers' opinions of the value of classic views of student engagement to diverse demographic student groups may differ (Barbatis, 2010; Braxton et al., 2004), yet a wide range of factors considered in the theories of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005) make them a viable foundation for research on engagement of international students at community colleges (Anderson et al., 2009; Mamiseishvili, 2012; McClenney et al., 2010; Nora et al., 2011). These theoretical approaches informed the analytical model of academic engagement in this study.

Integration of the theories of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005) has been known in prior research (Barbatis, 2010; Mamiseishvili, 2012; Schuetz, 2008; Ullah & Wilson, 2007; Zhao et al., 2005). Together, these theoretical underpinnings, validated by further studies, suggest a path link from student characteristics and institutional environmental factors to academic and social integration in the campus environment and to student outcomes. It should be noted that only insights related to academic engagement were considered in this study; social engagement of international students and campus experiences not related directly to academic pursuit were outside the scope of this research.

Viewed through the lens of multiculturalism, the academic engagement framework was expanded to account for the influences of upbringing in a foreign culture on academic engagement of international students. These influences came from inherent norms of academic behavior, internalized study habits, perceptions of host culture classroom environment, social background, and speaking English as a foreign language. In this respect, theories that provided an explanatory framework for the processes behind integration of international students into the academic environment of American colleges and universities, as well as for the cultural integrity of students, were employed in finalizing this study's analytical framework. Sociocultural theories of learning highlighted the link between learning and the cultural context (Vygotsky, 1978), resulting in culturally bound learning style preferences and motivation for academic achievement. The third space theory of cross-cultural adaptation (Bhabha, 1994) suggests that, rather than adopting cultural norms and values of American institutions, international students retain the norms, values, beliefs,

behaviors, and communication practices of their native cultures. This does not mean international students remain unaware of or are not sensitive to the cultural norms of the new environment; however, they should not be expected to fully assimilate and engage in academic processes in the same manner domestic students would.

Conceptual model. The conceptual model of the study, previously shown in Figure 1.1, represents the connection of educational and cultural theoretical insights for this study.

Research Design

This study utilized a nonexperimental quantitative research design using survey methodology and inferential statistical analysis (Creswell, 2009). The construct of academic engagement of international students at community college was examined based on a number of integrated minor constructs and individual items comprising those constructs. Quantitative data on individual items was captured through a survey. Quantitative descriptive statistical methods, between-groups analysis, and factor analysis were employed to examine underlying relationships among items in the analysis.

Research Questions

As discussed in the previous chapter, international students at community colleges are still a relatively new phenomenon. Understanding academic engagement of international students versus domestic students is expected to provide a guide for educational practitioners for the development and modification of practices that focus on increased student learning and student success. With this in mind, this study posed five quantitative research questions:

1. What is the demographic profile of international students and domestic students who participated in the study?
2. Are there any differences in demographic and background characteristics between international students and domestic students?

3. Are there any differences in academic engagement between international and domestic students?
4. How can academic engagement of international students at community colleges be defined in measurement terms?
5. How can a new measurement model of academic engagement of international community college students be defined?

Research Methods

The following section describes the research methods used in this study. Specifically, this section describes the source of data, setting, sample, instrumentation and data collection, and data analysis.

Data Sources

To examine the concept of academic engagement of international students at community colleges, this study utilized secondary data collected as part of a multistage study of general community college student population conducted by a research team at the School of Education at Iowa State University. The study, entitled *Measuring Constructs of STEM Students Success Literacy: Community College Students' Self-Efficacy, Social Capital, and Transfer Knowledge*, was generally focused on the theoretical constructs of self-efficacy, social capital, and transfer knowledge of community college students in STEM pathways. Led by Dr. Soko Starobin, the study was initially launched in 2012 in the state of Iowa, but in 2013 community colleges from a few other states were brought into the study. Only students who were enrolled in academic programs, had taken classes on campus, and had completed at least one semester of coursework were included in the target population.

Despite the intended focus on STEM-oriented community college students, the STEM Students Success Literacy (SSSL) survey was administered to community college

students in academic programs irrespective of their majors and career inclinations, and the SSSL survey instrument included numerous items related to student engagement and college experience. As a result, the SSSL study produced rich data on participating community college students overall and on academic engagement of community college students in particular.

Setting

This study utilized a dataset collected in the spring of 2013 at a public state community college outside the state of Iowa. The community college, here referred to as Sunshine College, is a multicampus, nonresidential college located in a large metropolitan area in the southeast United States. It is the third largest public community college in student headcount in its state, and according to Open Doors reports, was listed among top 40 associate's institutions hosting international students in the United States in 2013–2014 (IIE, 2014e). The college serves a total of over 65,000 students in a wide range of degree-oriented, vocation, professional training, and continuous education programs. At the time of the SSSL project data collection, this college enrolled approximately 41,000 credit-seeking students. The college offered 35 programs leading to Associate in Arts and Associate in Science degrees, and about 12,000 students were attending full time.

In the spring of 2013 the college enrolled 24,319 students who qualified to participate in the study and received the invitation to complete the survey. The response rate was 8.9%. A total of 2,169 cases were included in the final Sunshine College SSSL dataset after cleaning for missing and incomplete data.

Population and Sample

The target population for the study consisted of international students enrolled in academic programs at Sunshine College. Based on international education annual reports

available at the college's website, Sunshine College has been actively engaged in an intensive strategic effort to internationalize the campus. Strategic goals include an increase in international student enrollment, and financial and human resources have been dedicated to international student recruitment and retention. Specifically, Sunshine College maintains an international student services department with a range of services for future and current international students, has invested in marketing initiatives targeting international nondegree and degree-seeking students, and has allocated a travel budget for the college's recruitment staff to visit countries of interest in South America, East Asia and the Pacific, and the Caribbean.

According to public records available on the webpage of the college's institutional research office, in the spring of 2013 the college enrolled a total of 589 credit-seeking international students ([Sunshine College] Office of Institutional Research, 2013). A report on international student enrollment by the college's Office of Institutional Research indicated that 549 of them were enrolled in Associate in Arts, Associate in Applied Science, and Associate in Science degree programs, and 61 were identified as first time in college. Based on this information, the total number of international students at Sunshine College who were enrolled in academic programs and had completed at least one semester of coursework prior to Spring 2013 was estimated at 488 students.

Based on definitions from prior research (Galloway & Jenkins, 2005; IIE, 2012e; Kaczmarek et al., 1994; Klomegah, 2006) and on this study's theoretical approach, international students for this study were identified based on student citizenship status (Question 62) and English as a second language status (Question 65). The sample of international students consisted of nonnative English speakers who were non-U.S. citizens on

a permanent resident visa/green card or a temporary U.S. nonresident visa (such as an F1/F2 visa or a J1/J2 visa). Screening of the SSSL data based on these two criteria produced a sample of 184 international students. A conservatively estimated response rate for this study of international students was over 30%.

Instrumentation and Data Collection

Survey instrument. The SSSL survey instrument (Appendix A) was developed at Iowa State University as part of a continuous research project focused on the theoretical constructs of self-efficacy, social capital, and transfer knowledge of community college students. The second expanded version of the survey was administered at Sunshine College.

The expanded survey instrument includes 69 questions and 214 items measuring self-efficacy, social capital, transfer capital, and student demographic characteristics. The survey was derived from three groups of sources. First, the self-efficacy scales were developed based on scales by Sherer and colleagues (1982) and measures in the Campus Life and Learning Survey (Bryant, Spenner, & Martin, 2006). Second, the social capital construct was measured based on the Cooperative Institutional Research Program (CIRP) Freshman Survey (Higher Education Research Institute, 2011). Finally, transfer capital was measured based on the scales of the Laanan Transfer Students Questionnaire (L-TSQ; Laanan, 2007). A pilot study involving 565 students from five community colleges in Iowa was conducted to review the survey design and data for reliability and validity analysis. The instrument scales were finalized based on exploratory factor analysis (EFA), and some items were removed due to factor loadings below 0.6. The reliability of the constructs based on the remaining items was verified with Cronbach's alpha coefficients. Thus, the final versions of the SSSL survey instrument was based on commonly used and established national surveys, a pilot study, and a check for reliability and validity. For the spring of 2013, the original instrument of 67

questions and 212 items was expanded to include two more questions, resulting in a version comprising 69 questions and 214 items.

The survey predominantly used Likert-type scales (Likert, 1932) to measure the construct items associated with student attitudes, perceptions, and behaviors. In addition, continuous rating scales were applied for some survey items to measure, for example, levels of anxiety and confidence associated with class performance. Multiple choice questions were included to collect factual data such as classes attended, parents' occupation, degree aspirations, and student demographic characteristics.

Although the primary focus of the survey was on constructs other than student engagement, a number of questions consisting of several items each measured student academic engagement as viewed by Astin (1993), Harper and Quaye (2009), Kuh (2003), McClenney (2006), Nora et al. (2011), and Pascarella and Terenzini (2005). Laanan, Starobin, and Eggleston (2010) defined transfer capital as "cumulative knowledge and experiences of higher education environments [that] promote successful adjustment for students transferring from a community college to a 4-year university" (p. 180). Thus, the concept of transfer capital includes engagement experiences of students in higher education that affect student retention and persistence toward achieving students' educational goals (Alexander, Ellis, & Mendoza-Denton, 2009; Jensen, 2011; Laanan et al., 2010). The role of academic engagement in supporting retention, persistence, and potential transfer of community college students is consistent with its role in fostering student college success, be it retention, persistence, academic performance, or satisfaction, and within this study's theoretical focus on academic engagement.

Data collection and procedures. The dataset for this study comprised data collected with the SSSL survey instrument at Sunshine College in the spring of 2013. The survey was administered electronically. Students included in the study were sent an online invitation with a link to complete the survey using Qualtrics online survey software and an explanation of the data use and procedures (Appendix B). Participating in a lottery was provided as an incentive for students to complete the survey. The invitation informed students that, upon completing the survey, they would be automatically entered for a random drawing in the lottery. Students were given 2 weeks to complete the survey, and during that time they had an option of exiting and re-entering the survey as needed before submission. After the deadline, reminders to complete the survey were sent to those participants who had started but not submitted the survey. A total of 1,823 fully completed and 346 partially completed surveys were returned. The final dataset consisted of 2,169 cases. Surveys with 0% and near 0% completion were cleaned out from the final dataset.

Because dealing with missing data through simple strategies such as listwise case deletion may lead to inaccurate statistical estimates, including underestimated standard errors and biased parameter values (Rubin, 1987; Schafer, 1997), missing data imputation was applied to generate plausible values for missing data. The SSSL project team members employed built-in mechanism in IBM SPSS AMOS for full information multiple likelihood (FIML) estimation for imputation. The method uses a specified model of joint distribution of the observed variables, computes the likelihood for the observed data as a function of the parameters for the fixed observed data, and estimates the parameters that maximize this likelihood (Little & Rubin, 1987. The results of the FIML imputation were verified with the Bayesian method, which Garson (2012) believed was more appropriate for categorical

variables. The imputation process followed the steps laid out in the *IBM SPSS Amos 19 User's Guide* (Arbuckle, 2010).

Thus, two sets of SSSL data were available for analysis: a raw dataset and an imputed dataset. Preliminary analysis of the variables of interest for response rate frequencies in both datasets and shares of missing data in the raw dataset was conducted. Based on the fact that these shares were considered rather small, and that the two datasets appeared similar, this study utilized the imputed dataset.

Data Analysis

The data analysis was geared toward developing and testing a measurement model for academic engagement of international students at community college. Rooted in the blended educational and cultural conceptual framework of this study, the data analysis integrated the student engagement models and included factors accounting for cultural influences.

First, a descriptive statistical analysis was conducted to examine the demographic profiles of the international community college students in the sample and to compare international students to domestic students. Second, bivariate and multivariate statistical analyses, including between-groups comparative techniques, EFA, and CFA with goodness-of-fit estimates, were employed to answer the research questions.

Variables. The selection of variables for this study was informed by the analytical frameworks employed in studies of student engagement (Astin, 1984, 1993; Pascarella, 1985; Pascarella & Terenzini, 2005; Tinto, 1993), a related research literature on student engagement of community college and international students (Andrade, 2008; Kwon, 2009; Mamiseishvili, 2012; Marti, 2009; Price & Tovar, 2014; Sontam & Gabriel, 2012; Zhao et al., 2005); research literature related to the influence of cultural background on students' academic activities (Kim, 2012; Montgomery, 2010; Salili & Hoosain, 2007a; Sugahara &

Boland, 2010) and the role of English language proficiency in academic engagement of international students (Anderson et al., 2009; Burkholder, 2014; Sherry et al., 2010; Teranishi et al., 2011; Yu & Shen, 2012); and finally, the SSSL survey instrument.

Major variables for analyses with descriptions, codings, and scales are listed in Appendix C. A total of 60 observed, recoded, and computed variables were considered in this study. These variables could be grouped as follows: (a) demographic variables, (b) socioeconomic variables, (c) academic background variables, (d) academic engagement variables (e) classroom experience variables, and (f) persistence variables. The grouping variable to distinguish between domestic and international students in the study was immigration status, which was computed from two items: Q62 What is your citizenship status and Q65 Is English your native language?

Demographic characteristics. As past research shows, student background and demographic characteristics play an important role in shaping students' college experiences and achievement (Astin, 1993; Bryson, Smith, & Vineyard, 2002; DeBerard, Spielmans, & Julka, 2004; Harper & Quaye, 2009; Kirby, White, & Aruguete, 2007; Kuh et al., 2006; Pascarella, 1985; Pascarella & Terenzini, 2005; Tinto, 1993). To examine the demographic profile of the students in the study, the following variables were included in the analysis: gender (Q55), age (Q57), race/ethnicity (recoded from Q56 and Q68), enrollment status (Q49), marital status (Q58), and employment status (Q23).

Socioeconomic characteristics. Based on past research (Kim, 2012; Salili & Hoosain, 2007a; Schulz, 2006), background characteristics of the students in the analysis were expanded to include the socioeconomic variables of mother's education (Q17_1), father's education (Q17_2), estimated parents' total income (Q19), financial concerns (recoded from

Q21), and time at a job (Q24). In addition, items measuring parents' or other adults' interest and participation in students' education, academic life, and life outside school during high school were included to measure the level of family support, as follows: spent time just talking to you (Q25_8), worked with you on your homework (Q25_9), discussed your progress in school with you (Q25_10), and participated in school-related activities (Q25_4).

Academic background. Most variables in this group were included as proxy measures of students' academic preparedness and mastery of the English language skills. Level of math preparation was computed from items in Q50 and recoded on a 6-point scale as the number of courses previously taken, ranging from 1 = *0–3 courses* to 6 = *16–18 courses*. The same method was applied to create the level of science preparation variable, which was computed and recoded from Q51 and measured students' preparedness in science as courses previously taken on a 6-point scale ranging from 1 = *0–2 courses* to 6 = *16–18 courses*. An assumption was made that the courses previously taken had been completed, passed, and not repeated. The variable developmental education was created from Q36 to measure students' participation in developmental education in reading, writing, and math. Developmental education was a dichotomous variable coded as 0 = No if a student hadn't taken any developmental courses and 1 = Yes if a student had taken at least one developmental course. The need for language development was measured by a dichotomous language development variable computed from Q36, coded as 0 = No if a student had not taken developmental courses in reading and/or writing and 1 = Yes if a student had. Further, the perceived language skills variable was computed from Q5 to estimate students' confidence in English writing and public speaking skills. In addition, self-reported college GPA (Q69) and degree aspirations (Q33) were considered.

Academic engagement variables. Variables to measure various aspects of student involvement on campus, academic interactions, and ways of academic pursuit were selected from the survey items based on the related research literature discussed above and established surveys of student engagement, such as the NSSE and CCSSE. Measuring scales of constructs related to academic engagement employed in prior research on community college students and international community college students were considered (Hatch, 2012; Mamiseishvili, 2012; Marti, 2009). The following two variables were used to measure time students allocated to college work: time spent studying or preparing for classes (Q37) and time spent on the community college campus (Q35). A group of six variables was selected to measure levels of interaction with faculty and academic advisors: (a) visited faculty and sought their advice on class projects (Q40_1), (b) approached faculty outside the class (Q40_2), (c) discussed career and ambitions with faculty (Q40_5), (d) asked my instructor for comments and criticism (Q40_6), (e) met with advisor on a regular basis (Q38_3), and (f) talked with an advisor about courses to take, program requirements, and education plans (Q38_4).

Nine observed variables were chosen to measure student involvement in various practices of academic pursuit: (a) studied with other students in the class (Q14_10), (b) received informal tutoring outside class (Q14_12), (c) received academic support outside class (Q14_13), (d) used regular feedback from TA (teaching assistant) or professor (Q14_15), (e) spent more time studying (Q14_1), (f) taught myself to study more effectively (Q14_2), (g) did all of the assigned reading (Q14_3), (h) increased lecture attendance (Q14_5), and (i) studied by myself (Q14_7). These variables were included in the analysis for the opportunity to develop measuring scales of different academic pursuit practices which

may or may not require interaction, or collaboration, with other agents. Recoded dichotomous variants of these variables, coded as 0 = not used and 1 = used, were utilized to examine the differences between domestic and international students in the use of interactive and noninteractive academic engagement practices.

Classroom experience. Classroom experience was identified as one of the key factors in students' inclination to engage with faculty, administrators, staff, or peers, and is often included in measurement models of academic engagement (Mamiseishvili, 2012; Marti, 2009; Saenz et al., 2011). Six variables were selected based on the survey items as measures of students' classroom experience including (a) perception of poor treatment (Q41), (b) I felt I was treated respectfully in class (q43_1), (c) class size made it difficult to ask questions (Q43_2), (d) I felt isolated in class (Q43_3), (e) instructor or students made prejudiced comments (Q43_5), and (f) I felt like I did not fit in (Q43_6).

Persistence variables. Finally, variables measuring students' persistence in academic pursuit were brought into the analysis based on the research identifying achievement orientation as an important factor in international students' college careers (Astin, 1993; Kuh, 2001, 2009b; McClenney, 2006, 2007; Pascarella & Terenzini, 2005). Five variables were chose as proxy measures of achievement orientation: (a) I keep trying until a job is done (Q2_2), (b) I stick to unpleasant tasks until they are done (Q2_3), (c) failure makes me try harder (Q2_3), (d) I will not try complicated things (Q2_14), and (e) I give up soon if initially unsuccessful.

Methods of analysis. As was discussed earlier, this study utilized a quantitative research methodological approach and employed statistical analysis techniques. According to Mertler and Vannatta (2010), selecting the appropriate statistical technique for analyses

depends, besides the nature of research questions, on the type of variables and the number of independent variable and dependent variables. This subsection outlines methods of analysis used to answer each of the research questions.

Research question 1. What is the demographic profile of international students and domestic students who participated in the study? The purpose of this question was to gain a better understanding of the international individuals who chose to attend Sunshine Community College. General demographic characteristics, socioeconomic background, and academic characteristics of the students in the study were descriptively analyzed. Variables at this stage of the analysis included:

1. Gender, age, ethnicity, marital status, enrollment status, and employment status (general demographic variables);
2. Mother's education, father's education, estimated parents' total income, financial concerns, and time at a job (socioeconomic variables);
3. Level of math preparation, level of science preparation, developmental education, language development, perceived language skills, self-reported college GPA, and degree aspirations (academic characteristics).

Numbers, response frequencies, and rates were analyzed, as were measures of central tendency including means and standard deviations. These statistics were considered for the samples of international students, domestic students, and all students in the study. It should be kept in mind that conclusions based on descriptive information may apply only to the characteristics of the students in the study (Urdan, 2010).

Research question 2. Are there any differences in demographic and background characteristics between international students and domestic students? This question aimed to

gain insights into the similarities and differences between domestic and international students in the study. A comparative analysis of the demographic and background characteristics was performed to determine if any statistically significant differences existed between the means of the variables associated with general demographic, socioeconomic, and academic characteristics of international and domestic students. The techniques employed for between-groups analysis included cross-tabulation with Pearson chi-square tests, independent samples *t* tests, and Mann-Whitney *U* tests.

The choice of a particular analysis method was based on the type of the variable to be analyzed and compliance with assumptions for this method. Nonparametric cross-tabulation with Pearson chi-square tests were utilized to analyze relationships between nominal variables to see if background variables were dependent on group membership. The Pearson chi-square test measures how well the data fit the null hypothesis that observed frequencies are approximately the same as expected frequencies, which means that the two variables are independent of each other. According to Tabachnick and Fidell (2013), a small chi-square value indicates a good fit of the observed frequencies and independence of the two variables in the analysis, whereas a large chi-square value indicates a poor fit and rejection of the Null hypothesis and leads to the conclusion that the two variables are related. Mathematically the concept of chi-square is represented by the following equation:

$$\chi^2 = \sum \frac{f_o - f_e}{f_e},$$

where f_o is a set of observe frequencies and f_e is a set of expected frequencies. Based on the work by Morgan, Leech, Gloeckner, and Barrett (2013), significance of the test results was estimated with the phi coefficient for dichotomous variables and with Cramer's V for polytomous variables.

Independent samples *t* tests and Mann-Whitney *U* tests were employed for the comparison of international and domestic students on ordinal variables. The independent samples *t* test method is based on the assumptions of data independence, equality of the variances of the dependent variable in the population, and approximate normality of the dependent variable (Morgan et al., 2013). The following equation represents a *t* score calculation:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{{s_1}^2}{n_1} + \frac{{s_2}^2}{n_2}}},$$

where $\bar{x}_1$ is the mean of sample 1, $\bar{x}_2$ is the mean of sample 2, n_1 is the number of subjects in sample 1, n_1 is the number of subjects in sample 2, ${s_1}^2$ is the variance of sample 1, and ${s_1}^2$ is the variance of sample 2.

The data in the study were independent, each subject being assessed only once. The assumption of equal variances was tested by the Levene's test for equality of variances. Results of the Levene's test (at $p \leq .05$) indicate whether or not the variances of the dependent variables are significantly different and the assumption of equal variances is not met (Morgan et al., 2013). If this assumption was violated, results adjusted for the inequality of variances were reported and used in the analysis.

Skewness and kurtosis values of the dependent variables were used to check the assumption of normal distribution. Skewness tends to have more influence on analyses than does kurtosis, and it is acceptable not to consider kurtosis in checks for data normality (Morgan et al., 2013, p. 51). West, Finch, and Curran (1996) recommended concern for data normality if skewness is outside –2 and 2 and kurtosis is outside –7 and 7. According to Morgan et al. (2013) and Tabachnick and Fidell (2013), skewness values between –1 and 1

should provide evidence that the data fall within an acceptable normal distribution range. For this study, acceptable indicators of data normality were skewness values between –1 and 1 and kurtosis values between –7 and 7. If the data violated the assumption of normality in between-groups analysis, Mann-Whitney *U* tests were conducted. The Mann-Whitney *U* test is a nonparametric test that transforms the data into ranks and compares the mean ranks of the data in each group. If the mean rank of one group is significantly larger than that of the other group, the groups are considered significantly different. The Mann-Whitney *U* statistic is represented by the following equation:

$$U = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum_{i=n_1+1}^{n2} R_i ,$$

where n_1 and n_2 are the two sample sizes and R_i is the ranks of the samples.

Research question 3. Are there any differences in academic engagement between international and domestic students? A comparative between-groups analysis was conducted to determine if there were statistically significant differences between domestic and international students with respect to the variables related to academic engagement. Analysis methods and procedures to produce answers to the question followed those employed for research question 2. Between-groups comparative techniques were used including cross-tabulation with Pearson chi-square tests, independent samples *t* tests, and Mann-Whitney *U* tests. Similar to research question 2, the choice of the statistical techniques used to compare domestic and international students on variables related to academic engagement was based on the dependent variable type and the results of relevant assumptions checks.

Research question 4. How can academic engagement of international students at community colleges be defined in measurement terms? EFA was conducted to answer this question. EFA procedures were used to examine the relationships between variables related

to and surrounding academic engagement of international students at community colleges. The goal was to reveal unobserved variables that explained the relationships among the observed variables and thus to produce a more parsimonious sets of factors (Tabachnick & Fidell, 2013) and, eventually, a more effective measurement tool. Additional data screenings for normality, linearity, and multicollinearity were performed for the variables in the analysis. After the screening was complete, seven cases with variables violating the factor analysis assumptions were removed from the analysis. A total of 2,162 cases (including 184 cases of international students and 1,931 cases of domestic students) were included in EFA.

The criteria for the evaluation of the analysis results included eigenvalues greater than 1.0 and factor loadings of .05 and above (Mertler & Vannatta, 2010). Items that did not load strongly on relevant factors or could not be associated with any factor were removed from theorized measurement scales. Scree plots, correlation matrices, and item commonalities were also examined.

Reliability of the resulting constructs was estimated using Cronbach's alpha coefficient of internal consistency (α). This statistic measures how closely related a set of variables are as a group, and based on Creswell (2009), alpha values of close to .7 and higher were regarded acceptable. Furthermore, the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO test) and the Bartlett's tests of sphericity were considered to evaluate the suitability of the sample and the data for factor analysis. In this study, KMO values of 0.6 and above were considered acceptable (Tabachnick & Fidell, 2013), and statistically significant sphericity values indicated that the data were suitable for factor analysis (Mertler & Vannatta, 2010).

Principal components analysis (PCA) was used to extract the factors. PCA uses the correlations among variables to develop small sets of components that empirically summarize the correlations among variables (Tabachnick & Fidell, 2013). Varimax (orthogonal) rotation of the correlation matrix assisted in finding a more interpretable factor structure. The varimax rotation method maximizes high correlations between factors and variables, or in Tabachnick and Fidell's words, maximizes the variance of factor loadings "by making high loadings higher and low ones lower for each factor" (p. 625).

A total of 43 variables were considered in two major and numerous minor EFA iterations. Through these iterations, some variables were excluded from the analysis, and the remaining 35 variables were reduced to 10 reliable factors.

Research question 5. How can a new measurement model of academic engagement of international community college students be defined? The results of the EFA became the foundation for the development of a measurement model for academic engagement of international students at community colleges. As previous research showed, student background characteristics may have a strong impact on the student engagement (Astin, 1993; Bryson et al., 2002; DeBerard et al., 2004; Harper & Quaye, 2009; Kirby et al., 2007; Pascarella, 1985; Pascarella & Terenzini, 2005; Tinto, 1993). Cultural background and English language proficiency of international students have been linked to academic engagement as well (Anderson et al., 2009; Burkholder, 2014; Kim, 2012; Montgomery, 2010; Salili & Hoosain, 2007b; Sherry et al., 2010; Sugahara & Boland, 2010; Teranishi et al., 2011; Yu & Shen, 2012). With this in mind, measurement scales and relationships between constructs and variables were carefully examined to produce a theoretical

measurement model for academic engagement of international students at community colleges. Three theoretical measurement models were designed and tested via CFA.

Second-order factor structures of academic engagement were examined in the CFA. Second-order factor models are used in a wide variety of research domains and offer certain advantages in theoretical reasoning and practical implications. According to Chen, Sousa, and West (2005), a second-order model links first-order factors in a structure that potentially explains the covariance among first-order factors and observed variables in a more parsimonious way with few parameters. In addition, second-order factor models can also provide useful simplification of the interpretation of complex measurement structures.

The models were estimated using covariance matrices, statistical significance of the estimates measured by *p*-values, and factor loadings. Items in the measurement scales were retained based on the cutoff criteria of .5 and above (Mertler & Vannatta, 2010). The goodness-of-fit indicators used in this study included the chi-square, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker Lewis index (TLI; Hu & Bentler, 1998, 1999; Tabachnick & Fidell, 2013).

Although chi-square is considered a classic goodness-of-fit measure to determine overall model fit, it is sensitive to sample size and produces less reliable results as sample size grows larger (Tabachnick & Fidell, 2013, p. 720). It becomes more difficult to retain the null hypothesis as the number of cases increases (Hu & Bentler, 1999). In this study, the chi-square estimates were taken into consideration, but preference was given to the RMSEA, CFI, and TLI indices considered collectively. These indicators are considered not sensitive to sample size (Hu & Bentler, 1999; Tabachnick & Fidell, 2013). Cutoff values of these

indices were established based on Hu and Bentler's (1999) and Tabachnick and Fidell's recommendations. For the RMSEA, a value of about 0.05 or less indicates a close fit of the model and a value between 0.05 and 0.06 are considered acceptable. CFI values close to 0 indicate a poor fit, whereas those close to 1 are a sign of a good fit; values of 0.95 and above were preferred. The TLI value is usually lower than the CFI value, but values over .90 or over .95 are considered acceptable.

Although the RMSEA, CFI, and TLI methods are considered not sensitive to sample size, additional analyses with random samples of domestic students similar in size to the sample of international students were performed to screen for potential impact of the sample size on the analysis results. Three random samples of approximately 10% of the cases were selected using a random sample size selection procedure in IBM SPSS, resulting in samples of 181, 200, and 191 cases, respectively. CFA results and goodness-of-fit indicators were compared for the samples of international students and the three small samples of domestic students.

The discussion of the methods and variables this study utilized to answer the research questions is summarized in Table 3.1.

The IBM SPSS Version 22 statistical package was used to conduct descriptive, comparative, and exploratory factor analyses. The measurement models of academic engagement of international students were tested using the MPlus Version 7.3 statistical software package to perform the CFA and calculate goodness-of fit-indicators for measurement models.

Table 3.1

Methods of Analysis

Research question	Variable	Method of analysis
Research Question 1. What is the demographic profile of international students who participated in the study?	Demographic Socioeconomic Academic background	Descriptive statistical analysis
Research Question 2. Are there any differences in demographic and background characteristics between international students and domestic students?	Demographic Socioeconomic Academic background	Comparative between-groups analysis using cross-tabulation with Pearson's chi-square tests, independent samples *t* tests, and Mann-Whitney *U* tests
Research Question 3. Are there any differences in academic engagement between international and domestic students?	Academic engagement	Comparative between-groups analysis using cross-tabulation with Pearson's chi-square tests, independent samples *t* tests, and Mann-Whitney *U* tests
Research Question 4. How can academic engagement of international students at community colleges be defined in measurement terms?	Socioeconomic, Academic background Academic engagement Classroom experience Persistence	Exploratory factor analysis
Research Question 5. How can a new measurement model of academic engagement of international community college students be defined?	Socioeconomic Academic background Academic engagement Classroom experience Persistence	Confirmatory factor analysis

Validity of the Study's Results

A number of anticipated and potential threats to the validity of this study's results should be addressed.

External Validity

According to Creswell (2009), "external validity threats arise when experiments draw incorrect inferences from the sample data to other persons, other settings, and past or future situations" (p. 162). To minimize the potential effects of external validity threats, including overgeneralizing and/ or making assumptions about the groups to which the study results

may not relate, the study results were considered applicable to international students of different majors enrolled in academic programs at big urban community colleges in the southern parts of the United States where the influx of international students of Hispanic origin may be more pronounced than in other parts of the country.

Internal Validity

According to Shadish, Cook, and Campbell (2002), internal validity refers to "inferences about whether observed covariation between A and B reflects a causal relationship from A to B in the form in which the variables were manipulated or measured" (p. 53). In other words, internal validity involves the research design procedures, methods, responses, and reported data that may lead to incorrect inferences about the population (Creswell, 2009).

Because no actual experiment was conducted, and a secondary data analysis was performed, threats related to internal validity did not involve undesired manipulations or modifications of participants' behaviors or effects due to the experimental setting, such as compensatory demoralization or compensatory rivalry (Creswell, 2009). However, potential threats to internal validity of the study arose from utilizing a survey design and included nonresponse bias and issues related to self-reported information.

Nonresponse bias is associated with data coming from respondents who choose to complete the survey and whose answers may differ from the potential answers of those who choose not to complete the survey (Fowler, 2009). A comparison of the demographic characteristics of international student respondents with the demographic characteristics of international students as a whole enrolled at Sunshine College at the time of the study based on publicly available records was performed. The results and implications are discussed as limitations to the study.

According McClenney (2006) and Nora et al. (2011), a well-crafted student survey can provide insights into the student experience that other sources of information cannot, such as estimates of one's ability to interact effectively with others on an individual basis or in small groups and the degree to which one's values have developed since starting college. On the other hand, the accuracy of indirect self-reported data may be questioned for a number of various reasons including the unwillingness or inability of the respondents to provide credible information. In this case, for example, it should be recognized that the ability of nonnative English speakers to provide credible information may have been limited by the ability to read and understand questions in English.

However, Kuh (2001) asserted that a well-designed survey (with accurately, unambiguously, and clearly worded items that do not threaten, embarrass, or violate the privacy of respondents) prompts students to provide credible responses. Further, Kuh (2001) pointed out that students generally respond carefully, accurately, and with personal interest, and the information they provide about their experiences is valuable for educational research. Thus in this study, validity threats related to self-reported data were addressed through reliance on the SSSL survey design and administration procedures, which had focused on precision, unambiguity, relevance to student experiences, and preservation of privacy.

Survey Validity

This study utilized an instrument created for the SSSL project. The SSSL survey validity was established through the use of established research-based and national survey sources for the scales used to measure the survey constructs, on the one hand, and a factor analysis of survey items and a pilot study, on the other hand. First, the self-efficacy scales were adapted from the scales by Sherer at al. (1982) and measures comprising the Campus Life and Learning Survey (Bryant et al., 2006). The social capital construct was measured

based on social capital construct items in the CIRP Freshman Survey developed by the Higher Education Research Institute (2011). Finally, transfer capital was measured based on the scales of the L-TSQ (Laanan, 2007). The survey instrument was finalized using EFA. In addition, a pilot study including 565 students from five community colleges in Iowa was conducted to review the survey design and data for reliability and validity. Thus, the final versions of the SSSL survey instrument was based on research literature, commonly used and established national surveys, a pilot study, and a check for reliability and validity.

Construct Validity

Creswell (2009) refers to construct validity as the degree to which items measure hypothetical constructs or concepts. In this study, construct validity was evaluated based on previous research and statistical indicators of construct reliability. The construct validity of this study's constructs measuring academic engagement, socioeconomic characteristics, classroom experiences, and persistence was established through reliance on the theoretical models of academic engagement (Astin, 1984, 1993; Pascarella, 1985; Pascarella & Terenzini, 2005; Tinto, 1993) and the findings of related empirical research studies that supported the choice of items measuring the study constructs. Thus, the items measuring student engagement and socioeconomic status were selected based on Astin's (1993) I–E–O model, Pascarella's (1985) model of student engagement, and Tinto's (1993) model of academic and social integration. The specific items were verified by the use of similar items in established national surveys of student engagement, for example NSSE and CCSSE, that include measures and scales of student background characteristics, socioeconomic status, and educational aspirations. In addition, the choice of the measures was informed by a review of empirical studies including, but not limited to, studies by Barbatis (2010), Bers and Smith

(1991), DaPeppo (2009), Ellis et al. (2005), Kuh et al. (2008), Mamiseishvili (2012), Ullah and Wilson (2007), and Zhao et al. (2005).

Furthermore, construct validity was supported by previous studies utilizing SSSL data in factor analysis of models that incorporated constructs construed from some of the items selected for this study. For example, Myers (2013) used selected items related to faculty engagement and peer engagement in her predictive model for community college students' STEM aspirations. CFA of the model, which comprised the constructs of faculty engagement and peer engagement, among others, found in Myers's study based on a different SSSL dataset, resulted in a model with strong engagement constructs and a good model fit. Chen (2014) employed a SSSL dataset to study the influence of self-efficacy on degree aspirations of domestic and international students and selected some of the items considered as measures of parental support and persistence/achievement orientation in this study. Chen's models were confirmed through rigorous factor analysis. Overall, these provided empirical evidence that survey items and measures developed based on these survey items produced valid constructs.

Finally, statistical methods were applied to gauge construct validity as well. As discussed in appropriate sections of this dissertation, criteria for Cronbach's alpha were established and observed to verify the validity of this study's constructs.

Statistical Conclusion Validity

Statistical conclusion validity refers to the validity of statistical inferences from the data that may be threatened by inadequate statistical power or the violation of statistical assumptions (Creswell, 2009; Shadish et al., 2002). Careful crafting of the study design and methodology, as well as evaluation of the data, were performed to minimize the effects of potential threats to statistical conclusion validity. The first step was verification of the data

for compliance with the general assumptions of statistical analyses including the absence of outliers, the absence of multicollinearity, normality, linearity, and homoscedasticity of residuals (Mertler & Vannatta, 2010; Tabachnick & Fidell, 2013). As necessary, data transformation was performed and accounted for.

Second, as suggested by Shadish et al. (2002), study results were reported within 95% confidence intervals. To strengthen the statistical conclusion validity of the study results, effect size estimates were provided and discussed. Third, as described in detail in Chapter 4, criteria for conclusions based on statistical results were set and observed through each step of the analysis.

Delimitations and Limitations of the Study

There were a few study limitations and delimitations that should be discussed with regard to the study's results.

Delimitations

Delimitations were considered to avoid the overgeneralization of research findings to all international students. First, the study results may be applicable to international students enrolled in academic programs at community colleges similar to Sunshine College, i.e., large, multicampus, nonresidential, urban community colleges in southern parts of the United States. This was based on the assumption that international students who attend Sunshine College or similar institutions may have demographic characteristics different from those of international students who attend community colleges in states with a larger share of rural community colleges and states with lower international student enrollment in community colleges. Moreover, international students enrolled in academic programs may differ from international students enrolled in vocational and certificate programs.

Second, no emphasis on within-groups differences based on demographic characteristics, such as age, sociocultural background, or country of origin, may lead to overgeneralization of the study results as well. Third, study results may be limited to specific community college settings based on certain institutional characteristics including, but not limited to, size, the number of campuses, whether the campus is residential or nonresidential, whether it is urban or rural, and whether it has athletic programs.

Limitations

Some of the expected study limitations were associated with the study design. First, limitations arising from the use of secondary data should be recognized. Although the use of secondary data offers certain benefits, such as savings in resources and time (Russ-Eft & Preskill, 2009), the information available for analysis in this study was limited to that available from the secondary SSSL dataset and required the use of proxies and adjustments in research design.

Second, sampling limitations, including convenience sampling and nonresponse bias, were identified and should be accounted for (Creswell, 2009; Russ-Eft & Preskill, 2009). Statistical inference assumes random sampling whereby each participant has an equal probability of being drawn from the population (Creswell, 2009). However, this study utilized a convenience sample of all international student respondents in the original Sunshine College SSSL dataset to provide a large enough sample for analysis.

Nonresponse bias is associated with the fact that the data came from respondents who chose to complete the survey and whose answers may differ from potential answers of those who chose not to complete the survey (Fowler, 2009). Based on available public records, international student enrollment and demographics at Sunshine College at the time SSSL data

were collected (spring of 2013) were estimated and compared to the demographics of the international students who had responded to the survey.

Data from the Sunshine College Office of Institutional Research (2013) website showed that female students accounted for approximately 55.8% of about 41,000 students enrolled at Sunshine College, compared to 69.6% of the students in the study. Students 24 years of age and younger made up 73.8% of the enrolled students, 39.9% of the study participants, and 49.5% of the international students in the sample. In terms of enrollment status, at the time of the data collection approximately 61% of 589 credit-seeking international students at Sunshine College were enrolled full time (defined as being enrolled in 12 or more credit hours in Spring 2013). About 63% of the international study participants indicated that they were enrolled full time. Overall, the demographic profile of the students in the study did not accurately reflect the demographic profile of the enrolled students. In terms of nonresponse bias, this information suggests that nonrespondents included predominantly younger and male students. Previous research has indicated that biases toward female and more mature students are typical in surveys because female and older students are more likely to complete and submit surveys on a voluntary basis than are their male and younger peers (Porter & Whitcomb, 2005).

Third, although according to McClenney (2006) and Nora et al. (2011) a well-crafted survey can provide information on student experiences that other sources of information cannot, such as estimates of students' involvement with others on campus, the survey data employed in this study were self-reported and indirect. Although the use of self-reported data should be acknowledged, there was no reason to consider that the data were questionable or unreliable. According to Kuh (2001), students are credible and accurate

reporters of their own college experiences, providing that the survey questions are unambiguous, clearly worded, and allow respondents to answer them to the best of their knowledge.

Human Subject and Ethical Considerations

This study utilized secondary data collected as part of the large multistage SSSL project. For the project, an Iowa State University Institutional Review Board review was requested with regard to human subject rights, and an approval was obtained (see Appendix D). An exempt status was granted for this study (see Appendix E).

This study utilized de-identified data for which all personal information, including names, e-mail addresses, and college ID numbers, had been removed and unique participant identifiers had been put in place before the dataset became available for the study. Further, student data and analysis results were reported in an aggregate format. It is expected that the above measures were enough to prevent any chance that information from this study might lead to the disclosure of personal information.

Summary

Chapter 3 provided a brief overview of the problem and purpose of the study and research questions in connection with data collection and analysis procedures. In addition, it presented the methodological approach and described the research design and methodology used in the study. Specifically, this chapter discussed the population and the sample, data collection procedures, instrumentation, secondary data used in the study, dependent and independent variables, and data analysis procedures for each research question. The chapter also provided a discussion of the validity and reliability of the study's methodology and results, delimitations and limitations, and ethical considerations.

CHAPTER 4. STUDY RESULTS

Introduction

The purpose of this study was threefold: (a) to examine and compare background demographic characteristics and patterns of academic engagement of international and domestic students; (b) based on insights gained from an interdisciplinary literature review and preliminary data analysis, to develop a conceptual model of academic engagement of international community college students; and (c) to design a culturally sensitive measurement model of academic engagement of international students at community colleges and to conduct goodness-of-fit analyses of the model against SSSL data collected at the research site. This chapter provides a description of the findings of the statistical analyses conducted in this study using the methodologies delineated in Chapter 3 and is organized by sections and subsections corresponding to each of the research questions framing the study and the corresponding quantitative analyses.

The presentation of the findings proceeds as follows: (a) demographic and descriptive statistics for the students in the study, (b) comparative analysis of demographic and descriptive characteristics of domestic and international students at the research site, (c) comparative analysis of patterns of academic engagement of domestic and international students in the study, (d) EFA of variables pertaining to academic engagement of international community college students, and finally, (e) CFA and tests of model fit. The chapter concludes with a summary of analyses and findings.

Descriptive Analysis

The demographic profile of students at Sunshine College participating in the SSSL study was analyzed based on variables related to demographic, socioeconomic, and academic characteristics of surveyed students. IBM SPPS Version 22.0 was used to perform the descriptive analysis. Demographic characteristics included gender, age, ethnicity, marital status, enrollment status, and employment status. Socioeconomic variables included mother's education, father's education, estimated parents' total income, financial concerns, and time at a job. Academic characteristics included level of academic preparedness, self-reported college GPA, and degree aspirations. The level of academic preparedness at the time of the study was estimated based on the number of courses in mathematics and science taken in high school and college as well as developmental education completed. In addition, language development completion and perceived level of language skills were analyzed. The demographics were analyzed for all students in the sample and then disaggregated by domestic students and international students. The results of the descriptive analysis are summarized in Table 4.1. Included are the response frequencies and response rate for each demographic variable. Select measures of central tendency and variation for appropriate ordinal variables—means and standard deviation—are included in Table 4.2.

All Students

The total number of student respondents in this study was 2,169. As described in Chapter 3, the analyses were performed with imputed data, and there was no need to consider missing data. Response rates are used to present the analysis results in this and subsequent subsections.

Demographics. The largest groups of respondent demographics were as follows: female (65.7%), age 25 years and older (60.1%), White ethnicity (31.2%), single marital

Table 4.1

Descriptive Analysis of Demographic Characteristics

Variable	All students		Domestic students		International students	
	n	%	*n*	%	*n*	%
Gender						
Male	744	34.3	677	34.9	56	30.4
Female	1,425	65.7	1,261	65.1	128	69.6
Total	2,169	100.0	1,938	100.0	184	100.0
Age						
17 and younger	14	0.6	14	0.7	0	0
18–24 years old	852	39.3	737	38.1	91	49.5
25–29 years old	418	19.3	371	19.1	40	21.7
30–39 years old	520	24.0	479	24.7	32	17.4
40–54 years old	313	14.4	287	14.8	19	10.3
55 years or older	52	2.4	50	2.6	2	1.1
Total	2,169	100.0	1,938	100.0	184	100.0
Ethnicity						
Hispanic	604	27.8	512	26.4	80	43.5
American Indian/Alaskan Native	15	0.7	15	0.8	0	0
Asian	211	9.7	180	9.3	27	14.7
Black	510	23.5	461	23.8	34	18.5
Native Hawaiian/other Pacific Islander	23	11.0	20	1.0	3	1.6
White	676	31.2	638	32.9	33	17.9
Two or more races	93	4.3	85	4.4	3	1.6
Race/ethnicity unknown	37	1.7	27	1.4	4	2.2
Total	2,169	100.0	1,938	100.0	184	100.0
Enrollment status						
Full time (12 or more credits)	1,066	49.1	925	47.7	116	63.0
Part time (fewer than 12 credits)	1,103	50.9	1,013	52.3	68	37.0
Total	2,169	100.0	1,938	100.0	184	100.0
Marital status						
Married	470	21.7	401	20.7	58	31.5
Living together (not married)	309	14.2	298	15.4	10	5.4
Single, never married	1,210	55.8	1,078	55.6	105	57.1
Divorced/separated/widowed	180	8.3	161	8.3	11	6.0
Total	2,169	100.0	1,938	100.0	184	100.0
Employment status						
Yes, currently working on campus	87	4.0	73	3.8	12	6.5
Yes, currently working off campus	1,213	55.9	1,087	56.1	103	56.0
No, not looking for employment	313	14.4	279	14.4	24	13.0
No, unemployed but looking for employment	556	25.6	499	25.7	45	24.5
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.1 (continued)

Variable	All students		Domestic students		International students	
	n	%	*n*	%	*n*	%
Mother's education						
Elementary school or less	138	6.4	111	5.7	24	13.0
Some high school	245	11.3	213	11.0	23	12.5
High school graduate	566	26.1	513	26.5	39	21.2
Some college	387	17.8	359	18.5	22	12.1
Associate's degree from 2-year	255	11.8	239	12.4	13	7.1
Bachelor's degree	296	13.6	262	13.5	31	16.8
Some graduate school	25	1.2	22	1.1	3	1.6
Graduate degree	184	8.5	161	8.3	19	10.3
Don't know	73	3.4	58	3.0	10	5.4
Total	2,169	100.0	1,938	100.0	184	100.0
Father's education						
Elementary school or less	137	6.3	114	5.9	19	10.3
Some high school	263	12.1	234	12.1	21	11.4
High school graduate	580	26.7	531	27.4	35	19.0
Some college	329	15.2	304	15.7	21	11.4
Associate's degree from 2-year	199	9.2	184	9.5	10	5.4
Bachelor's degree	270	12.4	230	11.9	36	19.6
Some graduate school	24	1.1	21	1.1	3	1.6
Graduate degree	181	8.3	159	8.2	22	12.0
Don't know	186	8.6	161	8.3	17	9.2
Total	2,169	100.0	1,938	100.0	184	100.0
Estimated total parents' income						
Less than $20,000	290	13.4	249	12.8	34	18.5
$20,000–$39,000	401	18.5	357	18.4	37	20.1
$40,000–$59,000	420	19.4	379	19.6	34	18.5
$60,000–$79,000	419	19.3	391	20.2	21	11.4
$80,000 or more	292	13.5	262	13.5	22	12.0
I don't know	231	10.7	201	10.4	22	12.0
Prefer not to answer	116	5.3	99	5.1	14	7.6
Total	2,169	100.0	1,938	100.0	184	100.0
Financial concerns						
No concern	336	15.5	305	15.7	28	15.2
There are concerns	1,833	84.5	1,633	84.3	156	84.8
Total	2,169	100.0	1,938	100.0	184	100.0
Time at a job per week						
1–10 hours	66	3	60	3.1	5	2.7
11–15 hours	73	3.4	60	3.1	12	6.5
16–20 hours	243	11.2	205	10.6	34	18.5
21–30 hours	701	32.3	637	32.9	45	24.5
More than 30 hours	1,086	50.1	976	50.4	88	47.8
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.1 (continued)

Variable	All students		Domestic students		International students	
	n	%	*n*	%	*n*	%
Level of math preparation, number of courses taken						
0–3 courses	447	20.6	393	20.3	39	21.2
4–6 courses	974	44.9	899	46.4	55	29.9
7–9 courses	613	28.3	531	27.4	73	39.7
10–12 courses	110	5.1	94	4.9	14	7.6
13–15 courses	22	1.0	18	0.9	3	1.6
16–18 courses	3	0.1	3	0.2	0	0
Total	2,169	100.0	1,938	100.0	184	100.0
Level of science preparation, number of courses taken						
0–2 courses	637	29.4	573	29.6	48	26.1
3–4 courses	754	34.8	688	35.5	51	27.7
5–6 courses	559	25.8	490	25.3	56	30.4
7–8 courses	173	8.0	149	7.7	21	11.4
9–10 courses	38	1.8	31	1.6	7	3.8
11–12 courses	8	0.4	7	0.4	1	0.5
Total	2,169	100.0	1,938	100.0	184	100.0
Developmental education						
No	905	41.7	824	42.5	66	35.9
Yes	1,264	58.3	1,114	57.5	118	64.1
Total	2,169	100.0	1,938	100.0	184	100.0
Language development						
No	1,534	70.7	1,415	73.0	90	48.9
Yes	635	29.3	523	27.0	94	51.1
Total	2,169	100.0	1,938	100.0	184	100.0
Perceived language skills level						
Not applicable	16	0.7	15	0.8	1	0.5
In the bottom 10%	11	0.5	10	0.5	1	0.5
Below average but not in bottom 10%	103	4.7	94	4.9	9	4.9
About average	580	26.7	506	26.1	61	33.2
Above average but not in top 10%	889	41.0	791	40.8	73	39.7
In top 10%	570	26.3	522	26.9	39	21.2
Total	2,169	100.0	1,938	100.0	184	100.0
College GPA						
3.75–4.00 (mostly A's)	494	22.8	431	22.2	49	26.6
3.25–3.74 (about half A's, half B's)	785	36.2	699	36.1	70	38.0
2.75–3.24 (mostly B's)	539	24.9	493	25.4	38	20.7
2.25–2.74 (about half B's, half C's)	244	11.2	220	11.4	17	9.2
1.75–2.24 (mostly C's)	52	2.4	48	2.5	4	2.2
1.25–1.74 (about half C's, half D's)	8	0.4	7	0.4	0	0
Less than 1.25 (mostly D's or below)	4	0.2	4	0.2	0	0
Have not taken courses for which grades were given	0	0			0	0
Prefer not to answer	43	2	36	1.9	6	3.3
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.1 (continued)

Variable	All students		Domestic students		International students	
	n	%	*n*	%	*n*	%
Degree aspirations						
Take classes, no degree intended	4	0.2	4	0.2	0	0
Vocational certificate/diploma	9	0.4	9	0.5	0	0
Associate degree	49	2.3	47	2.4	2	1.1
Bachelor's degree	154	7.1	142	7.3	8	4.3
At least a bachelor's degree, maybe more	438	20.2	406	20.9	24	13.0
Master's degree	618	28.5	573	29.6	39	21.2
Doctoral degree	615	28.4	521	26.9	70	38.0
Medical degree	282	13.0	236	12.2	41	22.3
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.2

Select Measures of Central Tendency for Ordinal Demographic Variables

Variable	All students (*n* = 2,169)		Domestic students (*n* = 1,938)		International students (*n* = 184)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Age	3.19	1.19	3.23	1.20	2.92	1.09
Mother's education	4.25	2.05	4.29	2.40	4.25	2.00
Father's education	4.44	2.30	4.42	2.27	4.71	2.51
Estimated parents' total income	3.54	1.72	3.55	1.70	3.45	1.91
Time at a job	4.23	0.98	4.08	1.08	4.24	0.95
Level of math preparation, courses taken	2.21	0.87	2.20	0.86	2.39	0.96
Level of science preparation, courses taken	2.19	1.03	2.17	1.01	2.41	1.14
Perceived language skills level	3.86	3.86	3.86	0.94	3.74	0.90
College GPA	7.55	1.41	7.31	1.79	7.87	1.42
Degree aspirations	6.10	1.27	6.05	1.27	6.58	1.16

status (55.8%), and employed on campus or off campus (59.9%). About half of the students (49.1%) were enrolled full time.

Socioeconomic characteristics. With respect to parents' education level, the largest groups of respondents had mothers and fathers who were high school graduates (26.1% and 26.7%, respectively). About 51.3% of respondents reported estimated total parents' annual income at $59,000 or less. Most of the students (84.5%) expressed concerns about their ability to finance college education, and 82.4% worked at least 21 hour per week, with 50.1% working over 30 hours per week.

Academic characteristics. In the area of academic preparedness, the largest groups were as follows: regarding the level of math preparation, 44.9% had taken four to six courses, and regarding the level of science preparation, 34.8% had taken three or four courses. Overall, the share of students who had completed seven or more courses in math was 34.5%, and the share of students who had completed five or more courses in science was 36.0%. About 58.3% of students reported having taken developmental courses in at least one area (mathematics, reading, or writing). About 29.3% of respondents had completed courses in language development, and 67.3% of students perceived their language skills as above average compared to other students in class. The average self-reported college GPA was approximately at the B level (M = 7.55; see Table 4.2). Provided there were no obstacles, 69.9% of respondents aspired to master's, doctoral, and/or medical degrees.

Domestic Students

The total number of students in the study who were identified as domestic students based on U.S. citizenship and English as a native language was 1,938.

Demographics. The largest groups of respondent demographics were as follows: female (65.1%), age 25 years and older (61.2%), White ethnicity (32.9%); single marital

status (55.6%), and employed on campus or off campus (59.9%). Just under half (47.7%) reported full-time enrollment. The second largest ethnic group was Hispanic (26.4%), followed by Black (23.8%).

Socioeconomic characteristics. Regarding parents' education level, the largest groups of respondents had mothers and fathers who were high school graduates (26.5% and 27.4%, respectively). The shares of respondents whose mothers and fathers had a bachelor's degree or higher were 22.9% and 21.2%, respectively. About 50.8% of domestic students reported estimated total parents' annual income at $59,000 or less. The majority of domestic respondents (84.3%) expressed concerns about their ability to finance college education, and 83.3% of students worked at least 21 hours per week, with 50.4% of them working over 30 hours per week.

Academic characteristics. In the area of academic preparedness, the largest groups were as follows: regarding the level of math preparation, 46.4% had taken four to six courses, and regarding the level of science preparation, 35.5% had taken three or four courses. Overall, the share of domestic students who had completed seven or more courses in math was 33.4%, and the share of students who had completed at least five courses in science was 35.0%. About 57.5% of students indicated that they had completed developmental courses in at least one area (mathematics, reading, or writing). About 27.0% of domestic respondents had completed courses in language development, and 67.7% perceived their language skills to be at least above average compared to other students in class. The average self-reported college GPA was approximately at the B level (M = 7.31, see Table 4.2). Provided there were no obstacles, 68.7% of domestic students aspired to master's and/or higher academic degrees.

International Students

International students were identified based on the status of being permanent resident or an FI/F2 visa holder and having English as a nonnative language. The total number of students in the study identified as international was 184.

Demographics. International students in the study were predominantly female (69.6%), between 18 and 24 years of age (49.5%), and single (57.1%). The majority of international students was enrolled full time (63.0%) and employed on campus or off campus (62.5%). The analysis of ethnic groups represented among international students in the study showed that the largest ethnic group was Hispanic students (43.5%), followed by Black students (18.5%) and White students (17.9%).

Socioeconomic characteristics. Regarding parents' education level, the largest groups of respondents had mothers who were high school graduates (21.2%) and fathers who held a bachelor's degree (19.6%). At 19.0%, students with fathers who were high school graduates were the second largest group among international students. The shares of students whose mothers or fathers held a bachelor's or higher academic degree were 28.7% and 33.2%, respectively. The largest group of respondents (20.1%) estimated that their parents' total annual income was $20,000–$39,000. Overall, about 57.1% of international students reported their parents' total annual income was at $59,000 and less. Most of the students (84.8%) expressed concerns about their ability to finance college education, and 72.3% of students worked at least 21 hour per week, with 47.8% of them working over 30 hours per week.

Academic characteristics. In the area of academic preparedness, 48.9% of international students had taken at least seven courses in mathematics and 46.1% of students had taken at least five science courses. The largest groups of international respondents had

taken seven to nine courses in mathematics (39.7%) and five or six science courses (30.4%). About 64.1% of international students indicated they had taken developmental courses in at least one area (mathematics, reading, or writing). The share of international students who had completed courses in language development was 51.1%, and 60.9% of international students perceived their language skills to be at least above average compared to other students in class. The average self-reported college GPA was approximately at the B level (M = 7.87), with 26.6% of international students reporting a college GPA of 3.75–4.00 (mostly A's; see Table 4.2). Provided there were no obstacles, a total of 81.5% of respondents aspired to a master's, doctoral, and/or medical degrees.

Summative Descriptive Comparison of Domestic and International Students

Based on a comparison of the response frequencies and rates, as well as means of the variables in the analyses (see Tables 4.1 and 4.2), domestic and international students in the study shared similar characteristics in some areas and were different in other areas. Similarities and deviations in demographic and background variables were found in all three subcategories of general demographic, socioeconomic, and academic characteristics.

In terms of demographics, most students in both groups were female (65.1% of domestic students and 69.6% of international students), single and never married (55.6% of domestic students and 57.1% of international students), and were employed on campus or off campus (59.9% of domestic students and 62.5% of international students). Both domestic and international students came from a less affluent socioeconomic class: Over half the students in both groups indicated that the estimated total annual income of their parents was $59,000 or less. In addition, 43.2% of domestic students and 46.7% of international students indicated that their mothers' level of education was no higher than high school graduate. About 84.5% of students in both groups were concerned that they would be able to finance

college education. Nearly half of the students in these two groups worked more than 30 hours a week. Although noticeably more international students than domestic students reported having completed developmental courses in reading and writing, the majority of students in both groups perceived their language skills to be above average or in the top 10% compared to their classmates (67.7% of domestic students and 60.9% of international students). With an average GPA between 3.24 and 3.75 for both groups, the distributions of self-reported GPA were similar for domestic and international students; however, international students had a somewhat higher mean GPA compared to domestic students (*M* = 7.87 and *M* = 7.31, respectively), and 26.6% of international students indicated a GPA of 3.75–4.00 (mostly A's) compared to 22.2% of domestic students.

The major variation in variables were noted in age, ethnicity, enrollment status, parental education, levels of academic preparedness, developmental education completed, and degree aspirations. Nearly half of the international students were between 18 and 24 years of age (49.5%), whereas 61.2% of domestic students were at least 25 years old. With a mean of 3.19 for domestic students and 2.92 for international students for the variable of age (see Table 4.2), domestic students tended to be older than international students. The share of domestic students who were at least 30 years old was 42.1% compared to 28.8% among international students. Overall older, domestic students attended the community college mostly part time (52.3%), whereas the majority of international students were enrolled full time (63.0%). International students reported an overall higher level of father's education: 33.2% of international students indicated that their fathers held a bachelor's degree or higher, whereas this share of domestic students was 21.2%. The means for the variable of father's education were 4.71 for international students and 4.44 for domestic students (see Table 4.2).

Interestingly, although the means for mother's education variable were the same for both domestic and international students (M = 4.25; see Table 4.2) and the largest subsets of both groups had mothers who were high school graduates, a higher percentage of international students indicated that their mothers held a bachelor's or graduate degree compared to domestic students (28.7% and 22.9%, respectively).

The analysis of the descriptive statistics also revealed differences in academic characteristics of international and domestic students. Overall, international students had completed more courses in mathematics and in science. The percentage of international students who had taken as least seven courses in mathematics over their academic career was 48.9%, compared to 33.4% of domestic students. The largest group of international students (39.7%) had taken seven to nine math courses, and the largest group of domestic students, nearly half (46.4%), had taken four to six math courses. Similarly, for science, the largest group of domestic students (35.5%) had taken three or four science courses, whereas the largest group of international students (30.4%) had taken five or six science courses. Overall, the share of international students who had taken five or more courses in science was 46.1%, compared to 35.0% of domestic students. At the same time, international students participated in developmental education at higher rates than did domestic students. Nearly two-thirds of international students (64.1%) had completed developmental courses in reading, writing, and/or mathematics, whereas the percentage for domestic students was 57.5%. The gap was wider in language development courses for which 51.1%, or about half, of the international students had taken at least one developmental course in reading and/or writing, whereas only 27.0% of domestic students indicated that they had taken developmental courses in reading and/or writing.

Finally, provided there were no obstacles, more international students aspired to higher academic degrees—master's, doctoral, and/or medical—than did domestic students (81.5% and 68.7%, respectively). In terms of highest academic degrees, more international students indicated aspirations for medical degrees compared to domestic students (22.3% and 12.2%, respectively).

The similarities and differences between the demographic, socioeconomic, and academic variables were taken into consideration during further steps of the data analysis.

Comparative Analysis of Demographic Characteristics of Domestic and International Students

The descriptive analysis of the data revealed differences between domestic and international students for a number of demographic, socioeconomic, and academic characteristics. Yet, no definite conclusions could be made about the significance of the similarities and difference of response frequencies and rates between domestic and international students without further analysis. The findings presented in this section are the results of various between-groups comparative statistical analysis techniques, enabled by IBM SPPS Version 22.0, which were applied to further examine the differences and establish if any of them were statistically significant. These techniques included cross-tabulation with Pearson chi-square-tests, *t* tests, and Mann-Whitney *U* tests. The choice of a particular analysis technique was defined by the variable type and compliance with assumptions for the method applied.

Based on the variable type, the choice of the methods was as follows. Cross-tabulation with Pearson chi-square test was utilized to analyze dichotomous and polytomous nominal variables. Independent samples *t* tests were applied to analyze ordinal variables that were normally distributed as measured by skewness and kurtosis. In the cases of ordinal

variables that were not normally distributed, Mann-Whitney *U* tests were used (Mertler & Vannatta, 2010; Morgan et al., 2013; Tabachnick & Fidell, 2013; Urdan, 2010). Appropriate effect size measures were calculated and interpreted for each statistic (Morgan et al., 2013, pp. 102–103).

Appropriate sets of assumptions were checked for each statistical analysis technique, and additional screenings for normality of data were conducted. According to Tabachnick and Fidell (2013), neither skewness nor kurtosis makes a "substantive difference in the analysis for reasonably large samples of around 200 or more respondents" (p. 80). However, based on Mertler and Vannatta's (2010) recommendations as well assumptions and conditions for the use of statistical methods listed by Morgan et al. (2013), and because the sample of international students was close to but still somewhat smaller than the recommended 200, skewness and kurtosis were considered in the choice of statistical analysis techniques.

Because comparative analyses were performed with grouped data, outliers were searched for by univariate analyses within each group (Tabachnick & Fidell, 2013, p. 73). The box plot technique was applied to detect outliers. Cases that contained outliers for a specific variable were excluded from the analysis on that variable but may have been retained for analyses on other variables where no outliers were found in the case.

Cross-tabulation with Pearson Chi-square Tests

Dichotomous demographic, socioeconomic, and academic variables in the analysis were gender, enrollment status, financial concerns, developmental education, and language development. Polytomous nominal variables included ethnicity, marital status, and employment status. Cross-tabulation with Pearson chi-square tests was conducted to analyze the association of these variables with group membership among domestic and international

students. Chi-square tests provided a test of statistical significance. To measure the strength of the association between the two dichotomous variables, the phi statistic was utilized for dichotomous variables, and for nominal variables, Cramer's *V* was used (Morgan et al., 2013). According to Morgan et al. (2013), a phi or Cramer's *V* indicating a strong relationship between the two variables could be close to 1.00 or –1.00, whereas one close to 0 would indicate no relationship (p. 137).

Prior to the Pearson chi-square tests, the necessary data assumptions (that the data for the variables were independent, only nominal variables were analyzed, at least 80% of expected frequencies in cross-tabulation cells were 5 or more for nominal variables, and all expected frequencies in cross-tabulation cells were at least 5 for dichotomous variables) were checked and met (Morgan et al., 2013). Furthermore, the dichotomous variables were screened for extreme distribution of frequencies. According to Tabachnick and Fidell (2013), dichotomous variables with extreme frequency distribution (over 90/10) present a risk of distorted results and should be excluded from analyses (p. 73). All dichotomous demographic variables in this study passed the screening and were included in the comparative analysis. Moreover, the count of observations for each categorical variable in each cross-tabulation cell was over 5 in 80% of cases, which satisfied another necessary assumption for cross-tabulation and Pearson chi-square analysis (Morgan et al., 2013, p. 136). The results of the Pearson chi-square tests for dichotomous and nominal variables of general demographic, socioeconomic, and academic characteristics are presented in the text and tables that follow.

No statistically significant difference between domestic and international students was found in gender, financial concerns, developmental education, and employment status.

(Tables 4.3–4.6). As shown in Table 4.3, in terms of gender, domestic and international students were not significantly different, $\chi^2(1, N = 2{,}122) = 1.504$, $p > .05$. International students were not more likely to express concerns for the ability to finance college education than domestic students, $\chi^2(1, N = 2{,}122) = .034$, $p > .05$ (see Table 4.4).

As Table 4.5 shows, there was no statistically significant difference between domestic and international students in developmental education, , $\chi^2(1, N = 2{,}122) = 3.050$, $p > .05$. International students were not more likely than domestic students to have completed developmental courses in mathematics, reading, or writing.

Table 4.3

Chi-square Analysis of Gender Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Gender				1.504	>.05	1
Male	733	677	56			
Female	1,389	1,261	128			
Total	2,122	1,938	184			

Note. Phi = .027

Table 4.4

Chi-square Analysis of Financial Concerns Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Financial concerns				.034	>.05	1
There are no concerns	333	305	28			
There are concerns	1,789	1,633	156			
Total	2,122	1,938	184			

Note. Phi = 0.004

Table 4.5

Chi-square Analysis of Developmental Education Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Developmental courses taken				3.050	>.05	1
There are no concerns	890	824	66			
There are concerns	1,232	1114	118			
Total	2,122	1,938	184			

Note. Phi = 0.004

Employment status was another variable for which domestic and international students were not significantly different, $\chi^2(1, N = 2{,}122) = 3.509$, $p > .05$. As indicated in Table 4.6, domestic students were not more likely than international students to be employed, as may be expected.

Statistically significant differences between domestic and international students were found in ethnicity, enrollment status, marital status, and language development. As Table 4.7

Table 4.6

Chi-square Analysis of Employment Status Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Employment status				3.509	>.05	3
Yes, I am currently working on campus	85	73	12			
Yes, I am currently working off campus	1190	1,087	103			
No, I am not looking for working opportunities	303	279	24			
No, but I am currently looking for working opportunities	544	499	45			
Total	2,122	1,938	184			

Note. Cramer's *V* = .041.

indicates, there was a statistically significant difference between domestic and international students in ethnicity, $\chi^2(1, N = 2{,}122) = 42.249$, $p < .001$. White students constituted 32.9% of the domestic students, whereas this group made up only 17.9% of international students. At 43.5% and 14.7%, respectively, Hispanic and Asian students accounted for larger shares among international students compared to the shares of 26.4% and 9.3%, respectively, among domestic students (see Table 4.1). The biggest ethnic group among international students was Hispanic students. With Cramer's *V* value of 04, the effect size was considered small (Morgan et al., 2013, pp. 102–103).

Table 4.7

Chi-square Analysis of Ethnicity Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Ethnicity				42.249	<.001	7
Hispanic	592	512	80			
American Indian/ Alaskan Native	15	15	0			
Asian	207	180	27			
Black	495	461	34			
Native Hawaiian or Pacific Islander	23	20	3			
White	671	638	33			
Two or more races	88	85	3			
Race/ethnicity unknown	31	27	4			
Total	2,122	1,938	184			

Note. Cramer's $V = .1411$.

There was a statistically significant difference in enrollment status between domestic and international students, $\chi^2(1, N = 2{,}122) = 15.769$, $p < .001$. As Table 4.8 shows, international students (63.0%) were more likely than expected to be enrolled full time compared to domestic students (47.7%; see Table 4.1). The effect size measured by phi was small or smaller than typical.

Table 4.8

Chi-square Analysis of Enrollment Status Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Employment status				15.769	<.001	1
Full time (12 or more credits)	1,041	925	116			
Part time (fewer than 12 credits)	1,081	1,013	68			
Total	2,122	1,938	184			

Phi = –.086.

The results of the Pearson chi-square test for the difference in marital status between domestic and international students are shown in Table 4.9. According to the results, the marital status of international versus domestic students was significantly different, $\chi^2(1, N = 2{,}122) = 21.743$, $p < .001$. The effect size measured by Cramer's *V* was small (Morgan et al., 2013, p. 140). Compared to domestic students, international students were more likely than expected to be married and less likely than expected to be living together. As Table 4.1 shows, 31.5% of international students were married compared to 20.7% of domestic students and 5.4% of international students were living together with a partner while not married compared to 15.4% of domestic students.

Table 4.9

Chi-square Analysis of Marital Status among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Marital status				21.743	<.001	3
Married	495	401	58			
Living together (not married)	308	298	10			
Single, never married	1,183	1,078	105			
Divorced/separated/ widowed	172	161	11			
Total	2,122	1,938	184			

Phi = –.086.

There was a statistically significant difference between domestic and international students in developmental education in reading and writing, $\chi^2(1, N = 2{,}122) = 47.331$, $p < .001$ (see Table 4.10). International students were more likely than were domestic students to have completed language-related developmental education. As shown in Table 4.1, 51.1% of international students indicated that they had taken developmental courses in writing and reading, whereas only 27.0% of domestic students did so. The effect size of this difference measured by phi was small to medium (Morgan et al., 2013, pp. 102–103).

Table 4.10

Chi-square Analysis of Language Development among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Language development				47.331	<.001	1
No	1,505	1,415	90			
Yes	617	523	94			
Total	2,122	1,938	184			

Phi = .149.

Independent Samples *t* Tests and Mann-Whitney *U* Tests

Independent samples *t* tests and Mann-Whitney *U* tests were performed to analyze ordinal variables to compare domestic and international students with respect to demographic, socioeconomic, and academic characteristics. The ordinal variables in this analysis included age, mother's education, father's education, estimated total parents' income, level of preparation in mathematics, level of preparation in science, perceived language skills, degree aspirations, time at a job, and college GPA.

According to Tabachnick and Fidell (2013), outliers can be found "in both univariate and multivariate situations, among both dichotomous and continuous variables" (p. 72) and

can represent atypical cases. The effects of the outliers on the analysis results sometimes cannot be estimated (Tabachnick and Fidell, 2013). To avoid any potential unknown effects, within-group screening for outliers was conducted using the box plot technique. The results of the box plot analysis and the number of cases containing outliers detected for each group are summarized in Table 4.11. No reasons to consider outliers a legitimate part of the samples were unambiguously identified; hence, the cases containing outliers were excluded from the analysis (Tabachnick & Fidell, 2013). To keep the sample size of international students as large as possible given the analysis assumptions were met and no impact on the results could be produced by outliers, cases that contained outliers for a specific variable were excluded from the analysis on this variable but may have been retained for analyses on other variables for which no outliers were found in the case.

Response frequencies and rates for the ordinal variables for domestic and international students adjusted for outliers are presented in Table 4.12. Response frequencies

Table 4.11

Results of Box Plot Analysis for Outliers, Demographic Variables

Variable	Outliers detected	Number of cases excluded from analysis	
		Domestic students	International students
Age	No	—	—
Mother's education	No	—	—
Father's education	No	—	—
Estimated total parents' income	No	—	—
Level of math preparation	Yes	6	2
Level of science preparation	No	—	—
Perceived language skills	Yes	—	2
Degree aspirations	Yes	3	6
Time at a job	Yes	6	—
College GPA	Yes	15	4

Table 4.12

Descriptive Analysis of Demographic Variables Adjusted for Outliers

Variable	Domestic students		International students	
	n	%	*n*	%
Level of math preparation, number of courses taken				
0–3 courses	393	20.3	39	21.4
4–6 courses	899	46.5	55	30.2
7–9 courses	531	27.5	73	40.1
10–12 courses	94	4.9	14	7.7
13–15 courses	15	0.8	1	0.5
16–18 courses	0	0	0	0
Total	1,932	100.0	182	100.0
Perceived language skills level				
Not applicable	15	0.8	0	0
In the bottom 10%	10	0.5	0	0
Below average but not in the bottom 10%	94	4.9	9	4.9
About average	506	26.1	61	33.5
Above average but not in top 10%	791	40.8	73	40.1
In the top 10%	522	26.9	39	21.4
Total	1,938	100.0	182	100.0
Degree aspirations				
Take classes, no degree intended	1	0.1	0	0
Vocational certificate/diploma	9	0.5	0	0
Associate's degree	47	2.4	0	0
Bachelor's degree	142	7.3	4	2.2
At least a bachelor's degree, maybe more	406	21.0	24	13.5
Master's degree	573	29.6	39	21.9
Doctoral degree	521	26.9	70	39.3
Medical degree	236	12.2	41	23.0
Total	1,935	100.0	178	100.0
Time at a job per week				
1–10 hours	57	3.0	5	2.7
11–15 hours	57	3.0	12	6.5
16–20 hours	205	10.6	34	18.5
21–31 hours	637	33.0	45	24.5
More than 30 hours	976	50.5	88	47.8
Total	1,932	100.0	184	100.0
College GPA				
3.75–4.00 (mostly A's)	431	22.4	49	27.2
3.25–3.74 (about half A's, half B's)	699	36.3	70	38.9
2.75–3.24 (mostly B's)	493	25.6	38	21.1
2.25–2.74 (about half B's, half C's)	220	11.4	17	9.4
1.75–2.24 (mostly C's)	44	2.3	4	2.2
1.25–1.74 (about half C's, half D's)	3	0.2	0	0.0
Less than 1.25 (mostly D's or below)	0	0.0	0	0.0
Have not taken courses for which grades were given	0	0.0	0	0.0
Prefer not to answer	33	1.7	2	1.1
Total	1,923	100.0	180	100.0

and rates for the variables where outliers were not detected can be found in Table 4.1 in the section on descriptive analysis results.

After adjusting for outliers, the data were additionally screened for normality measured by skewness and kurtosis. The assumption of data normality determined the choice of a statistical analysis technique for each demographic and background variable (Mertler & Vannatta, 2010; Morgan et al., 2013; Tabachnick & Fidell, 2013). Skewness tends to have more influence on analyses then does kurtosis, and it is acceptable not to consider kurtosis in checks for data normality (Morgan et al., 2013, p. 51). West et al. (1996) recommended concern for data normality if skewness is outside –2 and 2 and kurtosis is outside –7 and 7. According to Morgan et al. (2013) and Tabachnick and Fidell (2013), skewness values between –1 and 1 should be evidence that the data fall within an acceptable normal distribution range. For this study, acceptable values for skewness were between –1 and 1, and acceptable values for kurtosis were between –7 and 7.

Kurtosis for all ordinal variables in the analysis was within the acceptable range of –7 and 7 and, thus, was not considered a major concern. Skewness, on the other hand, was considered in confirming approximate normality of the data and selecting tests for comparative data analysis. The independent samples *t* test was performed to analyze ordinal variables with skewness between –1 and 1, and the Mann-Whitney *U* test was chosen if this statistic was outside the –1 to 1 range. Basic descriptive statistics for the ordinal variables in the analysis, including skewness, are provided in Table 4.13.

Based on the statistics presented in Table 4.13, all ordinal demographic and background variables except time at a job and college GPA were analyzed using the independent samples *t* test. Because the skewness statistics were outside the acceptable

Table 4.13

Descriptive Statistics of Ordinal Demographic Variables Adjusted for Outliers

Variable	*n*	*M*	*SD*	Skewness	
				Statistic	*SE*
Age	2,122	3.200	1.190	0.451	0.053
Mother's education	2,122	4.260	2.037	0.581	0.053
Father's education	2,122	4.440	2.297	0.608	0.053
Estimated total parents' income	2,122	3.540	1.720	0.262	0.053
Level of math preparation	2,114	2.214	0.872	0.526	0.053
Level of science preparation	2,122	2.194	1.027	0.657	0.053
Perceived language skills	2,120	3.856	3.856	–0.770	0.053
Degree aspirations	2,113	6.110	6.110	–0.527	0.053
Time at a job	2,116	4.240	0.984	–1.453	0.053
College GPA	2,103	2.480	1.410	2.092	0.053

range of -1 and 1, comparative analysis on time at a job and college GPA was performed using the Mann-Whitney *U* test.

Independent samples *t* test results. The results of the independent samples *t* tests are summarized in Table 4.14. The results were interpreted based on the assumption for the equality of variances in the two groups satisfied. The Levene's test for equality of variances, conducted automatically by SPSS, was used to check this assumption. For cases in which the assumption of equal variances was not met, the adjusted statistics were considered and reported in Table 4.14.

As Table 4.14 shows, domestic and international students were significantly different regarding age, level of preparation in mathematics and science, and degree aspirations ($p < .05$). Overall, international students tended to be younger than domestic students ($M = 2.920$ and $M = 3.230$, respectively; $p < .001$). The effect size measured by Cohen's *d*, was approximately .3, which indicates a small to medium effect (Morgan et al., 2013,

Table 4.14

Independent Samples t-Test Analysis of Ordinal Variables for Domestic and International Students

Variable	*M*	*SD*	*t*	*df*	*p*	95% CI
Age			3.638[a]	227.303[a]	.000	[.141, .474]
Domestic students	3.230	1.196				
International students	2.920	1.086				
Mother's education			–0.190[a]	207.956[a]	.849	[–.394, .325]
Domestic students	4.253	2.000				
International students	4.288	2.395				
Father's education			–1.508[a]	212.434[a]	.133	[–.669, .089]
Domestic students	4.416	2.274				
International students	4.707	2.514				
Estimated total parents' income			0.690[a]	211.501[a]	.491	[–.187, .389]
Domestic students	3.546	1.701				
International students	3.446	1.910				
Level of math preparation			–2.327[a]	210.335[a]	.021	[–.305, –.025]
Domestic students	2.192	0.840				
International students	2.386	0.957				
Level of science preparation			–2.695[a]	211.587[a]	.008	[–.406–.063]
Domestic students	2.173	1.014				
International students	2.408	1.137				
Perceived language skills			1.175	2,118	.240	[–.057.226]
Domestic students	3.865	0.936				
International students	3.780	0.838				
Degree aspirations			–6.326	2,111	.000	[–.801–.422]
Domestic students	6.06	1.250				
International students	6.67	1.044				

[a]The *t* and *df* values were adjusted because variances were not equal.

pp. 102–103). In terms of preparation in mathematics and science, the results revealed that on average, international students had taken more math and science courses than had domestic students (math: $M = 2.386$ compared to $M = 2.192$; science: $M = 2.408$ compared to $M = 2.173$, respectively; $p < .05$). The effect size for the differences in the levels of preparation in mathematics and in science was $d = .2$ for both statistics, which indicates a small effect (Morgan et al., 2013, pp. 102–103).

International students were significantly different from domestic students regarding degree aspirations. On average, international students aspired for higher academic degrees than did domestic students (M = 6.67 and M = 6.06, respectively; $p < .001$). The combined share of international students aspiring to doctoral and medical degrees was 60.3% compared to 39.1% of students aspiring to these degrees among domestic students (see Table 4.12). Cohen's d was .5 which indicates a medium effect (Morgan et al., 2013, pp. 102–103).

As shown in Table 4.14, no statistically significant differences between domestic and international students were found with respect to the levels of mother's and father's education, estimated total parents' income, and perceived language skills.

Mann-Whitney *U* test results. Because the dependent variables of time at a job and college GPA violated the assumption of approximately normal distribution required for independent samples t tests, nonparametric Mann-Whitney U tests were performed to compare domestic and international students on these two variables. The assumptions of the Mann-Whitney test, including an underlying continuity of rankings from low to high in the dependent variables and independence of data scores (Morgan et al., 2013), were checked and met. According to the analysis results, domestic and international students were not significantly different regarding the number of hours they worked per week ($p > .05$; see Table 4.15).

Table 4.15

Mann-Whitney U Test Analysis of Time at a Job among Domestic and International Students

Variable	Mean rank	Mann-Whitney *U*	Asymp. sig. (2-tailed) *p*
Time at a job, hours per week		164289.000	.063
Domestic students	1065.46		
International students	985.38		

The Mann-Whitney *U* test results, however, revealed a statistically significant difference regarding college GPA between domestic and international students (Table 4.16). International students had higher mean ranks (1134.71) than did domestic students (1044.29) on self-reported college GPA, $U = 158235.500$, $p = .047$, $r = –0.04$. According to Morgan et al. (2013), the effect size is considered quite small or smaller than typical.

Table 4.16

Mann-Whitney U Test Analysis of College GPA among Domestic and International Students

Variable	Mean rank	Mann-Whitney *U*	Asymp. sig. (2-tailed) *p*
College GPA		158235.500	.047
Domestic students	1044.29		
International students	1134.41		

The between-groups analysis of the demographic differences between domestic and international students confirmed some of the descriptive results. International and domestic students were found to be statistically different with respect to age, ethnicity, marital status, enrollment status, level of preparedness in mathematics and science, participation in language development education, degree aspirations, and self-reported GPA. The effect size of these results was mostly small to medium.

No statistically significant differences between domestic and international students were found with respect to gender; socioeconomic background, including parents' education, estimated parents' income, and financial concerns; employment status and time at a job; participation in developmental education overall; and perceived language skills.

Comparative Analysis of Academic Engagement Patterns of Domestic and International Students

This section presents the results of the between-groups comparative analyses pertaining to variables that were selected to examine patterns of academic engagement of students in the study. These variables included groups of items related to time invested in college work; interaction with faculty, interaction with advisors; engaging in interactive academic practices; and engaging in individual academic pursuit. A comparative analysis of these variables for domestic and international students was conducted using IBM SPPS Version 22.0. Response frequencies and rates for academic engagement variables for all students in the study, domestic students, and international students are provided in Table 4.17. Select measures of central tendency variation—means and standard deviations—for appropriate ordinal variables are shown in Table 4.18.

The analysis procedures used to compare domestic and international students with respect to the study variables measuring various aspects of academic engagement were founded on the principles described previously relating to the comparison of demographic and background characteristics. The SPPS Version 22.0 statistical analyses were performed to examine differences between domestic and international students and to establish if any were statistically significant. Again, these techniques included cross-tabulation with Pearson chi-square-tests, *t* tests, and Mann-Whitney *U* tests. The choice of a particular analysis technique was determined by variable type and compliance with assumptions for the method applied.

Based on the variable type, the choice of the methods was as follows. Cross-tabulation with Pearson chi-square test was utilized to analyze dichotomous variables. Independent samples *t* tests were applied to analyze ordinal variables that were normally

Table 4.17

Descriptive Analysis of Academic Engagement Variables

Variable	All students		Domestic students		International Students	
	n	%	*n*	%	*n*	%
Time on campus, per week						
None	405	18.7	367	18.9	27	14.7
1– 3 hours	720	33.2	653	33.7	55	29.9
4–6 hours	565	26.0	512	26.4	46	25.0
7–9 hours	219	10.1	192	9.9	21	11.4
10–12 hours	109	5.0	89	4.6	14	7.6
More than 12 hours	151	7.0	125	6.4	21	11.4
Total	2,169	100.0	1,938	100.0	184	100.0
Time spent studying or preparing for class, per week						
1–5 hours	686	31.6	619	31.9	51	27.7
6–10 hours	705	32.5	639	33.0	51	27.7
11–15 hours	398	18.3	355	18.3	36	19.6
16–20 hours	207	9.5	176	9.1	28	15.2
More than 20 hours	173	8.0	149	7.7	18	9.8
Total	2,169	100.0	1,938	100.0	184	100.0
Visited faculty and sought their advice						
Never or very rarely	835	38.5	757	39.1	59	32.1
A few times per semester	605	27.9	559	28.8	35	19.0
About once a month	318	14.7	283	14.6	28	15.2
Several times a month	290	13.4	248	12.8	36	19.6
Several times a week	121	5.6	91	4.7	26	14.1
Total	2,169	100.0	1,938	100.0	184	100.0
Approached faculty outside class						
Never or very rarely	947	43.7	847	43.7	73	39.7
A few times per semester	610	28.1	565	29.2	38	20.7
About once a month	277	12.8	244	12.6	28	15.2
Several times a month	224	10.3	191	9.9	29	15.8
Several times a week	111	5.1	91	4.7	16	8.7
Total	2,169	100.0	1,938	100.0	184	100.0
Discussed career plans with faculty						
Never or very rarely	890	41.0	800	41.3	70	38.0
A few times per semester	676	31.2	622	32.1	38	20.7
About once a month	313	14.4	278	14.3	30	16.3
Several times a month	194	8.9	163	8.4	30	16.3
Several times a week	96	4.4	75	3.9	16	8.7
Total	2,169	100.0	1,938	100.0	184	100.0
Asked instructor for comments/criticism						
Never or very rarely	551	25.4	498	25.7	47	25.5
A few times per semester	594	27.4	541	27.9	36	19.6
About once a month	414	19.1	380	19.6	28	15.2
Several times a month	388	17.9	337	17.4	43	23.4
Several times a week	222	10.2	182	9.4	30	16.3
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.17 (continued)

Variable	All students		Domestic students		International Students	
	n	%	*n*	%	*n*	%
Met with advisor on a regular basis						
Strongly disagree	368	17.0	336	17.3	20	10.9
Disagree	364	16.8	339	17.5	18	9.8
Slightly disagree	302	13.9	284	14.7	16	8.7
Neither agree nor disagree	414	19.1	370	19.1	37	20.1
Slightly agree	301	13.9	262	13.5	34	18.5
Agree	229	10.6	192	9.9	29	15.8
Strongly agree	191	8.8	155	8.0	30	16.3
Total	2,169	100.0	1,938	100.0	184	100.0
Talked with an advisor about courses to take, requirements, and education plans						
Strongly disagree	169	7.8	156	8.0	10	5.4
Disagree	83	3.8	71	3.7	8	4.3
Slightly disagree	59	2.7	50	2.6	8	4.3
Neither agree nor disagree	266	12.3	238	12.3	21	11.4
Slightly agree	462	21.3	437	22.5	19	10.3
Agree	610	28.1	542	28.0	56	30.4
Strongly agree	520	24.0	444	22.9	62	33.7
Total	2,169	100.0	1,938	100.0	184	100.0
Studied with other students in the class						
Not used/not applicable	914	42.1	826	42.6	74	40.2
Used, not helpful	221	10.2	197	10.2	19	10.3
Used, somewhat helpful	554	25.5	499	25.7	44	23.9
Used, very helpful	480	22.1	416	21.5	47	25.5
Total	2,169	100.0	1,938	100.0	184	100.0
Received informal tutoring outside class						
Not used/not applicable	1,125	51.9	1,011	52.2	88	47.8
Used, not helpful	172	7.9	152	7.8	17	9.2
Used, somewhat helpful	460	21.2	411	21.2	39	21.2
Used, very helpful	412	19	364	18.8	40	21.7
Total	2,169	100.0	1,938	100.0	184	100.0
Received academic support outside class						
Not used/not applicable	1,118	51.5	999	51.5	94	51.1
Used, not helpful	156	7.2	138	7.1	16	8.7
Used, somewhat helpful	439	20.2	393	20.3	35	19.0
Used, very helpful	456	21	408	21.1	39	21.2
Total	2,169	100.0	1,938	100.0	184	100.0
Used regular feedback from TA or professor						
Not used/not applicable	852	39.3	771	39.8	66	35.9
Used, not helpful	231	10.7	208	10.7	20	10.9
Used, somewhat helpful	540	24.9	490	25.3	38	20.7
Used, very helpful	546	25.2	469	24.2	60	32.6
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.17 (continued)

Variable	All students		Domestic students		International Students	
	n	%	*n*	%	*n*	%
Spent more time studying						
Not used/not applicable	114	5.3	106	5.5	7	3.8
Used, not helpful	172	7.9	156	8.0	13	7.1
Used, somewhat helpful	744	34.3	685	35.3	45	24.5
Used, very helpful	1,139	52.5	991	51.1	119	64.7
Total	2,169	100.0	1,938	100.0	184	100.0
Taught myself to study more effectively						
Not used/not applicable	316	14.6	305	15.7	9	4.9
Used, not helpful	190	8.8	173	8.9	13	7.1
Used, somewhat helpful	729	33.6	662	34.2	54	29.3
Used, very helpful	934	43.1	798	41.2	108	58.7
Total	2,169	100.0	1,938	100.0	184	100.0
Did all of the assigned reading						
Not used/not applicable	262	12.1	249	12.8	11	6.0
Used, not helpful	302	13.9	281	14.5	15	8.2
Used, somewhat helpful	717	33.1	645	33.3	55	29.9
Used, very helpful	888	40.9	763	39.4	103	56.0
Total	2,169	100.0	1,938	100.0	184	100.0
Increased lecture attendance						
Not used/not applicable	423	19.5	396	20.4	16	8.7
Used, not helpful	269	12.4	241	12.4	21	11.4
Used, somewhat helpful	545	25.1	497	25.6	36	19.6
Used, very helpful	932	43	804	41.5	111	60.3
Total	2,169	100.0	1,938	100.0	184	100.0
Studied by myself						
Not used/not applicable	119	5.5	111	5.7	6	3.3
Used, not helpful	342	15.8	319	16.5	15	8.2
Used, somewhat helpful	787	36.3	717	37.0	53	28.8
Used, very helpful	921	42.5	791	40.8	110	59.8
Total	2,169	100.0	1,938	100.0	184	100.0

Table 4.18

Select Measures of Central Tendency for Ordinal Academic Engagement Variables

Variable	All students (n = 2,169)		Domestic students (n = 1,938)		International students (n = 184)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Time on campus, per week	2.70	1.39	2.67	1.36	3.02	1.53
Time spent studying or preparing for class, per week	2.30	1.23	2.28	1.22	2.52	1.31
Visited faculty and sought their advice	2.20	1.24	2.15	1.20	2.65	1.46
Approached faculty outside class	2.05	1.20	2.03	1.18	2.33	1.37
Discussed career plans with faculty	2.05	1.14	2.01	1.11	2.37	1.36
Asked instructor for comments/criticism	2.59	1.31	2.57	1.29	2.85	1.45
Met with advisor on a regular basis	3.63	1.88	3.56	1.86	4.34	1.90
Talked with an advisor about courses to take, requirements, and plans	5.16	1.74	5.13	1.74	5.43	1.74
Studied with other students in the class	2.28	1.22	2.26	1.22	2.35	1.25
Received informal tutoring outside class	2.07	1.22	2.07	1.22	2.17	1.24
Received academic support outside class	2.11	1.24	2.11	1.25	2.10	1.24
Used regular feedback from TA or professor	2.36	1.23	2.34	1.23	2.50	1.28
Spent more time studying	3.34	.84	3.32	.84	3.50	.79
Taught myself to study more effectively	3.05	1.05	3.01	1.06	3.42	.83
Did all of the assigned reading	3.03	1.02	2.99	1.03	3.36	.87
Increased lecture attendance	2.92	1.15	2.88	1.16	3.32	.96
Studied by myself	3.16	.88	3.13	.87	3.45	.78

distributed as measured by skewness and kurtosis. If ordinal variables were not normally distributed, Mann-Whitney *U* tests were used (Mertler & Vannatta, 2010; Morgan et al., 2013; Tabachnick & Fidell, 2013; Urdan, 2010). Appropriate effect size measures were calculated and interpreted for each statistic (Morgan et al., 2013, pp. 102–103).

Appropriate sets of assumptions were checked for each statistical analysis technique, and additional screenings for normality of data were conducted. According to Tabachnick and Fidell (2013), neither skewness nor kurtosis makes a "substantive difference in the analysis for reasonably large samples of 200 or more respondents" (p. 80). However, based

on Mertler and Vannatta's (2010) recommendations, assumptions and conditions for the use of statistical methods listed by Morgan et al. (2013) and, because the sample of international students was close to but still somewhat smaller than the recommended 200, skewness and kurtosis were considered in the choice of statistical analysis techniques.

Because comparative analyses were performed with grouped data, outliers were searched for in univariate analyses within each group (Tabachnick & Fidell, 2013, p. 73). The box plot technique was applied to detect outliers. Cases that contained outliers for a specific variable were excluded from the analysis on this variable but may have been retained for analyses on other variables where no outliers were found in the case.

Independent Samples *t* Tests and Mann-Whitney *U* Tests

All the original variables measuring academic engagement of the students in this study were classified as ordinal. A total of 17 variables were selected for the analysis; these variables were grouped as follows:

- Time invested in college including (a) time on campus and (b) time spent studying and preparing for class;
- Interaction with faculty including (c) visited faculty and sought their advice, (d) approached faculty outside class, (e) discussed career plans with faculty, and (f) asked instructor for comments/criticism;
- Interaction with advisors including (g) met with advisor on a regular basis and (h) talked with an advisor about courses to take, requirements, and education plans;
- Use of interactive academic practices including (i) studied with other students in the class, (j) received informal tutoring outside class, (k) received academic support outside class, and (l) used regular feedback from TA or professor;

- Use of non-interactive academic practices including (m) spent more time studying, (n) taught myself to study more effectively, (o) did all of the assigned reading, (p) increased lecture attendance, and (q) studied by myself.

Independent samples *t*-tests and Mann-Whitney *U* tests were performed to compare domestic and international students with respect to academic engagement.

Within-group screening for outliers was conducted using the box plot technique. The results of the box plot analysis and the number of cases containing outliers detected for each group are summarized in Table 4.19. No reasons to consider outliers a legitimate part of the samples were unambiguously identified; hence, the cases containing outliers were excluded from the analysis (Tabachnick & Fidell, 2013). To keep the sample size of international students as large as possible, given the analysis assumptions were met and no impact on the results could be produced by outliers, cases that contained outliers for a specific variable were excluded from the analysis on that variable but may have been retained for analyses on other variables for which no outliers were found in the case.

Response frequencies and rates for the academic engagement variables for domestic and international students adjusted for outliers are presented in Table 4.20. Response frequencies and rates for the variables for which outliers were not detected can be found in Table 4.17.

After adjusting for outliers, the data were additionally screened for normality measured by skewness and kurtosis. The normality assumption determined the choice of a statistical analysis technique for each academic engagement variable (Mertler & Vannatta, 2010; Morgan et al., 2013; Tabachnick & Fidell, 2013). Skewness tends to have more influence on analyses than does kurtosis, and it is acceptable not to consider kurtosis in

Table 4.19

Results of Box Plot Analysis for Outliers, Academic Engagement Variables

Variable	Outliers detected	Number of cases excluded from analysis	
		Domestic students	International students
Time on campus, per week	Yes	6	0
Time spent studying or preparing for class, per week	No	-	-
Visited faculty and sought their advice	No	-	-
Approached faculty outside class	No	-	-
Discussed career plans with faculty	No	-	-
Asked instructor for comments/criticism	No	-	-
Met with advisor on a regular basis	No	-	-
Talked with an advisor about courses to take, requirements, and plans	No	-	-
Studied with other students in the class	No	-	-
Received informal tutoring outside class	No	-	-
Received academic support outside class	No	-	-
Used regular feedback from TA or professor	No	-	-
Spent more time studying	Yes	3	3
Taught myself to study more effectively	Yes	3	3
Did all of the assigned reading	Yes	0	4
Increased lecture attendance	Yes	0	4
Studied by myself	Yes	3	3

Table 4.20

Adjusted Response Frequencies and Rates of Academic Engagement Variables for Domestic and International Students

Variable	Domestic students		International students	
	n	%	*n*	%
Time on campus, per week				
None	367	19.0	27	14.7
1–3 hours	653	33.8	55	29.9
4–6 hours	512	26.5	46	25.0
7–9 hours	192	9.9	21	11.4
10–12 hours	86	4.5	14	7.6
More than 12 hours	122	6.3	21	11.4
Total	1,932	100.0	184	100.0
Spent more time studying				
Not used/not applicable	103	5.3	4	2.2
Used, not helpful	156	8.1	13	7.2
Used, somewhat helpful	685	35.4	45	24.9
Used, very helpful	991	51.2	119	65.7
Total	1,935	100.0	181	100.0
Taught myself to study more effectively				
Not used/not applicable	302	15.6	6	3.3
Used, not helpful	173	8.9	13	7.2
Used, somewhat helpful	662	34.2	54	29.8
Used, very helpful	798	41.2	108	59.7
Total	1,935	100.0	181	100.0
Did all of the assigned reading				
Not used/not applicable	249	12.8	7	3.9
Used, not helpful	281	14.5	15	8.3
Used, somewhat helpful	645	33.3	55	30.6
Used, very helpful	763	39.4	103	57.2
Total	1,938	100.0	180	100.0
Increased lecture attendance				
Not used/not applicable	396	20.4	12	6.7
Used, not helpful	241	12.4	21	11.7
Used, somewhat helpful	497	25.6	36	20.2
Used, very helpful	804	41.5	111	61.7
Total	1,938	100.0	180	100.0
Studied by myself				
Not used/not applicable	108	5.6	3	1.7
Used, not helpful	319	16.5	15	8.3
Used, somewhat helpful	717	37.1	53	29.3
Used, very helpful	791	40.9	110	60.8
Total	1,935	100.0	181	100.0

checks for data normality (Morgan et al., 2013, p. 51). West et al. (1996) recommended concern for data normality if skewness is outside –2 and 2 and kurtosis is outside –7 and 7. According to Morgan et al. (2013) and Tabachnick and Fidell (2013), skewness values between –1 and 1 should be evidence that the data fall within an acceptable normal distribution range. For this study, acceptable values for skewness were between –1 and 1, and acceptable values for kurtosis were between –7 and 7.

Kurtosis for all ordinal academic engagement variables was within the acceptable range of –7 and 7 and was not a concern. Skewness, on the other hand, was considered in confirming approximate normality of the data and selecting tests for comparative data analysis. An independent samples *t* test was performed to analyze ordinal variables with skewness between –1 and 1, and the Mann-Whitney *U* test was chosen if this statistic was outside the –1 to 1 range. Basic descriptive statistics for the academic engagement variables in the analysis, including skewness, are provided in Table 4.21.

As a result, differences between domestic and international students with respect to two academic engagement variables—talked with an advisor about courses to take, requirements, and educational plans and spent more time studying—were analyzed using the Mann-Whitney *U* test because the skewness statistics for these variables were outside the acceptable range of -1 and 1. The independent samples *t* tests were conducted to examine differences between domestic and international students on the other academic engagement variables selected for the analysis.

Independent samples *t* tests results. The results of the independent samples *t* tests conducted to examine differences between domestic and international students with respect to academic engagement variables are shown in Table 4.22. The results were interpreted

Table 4.21

Descriptive Statistics of Ordinal Academic Engagement Variables Adjusted for Outliers

Variable	*n*	*M*	*SD*	Skewness	
				Statistic	*SE*
Time on campus, per week	2,116	2.690	1.372	0.874	0.053
Time spent studying or preparing for class, per week	2,122	2.520	1.306	0.463	0.053
Visited faculty and sought their advice	2,122	2.650	1.456	0.280	0.053
Approached faculty outside class	2,122	2.330	1.365	0.594	0.053
Discussed career plans with faculty	2,122	2.370	1.361	0.542	0.053
Asked instructor for comments/criticism	2,122	2.850	1.447	0.073	0.053
Met with advisor on a regular basis	2,122	4.340	1.901	-0.313	0.053
Talked with an advisor about courses to take, requirements, and education plans	2,122	5.430	1.742	-1.170	0.053
Studied with other students in the class	2,122	2.270	1.217	0.204	0.053
Received informal tutoring outside class	2,122	2.070	1.219	0.488	0.053
Received academic support outside class	2,122	2.110	1.244	0.452	0.053
Used regular feedback from TA or professor	2,122	2.350	1.231	0.107	0.053
Spent more time studying	2,116	3.340	0.830	-1.244	0.053
Taught myself to study more effectively	2,116	3.050	1.047	-0.860	0.053
Did all of the assigned reading	2,118	3.030	1.016	-0.748	0.053
Increased lecture attendance	2,118	2.920	1.149	-0.612	0.053
Studied by myself	2,116	3.160	0.876	-0.791	0.053

based on the assumption for the equality of variances in the two groups satisfied. The Levene's test for equality of variances, conducted automatically by SPSS, was used to check this assumption. For cases in which the assumption of equal variances was not met, the adjusted statistics were considered (see Table 4.22).

Table 4.22

Independent Samples t Test Analysis of Academic Engagement Variables for Domestic and International Students

Variable	*M*	*SD*	*t*	*df*	*p*	95% CI
Time on campus, per week			–3.046[a]	211.097[a]	.003	[–.587, –.126]
Domestic students	2.660	1.352				
International students	3.020	1.531				
Time spent studying or preparing for class, per week			–2.399[a]	214.327[a]	.017	[–.438, –.043]
Domestic students	2.280	1.218				
International students	2.520	1.306				
Visited faculty and sought their advice			–4.464[a]	207.428[a]	.000	–.713, –.276]
Domestic students	2.150	1.204				
International students	2.650	1.456				
Approached faculty outside class			–2.927[a]	209.555[a]	.004	[–.510, –.100]
Domestic students	2.030	1.175				
International students	2.330	1.365				
Discussed career plans with faculty			–3.427[a]	206.958[a]	.001	[–.559, –.151]
Domestic students	2.010	1.114				
International students	2.370	1.361				
Asked instructor for comments/criticism			–2.573[a]	211.684[a]	.011	[–.503, –.067]
Domestic students	2.570	1.293				
International students	2.850	1.447				
Met with advisor on a regular basis			–5.727	2,120	.000	[–1.106, –.542]
Domestic students	3.560	1.861				
International students	4.380	1.901				
Studied with other students in the class			–.929	2,120	.353	[–.271, .097]
Domestic students	2.260	1.215				
International students	2.350	1.245				

Table 4.22 (continued)

Variable	*M*	*SD*	*t*	*df*	*p*	95% CI
Received informal tutoring outside class			–1.089	2,120	.276	[–.287, .082]
Domestic students	2.070	1.217				
International students	2.170	1.241				
Received academic support outside class			.053	2,120	.958	[–.183, .193]
Domestic students	2.110	1.245				
International students	2.100	1.244				
Used regular feedback from TA or professor			–1.695	2,120	.090	[–.347, .025]
Domestic students	2.340	1.227				
International students	2.500	1.276				
Taught myself to study more effectively			–7.202[a]	248.789[a]	.000	[–.570, –.325]
Domestic students	3.010	1.061				
International students	3.460	0.771				
Did all of the assigned reading			–6.525[a]	236.837[a]	.000	[–.546, –.293]
Domestic students	2.990	1.026				
International students	3.410	0.804				
Increased lecture attendance			–6.520[a]	233.551[a]	.000	[–.631, –.338]
Domestic students	2.880	1.159				
International students	3.370	0.933				
Studied by myself			–6.290[a]	233.833[a]	.000	[–.472, –.247]
Domestic students	3.130	0.883				
International students	3.490	0.720				

[a]The values for *t* and *df* were adjusted because variances were not equal

The independent samples *t* test results presented in Table 4.22 indicate that domestic and international students were significantly different with respect to most of the academic engagement variables. Specifically, there was a statistically significant difference between domestic and international students regarding time invested in college, including time on campus and time spent studying or preparing for class. With means of 3.02 and 2.66, respectively, international students spent more time on campus ($p < .01$) than did domestic students. The effect size measured by Cohen's *d*, was approximately .25 which indicates a

small effect (Morgan et al., 2013, pp. 102–103). In addition, international students invested more time in studying or preparing for classes than did domestic students (M = 2.52 and M = 2.28, respectively; $p < .05$). With a Cohen's d value of .19, the effect size for this result was small (Morgan et al., 2013, pp. 102–103).

Overall, international students at this community college appeared to interact more with faculty than did domestic students. According to the analysis results, there was a statistically significant difference between international and domestic students with respect to visiting faculty and seeking their advice ($p < .001$), approaching faculty outside of class ($p < .01$), discussing career plans with faculty ($p = 0.001$), and asking faculty for comments about student work ($p < .05$). The effect size measured by Cohen's d for the first variable (visited faculty and sought their advice) was .37, which indicates a small to medium effect. Cohen's d for the remaining three variables ranged between .20 and .29 which indicates a small effect. International students were also significantly different from domestic students with respect to interacting with advisors, namely regarding meeting with advisors on a regular basis (M = 4.38 and M = 3.5, respectively; $p < .001$). The Cohen's d value was .44 which indicates a medium to typical effect (Morgan et al., 2013, pp. 102–103).

As indicated in Table 4.22, international and domestic students at this community college were not significantly different regarding the use of interactive academic practices including studying with other students, receiving informal tutoring or academic support outside of class, and using regular feedback from TAs or professors. With the means for these variables ranging between approximately 2.1 and 2.5 for both groups, domestic and international students appeared to be using interactive academic practices to boost performance in challenging courses and finding that useful. With means of 2.34 and 2.50 for

domestic students and international students, respectively, which were higher than the means for other variables pertaining to the use of interactive academic practices within the two groups (see Table 4.20), both groups found receiving regular feedback from TAs or professors most helpful compared to other practices.

Meanwhile, there was a statistically significant difference ($p < .001$) between domestic and international students with respect to all four variables measuring the use of noninteractive academic practices. On average, international students studied by themselves more often and found this practice more helpful than did domestic students ($M = 3.49$ and $M = 3.13$, respectively). They also taught themselves to study more effectively and found this practice more helpful than did domestic students ($M = 3.46$ and $M = 3.01$, respectively). Moreover, with means of 3.41 and 2.99 for international students and domestic students, respectively, international students did all of the assigned readings more often compared to domestic students. Finally, international students tended to increase lecture attendance more and thought it was more helpful than did domestic students ($M = 3.37$ and $M = 2.88$, respectively). The effect size for these results measured by Cohen's *d* ranged between .45 and .49 which indicates a medium effect (Morgan et al., 2013, pp. 102–103).

Mann-Whitney *U* test results. Because the data for the two academic engagement variables of talked with an advisor about courses to take, requirements, and educational plans and spent more time studying violated the assumption of approximately normal distribution required for independent samples *t* tests (see Table 4.21 for the skewness statistics), nonparametric Mann-Whitney *U* tests were performed to compare domestic and international students with respect to these two variables. The assumptions of the Mann-Whitney test,

including an underlying continuity of rankings from low to high for the dependent variables and independence of data scores (Morgan et al., 2013), were checked and met.

As shown in Table 4.23, the Mann-Whitney *U* test results indicated a statistically significant difference between domestic and international students with respect to talking with advisors/counselors about meeting program requirements and educational plans. International students had a higher mean rank (1187.39) than did domestic students (1049.55) on the frequency of talking with an advisor/counselor about courses to take, program requirements, and education plans, $U = 1555131.500$, $p < .01$, $r = –0.06$. According to Morgan et al. (2013), the effect size is considered to be small or smaller than typical.

Table 4.23

Mann-Whitney U Test Analysis of Talking with an Advisor Among Domestic and International Students

Variable	Mean rank	Mann-Whitney *U*	Asymp. sig. (2-tailed) *p*
Talked with an advisor about courses to take, requirements, and education plans		155131.500	.003
Domestic students	1049.55		
International students	1187.39		

The Mann-Whitney *U* test results also revealed a statistically significant difference between domestic and international students with respect to spending more time studying (see Table 4.24). International students had a higher mean rank (1201.09) than did domestic students (1045.16) on spending more time studying by themselves and the usefulness of this practice in addressing academic challenges, $U = 149308.000$, $p = < .001$, $r = –0.08$. According to Morgan et al. (2013), the effect size is considered to be small or smaller than typical.

Table 4.24

Mann-Whitney U Test Analysis of Spending More Time Studying Among Domestic and International Students

Variable	Mean rank	Mann-Whitney *U*	Asymp. sig. (2-tailed) *p*
Spent more time studying		149308.000	.000
Domestic students	1045.16		
International students	1201.09		

Additional Analysis of Variables Related to Use of Interactive and Noninteractive Academic Practices

In the analysis of differences between domestic and international students at this community college, an additional point of interest was if one group of students was simply more inclined than the other to use interactive and/or noninteractive engagement practices when overcoming academic challenges. In order to examine this issue, the original nine ordinal variables pertaining to the use of interactive and noninteractive academic practices were recoded into dichotomous variables where 0 = Not used and 1 = Used. Response frequencies and rates for these variables for domestic and international students are presented in Table 4.25.

Based on established principles of statistical analysis and the methodological approach in this study, the association of these nine dichotomous academic engagement variables with group membership among domestic and international students was to be analyzed using cross-tabulation with a Pearson chi-square test. However, the dichotomous variables in the noninteractive academic practices group for international students had a split of extreme frequency distributions' of over 90/10 (see Table 4.25), which meant that cross-tabulation couldn't be performed (Tabachnick & Fidell, 2013). The cross-tabulation with

Table 4.25

Descriptive Statistics for Use of Interactive and Noninteractive Academic Practices Among Domestic and International Students

Variable	Domestic students		International students	
	n	%	*n*	%
Studied with other students in the class				
0 = Not used/not applicable	826	42.6	74	40.2
1 = Used	1,112	57.4	110	59.8
Total	1,938	100.0	184	100.0
Received informal tutoring outside class				
0 = Not used/not applicable	1,011	52.2	88	47.8
1 = Used	927	47.8	96	52.2
Total	1,938	100.0	184	100.0
Received academic support outside class				
0 = Not used/not applicable	999	51.5	94	51.1
1 = Used	939	48.5	90	48.9
Total	1,938	100.0	184	100.0
Used regular feedback from TA or professor				
0 = Not used/not applicable	771	39.8	66	35.9
1 = Used	1,167	60.2	118	64.1
Total	1,938	100.0	184	100.0
Spent more time studying				
0 = Not used	106	5.5	7	3.8
1 = Used	1,832	94.5	177	96.2
Total	1,938	100.0	184	100.0
Taught myself to study more effectively				
0 = Not used	305	15.7	9	4.9
1 = Used	1,633	84.3	175	95.1
Total	1,938	100.0	184	100.0
Did all of the assigned reading				
0 = Not used	249	12.8	11	6.0
1 = Used	1,689	87.2	173	94.0
Total	1,938	100.0	184	100.0
Increased lecture attendance				
0 = Not used	396	20.4	16	8.7
1 = Used	1,542	79.6	168	91.3
Total	1,938	100.0	184	100.0
Studied by myself				
0 = Not used	6	3.3	111	5.7
1 = Used	178	96.7	1827	94.3
Total	1,938	100.0	184	100.0

Pearson chi-square tests results for the variables in the interactive academic practices group is shown in Table 4.26.

The results of chi-square tests summarized shown in Tables 4.26 reinforce that domestic and international students were not significantly different with respect to their use of interactive academic engagement practices including studying with other students in class, $\chi^2(1, N = 2,122) = 0.398$, $p > .05$; receiving informal tutoring outside class, $\chi^2(1, N = 2,122)$

Table 4.26

Chi-square Analysis of Variables in the Interactive Academic Practices Group Among Domestic and International Students

Variable	*n*	Status		χ^2	*p*	*df*
		Domestic	International			
Studied with other students in the class				0.398	>0.05	1
Not used	900	826	74			
Used	1,222	1,112	110			
Total	2,122	1,938	184			
Phi = .014						
Received informal tutoring outside class				1.268	>.05	1
Not used	1,099	1,011	88			
Used	1,023	927	96			
Total	2,122	1,938	184			
Phi = .024						
Received academic support outside class				0.014	>.05	1
Not used	1,093	999	94			
Used	1,029	939	90			
Total	2,122	1,938	184			
Phi = .003						
Used regular feedback from TA or professor				1.078	>.05	1
Not used	837	771	66			
Used	1,285	1,167	118			
Total	2,122	1,938	184			
Phi = .023						

= 1.268, $p > .05$; receiving academic support outside class, $\chi^2(1, N = 2{,}122) = 0.014$, $p > .05$; and using feedback from TAs or professors on a regular basis, $\chi^2(1, N = 2{,}122) = 1.078$, $p > .05$.

Overall, international students appeared to be more academically engaged than domestic students were. International students spent more time on campus and more time studying and preparing for classes than did domestic students. On average, they interacted more with faculty and were more engaged in discussing academic work and career plans. Furthermore, the results indicate that international students tended to interact more with advisors. In terms of engaging in various practices of academic pursuit, there were no statistically significant differences between domestic and international students with respect to the use of interactive academic practices such as studying with other students, receiving informal tutoring or academic support outside the class, and using regular feedback from TAs or professors.

The analysis results revealed that, compared to domestic students, international students were more likely to engage in the use of noninteractive academic practices (including studying on their own, spending more time studying, studying more effectively, doing all of the assigned reading, and increasing lecture attendance) than were domestic students and, on average, found noninteractive academic practices more useful.

Exploratory Factor Analysis

Exploratory factor analysis procedures were conducted to determine what underlying structures existed among variables related to student academic engagement at community colleges and surrounding factors. The purpose was to summarize the relationship among these variables and to produce a factor model to define a broad framework of academic engagement of international students at community colleges. The academic engagement

variables and variables surrounding academic engagement were identified through the review of research literature. Surrounding factors included socioeconomic background, classroom experience, and persistence in academic pursuit. The EFA was performed using IBM SPSS Version 22.0 on the SSSL dataset comprising 2,169 cases. EFA procedures were also applied separately to the international students' data and domestic students' data.

Variables in the Exploratory Factor Analysis

Informed by the research findings factors related to academic engagement summarized in Chapter 2, and based on the SSSL data, variables in seven major areas were considered in the EFA of academic engagement constructs:

1. Variables measuring time invested in college including (a) time on campus and (b) time spent studying or preparing for class;
2. Variables pertaining to interaction with faculty and advisors including (c) visited faculty and sought their advice, (d) approached faculty outside class, (e) discussed career plans with faculty, (f) asked instructor for comments/criticism, (g) met with advisor on a regular basis, and (h) talked with an advisor about courses to take/ requirements/education plans;
3. Variables pertaining to involvement in academic pursuit practices including (i) studied with other students in the class, (j) received informal tutoring outside class, (k) received academic support outside class, (l) used regular feedback from TA or professor, (m) spent more time studying, (n) taught myself to study more effectively, (o) did all of the assigned reading, (p) increased lecture attendance, and (q) studied by myself;
4. Variables pertaining to classroom experience including (r) poor treatment, (s) I felt isolated in class, (t) I felt like I did not fit in, (u) instructor or students made

prejudiced comments, (v) class size made it difficult to ask questions, (w) I felt I was treated respectfully in class;

5. Variables related to persistence in academic work including (x) I give up soon if initially unsuccessful, (y) I will not try complicated things, (z) I keep trying until a job is done, (aa) failure makes me try harder, (bb) I stick to unpleasant tasks until they are done;
6. Variables pertaining to socioeconomic background including (cc) mother's education, (dd) father's education, (ee) [parents] spent time just talking to you, (ff) [parents] worked with you on homework, (gg) [parents] discussed your progress in school with you, (hh) [parents] participated in school-related activities, (ii) estimated total parent's income, (jj) financial concerns, and (kk) time at a job;
7. Variables related to academic preparedness and aspirations, including (ll) level of math preparation, (mm) level of science preparation, (nn) developmental education, (oo) language development, (pp) perceived language skills, and (qq) degree aspirations.

A total of 43 variables were considered in the EFA. Scales of six variables, including I felt isolated in class, I felt like I did not fit in, instructor or students in class made prejudiced comments, class size made it difficult to ask questions, gave up soon if initially not successful, and I will not try complicated things, were reversed so that the lowest values expressed the most negative perception and the highest values expressed the most positive perception and so that all variables potentially loading on the same factor varied in the same direction. Descriptive statistics and select measures of central tendency for the 43 variables can be found in Tables 4.17 and 4.18 (time invested in college, interaction with faculty,

interaction with advisors, engaging in interactive and noninteractive academic practices), Tables 4.1 and 4.2 (socioeconomic background, academic preparedness, and aspirations), and Appendices F and G (classroom experience, persistence in academic pursuit, and parental support).

Data Screening and Preparation for Exploratory Factor Analysis

According to Mertler and Vannatta (2010), if factor analysis is used to describe relationships among variables, assumptions regarding the distribution of variables in the population do not need to be assessed (p. 241). However, Tabachnick and Fidell (2013) and Mertler and Vannatta recommended that assumptions of multivariate normality and linearity be evaluated to ensure the quality of the data. To improve the quality of the resulting factors and to build a solid foundation for further CFAs, the data were screened to address the general assumptions of factor analysis including the absence of outliers, normality, multicollinearity, and linearity (Mertler & Vannatta, 2010). The assumption of homoscedasticity (or normality of error variances) was not considered a critical assumption for EFA (Tabachnick & Fidell, 2013).

Descriptive statistical analysis was used to screen the dataset for univariate outliers. Outliers were detected for the following variables: degree aspirations, time at a job, and level of math preparation. In quantitative research practice, extreme outliers can be treated in two ways: first, cases with extreme outliers can be excluded from analysis and, second, extreme values can be modified so as to not stand out as extreme (Mertler & Vannatta, 2010; Tabachnick & Fidell, 2013). Based on Tabachnick and Fidell's (2013, p. 73) recommendation, after careful examination of descriptive statistics for each variable in question and each case that contained values marked as outliers, a decision was made to delete cases that contained outliers for degree aspirations and level of math preparation. Outlier values for

time at a job were changed so that the cases no longer had as much potential impact on the results of the analysis. Thus, seven cases were removed from the analysis and four cases were modified, which resulted in a dataset of 2,162 cases used in the EFA.

Further, screening for data normality measured by skewness revealed that some of the variables to be included in the EFA did not satisfy this assumption. Data transformation was performed on 13 variables to make the data appear more normal. These variables included talked with an advisor about requirements and plans, spent more time studying, I felt isolated in class, I felt like I did not fit in, instructor or students made prejudiced comments in class, class size made it difficult to ask questions, I felt I was treated respectfully in class, I give up soon if initially not successful, I will not try complicated things, I keep trying until a job is done, failure makes me try harder, I stick to unpleasant tasks until they are done, and time at a job. Details about the skewness of the observed variables in the EFA, the data transformation techniques applied to improve normality of variables with skewness outside the acceptable limits based on the recommendations of Mertler and Vannatta (2010) and Tabachnick and Fidell (2013), and skewness of transformed variables is provided in Appendix H.

The remaining general assumptions of multicollinearity and linearity were also checked and met. Multicollinearity was screened using a diagnostic tool in IBM SPSS Version 22 that tested for variance inflation factor (VIF). VIF test results of 3 or less are considered acceptable (Mertler & Vannatta, 2010). In this study, all of the VIF test results were below 3. The assumption of linear correlation among variables was tested by the examination of the correlation matrix, and the majority of pairings met the assumption (Mertler & Vannatta, 2010).

Criteria for Exploratory Factor Analysis Results Analysis

A PCA analysis with a varimax (orthogonal) rotation was conducted in SPSS Version 22.0 to examine if any underlying structure existed among the variables related to and surrounding academic engagement of community college students. Only components with eigenvalues (the amount of total variance explained by each factor) greater than 1.0 were retained as factors of the underlying structure (Mertler & Vannatta, 2010, p. 234). In addition, as described by Mertler and Vannatta (2010), scree plots were visually analyzed for a specific bend in graph lines to confirm the number of components to be retained.

Factor loading matrices were used to determine if variables should be retained in the analysis and interpretation. Factor loadings represented the strength of correlation between variables and the underlying component, or factor. Quoting Comrey and Lee (1992), Tabachnick and Fidell (2013) suggested that loadings in excess of .71 (50% of overlapping variance) are considered excellent, those that are .63 (40% of overlapping variance) are very good, .55 (30% of overlapping variance) is good, .45 (20% overlapping variance) is fair, and .32 (10%) is poor (p. 654). However, the final choice of the cutoff for size of loading to be interpreted should be a matter of researcher preference (Tabachnick & Fidell, 2013). Generally, the bigger the sample size is, the more liberal are the requirements for acceptable factor loadings. Taking into account the sample size of 184 for international students in this study, the cutoff for interpretable factor loadings was set at .50.

The reliability of the resulting constructs was estimated using Cronbach's alpha coefficient of internal consistency, α. This statistic measures how closely related a set of variables are as a group and, based on Creswell (2009), alpha values of close to .7 or higher were regarded acceptable.

The Kaiser–Meyer–Olkin measure of sampling adequacy (KMO test) was used to establish suitability of the sample for factor analysis. According to Tabachnick and Fidell (2013), a KMO value of 0.6 or above is considered acceptable, a value of around 0.8 is good, and a value closer to 1.0 is excellent.

Finally, the results of the Bartlett's tests of sphericity were considered. Bartlett's sphericity test tests the hypothesis about correlation of the variables in the population correlation matrices. The null hypothesis states that the variables in the population correlation matrix are not correlated. A sphericity value significant at $p < .05$ indicated that the variables in the analysis were correlated enough to provide a reasonable basis for factor analysis (Mertler & Vannatta, 2010, p. 243).

Exploratory Factor Analysis: Initial Iterations

The goal of EFA and concurrent rotations was to produce a simple and easily interpretable underlying structure for variables related to and surrounding academic engagement that could be further used in developing a measurement model. The initial EFA iterations were performed on 43 variables using the data from 2,162 cases in the study. With the rule of thumb stating that roughly 10 cases per variable are required, the sample size at this stage of the study satisfied this requirement. First, the factorability of all 43 variables selected for the EFA was examined. An examination of the KMO measure of sampling adequacy showed that it was above the commonly recommended value of .6 and was regarded as good (KMO = .813). The Bartlett's test produced a significant sphericity value, $\chi^2(903, N = 2{,}162) = 26708.164$, $p < .001$. These two indicators suggested that the sample was factorable.

Overall, 13 components with eigenvalues over 1.0 were produced, and factor loadings of individual items on those components were examined. As Table 4.27 shows, factor

loadings for the variables of degree aspirations and time at a job were below the accepted cutoff of .50. In addition, three factors could not be retained for the model based on the requirement for alpha reliability coefficients. At α = .114, Cronbach's alpha for Factor 11 was below the acceptable threshold of 0.5, and the negative values of Cronbach alphas for Factor 12 (α = –.398) and Factor 13 (α = –.040) violated the assumptions for analysis reliability.

Because, as the name implies, the EFA is exploratory in nature and the purpose of the EFA was to seek an underlying structure, if existent, in the variables of interest, various combinations of the initial 43 variables were entered into the EFA. Although most combinations produced factor structures that met and exceeded the factorability criteria measured by KMO and Bartlett's test of sphericity, multiple iterations revealed that a number

Table 4.27

Initial Exploratory Factor Analysis Results for Academic Engagement and Surrounding Variables

Factor/variable	Factor loading
Factor 1 (α = .786)	
I felt isolated in class (reflected and inversed)	.816
I felt like I did not fit in (reflected and inversed)	.752
Instructor or students made prejudiced comments (reflected and inversed)	.732
Class size made it difficult to ask questions (reflected and inversed)	.662
I felt I was treated respectfully in class (reflected and inversed)	.573
Factor 2 (α = .797)	
Spent more time studying (reflected and inversed)	.772
Taught myself to study more effectively	.751
Studied by myself	.743
Did all of the assigned readings	.734
Increased lecture attendance	.618
Factor 3 (α = .858)	
Approached faculty outside class	.786
Asked my instructor for comments and criticism about my work	.775
Discussed career plans with faculty	.771
Visited faculty after class and sought their advice on class projects	.761

Table 4.27 (continued)

Factor/variable	Factor loading
Factor 4 (α = .795)	
I give up soon if initially unsuccessful (reflected and inversed)	.758
I will not try complicated things (reflected and inversed)	.735
I keep trying until a job is done (reflected and inversed)	.732
Failure makes me try harder (reflected and inversed)	.707
I stick to unpleasant tasks until they are done (reflected and inversed)	.666
Factor 5 (α = .816)	
Discuss your progress in school with you	.855
Work with you on your homework	.823
Participated in school related activities	.738
Spent time just talking to you	.688
Factor 6 (α = .735)	
Received informal tutoring	.819
Received academic support outside the class	.784
Studied with other students in the class	.650
Used feedback from a TA or professor on a regular basis	.528
Factor 7 (α = .559)	
Level of preparedness in science	.831
Level of preparedness in mathematics	.827
Degree aspirations	.442
Factor 8 (α = .710)	
The highest level of education completed by your parents - Father	.861
The highest level of education completed by your parents - Mother	.874
Factor 9 (α = .703)	
Developmental courses taken in writing and reading	.852
Developmental courses taken	.820
Factor 10 (α = .678)	
I talked with an advisor/counselor about courses to take, requirements, and education plans (reflected and inversed)	.793
I met with academic advisors/counselors on a regular basis	.702
Factor 11 (α = .171)	
Time spent studying or preparing for class	.692
Time on campus	.689
Time at a job (reflected and inversed)	–.447
Factor 12 (α = –.143[a])	
Financial concerns	.770
Estimated total annual parents' income	–.580
Factor 13 (α = –.028[a])	
Poor treatment	–.611
Perceived language skills	.587

[a]Value is negative due to a negative covariance among items; this violates model reliability assumptions.

of variables lacked consistency in correlating with other variables, failed to consistently load onto the same components, and/or did not meet the minimum criterion of having a factor loading of .50 and above. This resulted in poor interpretability of factors. These variables were perceived language skills (inconsistent correlations, factor loadings not exceeding .187), degree aspirations (inconsistent correlations, factor loadings of .313 to .459 on different components), and poor treatment (inconsistent correlations). Deleting the variable of time at a job did not improve the alpha reliability of the factor composed of variables measuring allocation of time. The variables time on campus, time studying or preparing for class, financial concerns, and estimated total annual parents' income were excluded because they were not associated with any reliable underlying structure.

Exploratory Factor Analysis Final Results

Based on the preliminary results and information gained through the initial EFA iterations, and with the ultimate goal to produce a model to measure academic engagement of international students at community colleges, a final approach to EFA in this study was developed. The remaining 35 variables were grouped into (a) variables related to academic pursuit, academic interactions, and college experiences (academic variables) and (b) variables related to social and academic capital (capital variables). The principal components factor analysis using varimax rotation was conducted and resulted in two factor structures.

The final EFA for 25 academic variables produced a model consisting of six factors with an eigenvalue above 1.0 that cumulatively explained slightly over 60% of the variance. The KMO measure of sampling adequacy was .843, and the Bartlett's test of sphericity returned a value significant, $\chi^2(300, N = 2{,}162) = 18{,}436.247$, $p < .001$, which confirmed that the data were factorable. The resulting factors were named Interaction with Faculty (four items), Interaction with Academic Advisors (two items), Classroom Experience (five items),

Use of Noninteractive Academic Practices (five items), Use of Interactive Academic Practices (four items), and Persistence Toward Goal (five items). All items in this analysis had factor loadings over 0.5, and based on Tabachnick and Fidell (2013), most loadings were either good or excellent. The factors and factor loadings for this final solution are presented in Table 4.28.

Internal consistency for each of the factors was examined using Cronbach's alpha. As Table 4.28 shows, alpha coefficients ranged between .677 and .858, and most of them were considered moderate: $\alpha = .677$ for Interaction with Academic Advisors, $\alpha = .735$ for Use of Interactive Academic Practices, $\alpha = .786$ for Classroom Experience, $\alpha = .795$ for Persistence Toward Goals, $\alpha = .858$ for Interaction with Faculty, and $\alpha = .746$ for Use of Noninteractive Academic Practices. No substantial increases in the Cronbach's alpha coefficient for any of the factors could have been achieved by eliminating items with somewhat lower factor loadings (e.g., the used feedback from a TA or professor on a regular basis variable in the Use of Interactive Academic Practices factor).

The EFA of the 10 remaining variables related to social and academic capital resulted in four factors with an eigenvalue of over 1.0, which were named Social Capital—Parental Support (four items), Academic Preparedness (two items), Developmental Education (two items), and Social Capital—Parental Education (two items). These factors accounted for 72.7% of the variance among variables, with Parental Support accounting for roughly 26% of the variance and the other three factors accounting for about 15.6% of the variance each. The factors and the items that loaded onto them are presented in Table 4.29. As can be seen from the table, all items had factor loadings of above .71, which are regarded as excellent (Tabachnick & Fidell, 2013).

Table 4.28

Final Exploratory Factor Analysis Results for Academic Engagement Variables

Factor/variable	Factor loading
Use of Noninteractive Academic Practices (α = .746)	
Spent more time studying (reflected and inversed)	.770
Taught myself to study more effectively	.751
Studied by myself	.740
Did all of the assigned readings	.738
Increased lecture attendance	.627
Interaction with Faculty (α = .858)	
Approached faculty outside class	.851
Discussed career plans with faculty	.810
Asked my instructor for comments and criticism about my work	.796
Visited faculty after class and sought their advice on class projects	.793
Persistence toward Goal (α = .795)	
I give up soon if initially unsuccessful (reflected and inversed)	.774
I will not try complicated things (reflected and inversed)	.752
I keep trying until a job is done (reflected and inversed)	.726
Failure makes me try harder (reflected and inversed)	.692
I stick to unpleasant tasks until they are done (reflected and inversed)	.663
Classroom Experience (α = .786)	
I felt isolated in class (reflected and inversed)	.833
I felt like I did not fit in (reflected and inversed)	.768
Instructor or students made prejudiced comments (reflected and inversed)	.734
Class size made it difficult to ask questions (reflected and inversed)	.685
I felt I was treated respectfully in class (reflected and inversed)	.570
Use of Interactive Academic Practices (α = .735)	
Received informal tutoring	.839
Received academic support outside the class	.810
Studied with other students in the class	.636
Used feedback from a TA or professor on a regular basis	.546
Interaction with Academic Advisors (α = .677)	
I talked with an advisor/counselor about courses to take, requirements, and education plans (reflected and inversed)	.808
I met with academic advisors/counselors on a regular basis	.803

Table 4.29

Final Exploratory Factor Analysis Results for Social and Academic Capital Variables

Factor/variable	Factor loading
Social Capital— Parental Support (α = .816)	
Discuss your progress in school with you	.860
Work with you on your homework	.835
Participated in school related activities	.779
Spent time just talking to you	.718
Academic Preparedness (α = .685)	
Level of preparedness in mathematics	.885
Level of preparedness in science	.865
Developmental Education (α = .703)	
Developmental courses taken in writing and reading	.882
Developmental courses taken	.868
Social Capital—Parental Education (α = .710)	
The highest level of education completed by your parents: father	.869
The highest level of education completed by your parents: mother	.860

Reliabilities were examined for each of the factors based on Cronbach's alpha coefficients of internal consistency. The alpha coefficients ranged between .685 and .816 and were found acceptable to retain the factors in the model (see Table 4.29). The KMO measure of sampling adequacy was .655, which was somewhat lower than this statistic for the EFA on academic variables but still above the acceptable threshold of 0.6 (Tabachnick & Fidell, 2013). The Bartlett's test of sphericity was significant χ^2 (345, N = 2,162) = 5,875.215, $p < .001$. Overall, these analyses indicated that the four factor structure for the variables related to social and academic capital could be retained.

The same EFA procedures were conducted separately for domestic students and for international students in the study. Generally, the reliability of the EFA results for samples over 250 is established through criteria described above (Mertler & Vannatta, 2010; Tabachnick & Fidell, 2013). According to Tabachnick and Fidell (2013), sample sizes in the

range of 100–200 are acceptable with well-determined factors, i.e., with most factors defined by variables with loadings of around or above .80 and communalities of .5 and above (p. 618). Mertler and Vannatta suggested (2010) a mean level of communalities of .6 (p. 242). The potential impact of the sample size of international students was examined, and the criteria for smaller sample sizes were satisfied. The EFA produced factor structures with factor loadings presented in Tables 4.30 and 4.31.

Factors and their items for the construct representing the relationships among variables related to academic interactions and experiences of domestic and international students are shown in Table 4.30. For the academic engagement factor structure, the KMO measure of sampling adequacy for domestic students was .840, and for the sample of international students it was .799. Both statistics were good (Tabachnick & Fidell, 2013). The Bartlett's test of sphericity was significant for both samples as well: for domestic students, $\chi^2(300, N = 1{,}931) = 16{,}357$, $p < .001$, and for international students, $\chi^2(300, N = 184)$ 1,773.240, $p < .001$.

The relationships among variables capturing the socioeconomic background of the domestic and international students in the analysis are presented in Table 4.31. The KMO statistics for the samples of domestic and international students were .661 and .621, respectively, which again, was somewhat lower than these measures for the EFA on academic variables. However, both statistics were above the acceptable threshold of 0.6 (Tabachnick & Fidell, 2013). The Bartlett's test of sphericity was significant for both samples: for domestic students, $\chi^2(45, N = 1{,}931) = 5{,}098.866$, $p < 0.001$, and for international students, $\chi^2(45, N = 184) = 766.013$, $p < .001$.

Table 4.30

Results of Exploratory Factor Analysis of Academic Engagement Variables: Domestic and International Students

Factor/variable	Factor loading: Domestic students (n = 1,931)	Factor loading: International students (n = 184)
Use of Noninteractive Academic Practices		
Spent more time studying (reflected and inversed)	.767	.814
Taught myself to study more effectively	.751	.742
Studied by myself	.738	.668
Did all of the assigned readings	.733	.819
Increased lecture attendance	.624	.638
Interaction with Faculty		
Approached faculty outside class	.848	.824
Discussed career plans with faculty	.802	.851
Asked my instructor for comments and criticism about my work	.797	.774
Visited faculty after class and sought their advice on class projects	.796	.766
Persistence Toward Goal		
I give up soon if initially unsuccessful (reflected and inversed)	.781	.741
I will not try complicated things (reflected and inversed)	.762	.725
I keep trying until a job is done (reflected and inversed)	.733	.579
Failure makes me try harder (reflected and inversed)	.686	.718
I stick to unpleasant tasks until they are done (reflected and inversed)	.665	.516
Classroom Experience		
I felt isolated in class (reflected and inversed)	.832	.838
I felt like I did not fit in (reflected and inversed)	.766	.749
Instructor or students made prejudiced comments (reflected and inversed)	.724	.789
Class size made it difficult to ask questions (reflected and inversed)	.689	.665
I felt I was treated respectfully in class (reflected and inversed)	.579	.572
Use of Interactive Academic Practices		
Received informal tutoring	.842	.825
Received academic support outside the class	.810	.836
Studied with other students in the class	.612	.672
Used feedback from a TA or professor on a regular basis	.542	.581
Interaction with Academic Advisors		
I talked with an advisor/counselor about courses to take, requirements, and education plans (reflected and inversed)	.810	.748
I met with academic advisors/counselors on a regular basis	.800	.789

Table 4.31

Results of Exploratory Factor Analysis for Social and Academic Capital Variables: Domestic and International Students

Factor/variable	Factor loading	
	Domestic students (n = 1,931)	International students (n = 184)
Social Capital—Parental Support		
Discuss your progress in school with you	.859	.880
Work with you on your homework	.834	.841
Participated in school related activities	.779	.770
Spent time just talking to you	.717	.751
Social Capital—Parental Education		
The highest level of education completed by your parents: father	.881	.910
The highest level of education completed by your parents: mother	.859	.912
Developmental Education		
Developmental courses taken in writing and reading	.879	.935
Developmental courses taken	.859	.933
Academic Preparedness		
Level of preparedness in mathematics	.861	.897
Level of preparedness in science	.859	.899

Reliabilities were also examined for international students and domestic students. Cronbach's alpha coefficients are shown in Table 4.32. For comparison, alphas for the EFA with all students in the study are also included in the table.

Thus, the EFA produced two reliable underlying factor structures: one summarizing variables measuring academic engagement, academic experiences, and persistence in academic pursuit of students in the study and the other based on the variables related to students' social background and academic preparation. Each structure was examined against the data for all students in the study, international students in the study, and domestic students in the study. Assumptions for sample sizes were taken into consideration, and criteria for reliability of EFA results were checked and met.

Table 4.32

Cronbach's Alpha Reliability for Academic Engagement and Surrounding Factors

Factor	Cronbach's alpha		
	All students (n = 2,162)	Domestic students (n = 1,931)	International students (n = 184)
Interaction with Faculty	.858	.854	.867
Interaction with Academic Advisors	.677	.670	.753
Classroom Experience	.786	.745	.807
Use of Noninteractive Academic Practices	.746	.743	.754
Use of Interactive Academic Practices	.735	.732	.770
Persistence Toward Goal	.795	.752	.783
Social Capital—Parental Support	.816	.815	.839
Social Capital—Parental Education	.710	.800	.831
Developmental Education	.703	.683	.866
Academic Preparedness	.685	.678	.768

Confirmatory Factor Analysis

The final steps in this study focused on confirming a measurement model of academic engagement of international students at community colleges. Informed by the results of the comparative analysis and the EFA, CFA with second-order factor structures was conducted using MPlus Version 7.3 statistical software. This section describes the procedures and the results of the CFA.

Conceptual Model

The analysis of the similarities and differences in demographics, socioeconomic background, and patterns of academic engagement between domestic and international students at the research site, as well as the extensive EFA of related variables resulted in rich information that laid out a foundation for a measurement model of academic engagement of international students at community colleges. Displayed in Figure 4.1 are the unaligned

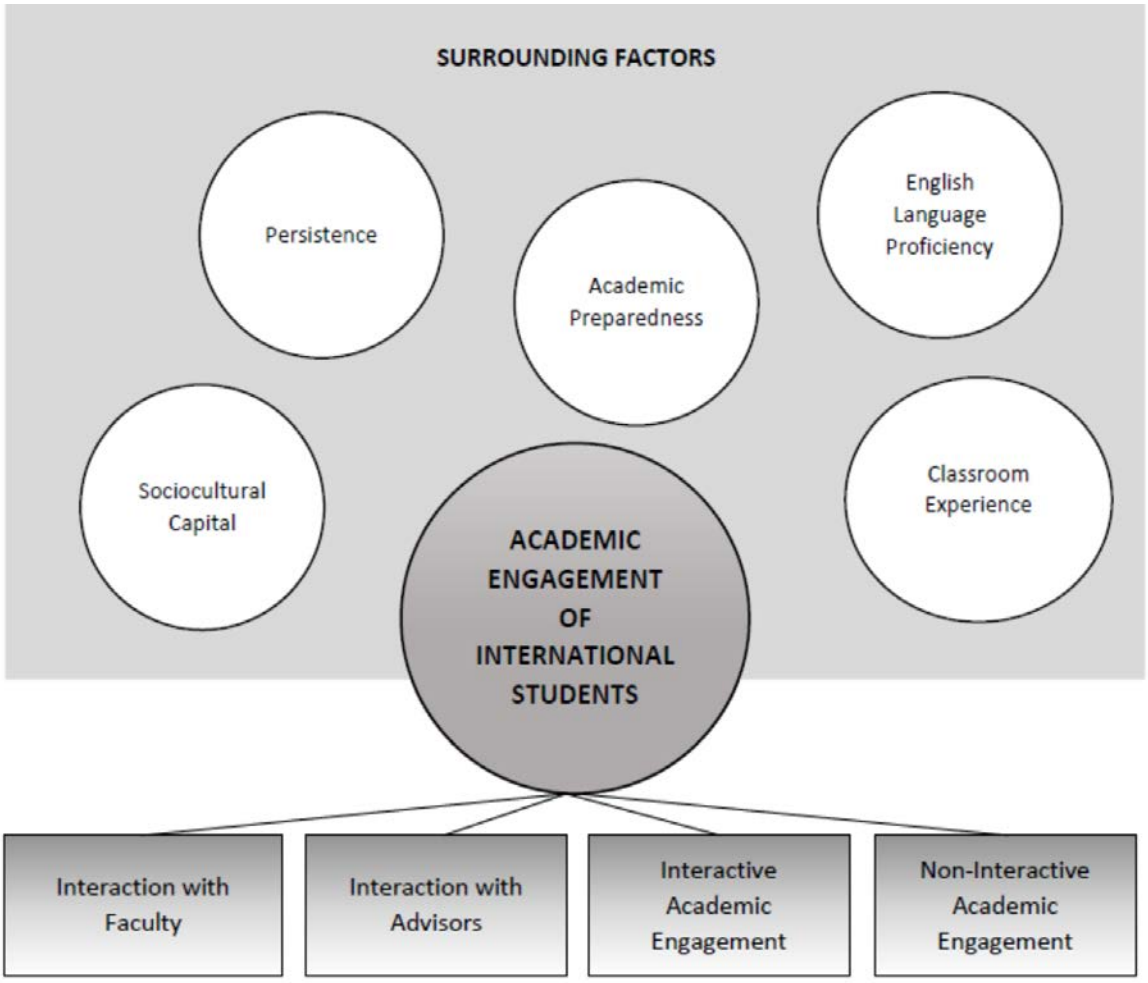

Figure 4.1. Constructs of the measurement model of academic engagement of international students at community colleges.

theoretical constructs of the academic engagement of international students at community colleges measurement model. This model is an analysis-driven revision of this study's conceptual approach discussed in Chapter 3 and depicted in Figure 1.1.

The factors that were identified in the EFA are considered elements of the academic engagement model of international students. Academic engagement of international students was conceptualized as a construct of four factors including interaction with faculty, interaction with advisors, use of interactive academic engagement, and use of noninteractive

academic engagement. Sociocultural capital, academic preparedness, English language proficiency, persistence toward goal, and classroom experience were included as surrounding background factors that potentially may have an impact on students' academic engagement. At this point in the analysis the link between surrounding factors and academic engagement was hypothesized. CFA was applied to test the conceptual model against the data.

Data Preparation for Confirmatory Factor Analysis

A series of CFA tests were performed on 2,162 cases in the SSSL dataset from the research site. The relevant data (based on the variables in the EFA) were transferred to MPlus. Variable names were shortened to comply with the 8-symbol length requirement, thus all modified variables were renamed and coded with "m."

Criteria and Procedures for the Confirmatory Factor Analysis

The EFA results described were used as a basis to specify a measurement model of academic engagement for international students at community colleges. Numerous hypothetical variations of the model were estimated to produce a model with the best fit against the data. The focus was on the international students in the study, and estimation of the model against the data for all students in the study and domestic students in the study served as additional points of reference in the analysis and the conclusions.

Initial iterations for the model included the factors established in the EFA and the observed variables that loaded onto these factors. The models were estimated using covariance matrices, statistical significance of the estimates measured by *p*-values, and factor loadings. Items in the measurement scales were retained based on the cutoff criteria of .5 and above (Mertler & Vannatta, 2010). The goodness-of-fit indicators used in this study included the chi-square, RMSEA, the CFI, and the TLI (Hu & Bentler, 1998, 1999; Tabachnick & Fidell, 2013).

Although the chi square is considered a classic goodness-of-fit measure to determine overall model fit, it is sensitive to sample size (Tabachnick & Fidell, 2013, p. 720). The chi-square estimate is based on the null hypothesis that the implied covariance matrix is equivalent to the observed sample covariance matrix. Thus, a small chi-square value and failure to reject the null hypothesis indicates a good model fit, whereas a large chi-square value and rejection of the null hypothesis means that model estimates do not sufficiently reproduce sample covariance and that the model does not fit the data well (Hu & Bentler, 1999). However, it becomes more difficult to retain the null hypothesis as the number of cases increases. In this study, the chi-square estimates were taken into consideration, but preference was given to the RMSEA, the CFI, and the TLI indices considered collectively. These indicators are considered not sensitive to sample size (Hu & Bentler, 1999; Tabachnick & Fidell, 2013). Cutoff values of these indices were established based on Hu and Bentler's (1999) and Tabachnick and Fidell's (2103) recommendations. For the RMSEA, a value of about 0.05 or less indicates a close fit of the model and a value between 0.05 and 0.06 is considered acceptable. A CFI value close to 0 indicates a poor fit, whereas a value close to 1 is a sign of a good fit; values of 0.95 and above are preferred. The TLI is usually lower than the CFI, but values over .90 or over .95 are considered acceptable.

Although the RMSEA, CFI, and TLI methods are considered not sensitive to sample size, additional analyses with random samples of domestic students similar in size to the sample of international students were performed to screen for potential impact of the sample size on the analysis results. Three random samples of approximately 10% of cases were selected using a random sample size selection procedure in the IBM SPSS, resulting in samples of 181, 200, and 191 cases, respectively.

A second-order factor model structure was hypothesized for the relationships among variables pertaining to academic engagement. Second-order factor models are used in a wide variety of research domains and offer certain advantages in theoretical reasoning and practical implications. According to Chen et al. (2005), a second-order model links first-order factors in a structure that potentially explains the covariance among first-order factors and observed variables in a more parsimonious way with few parameters. Moreover, second-order factor models can also provide useful simplification of the interpretation of complex measurement structures.

Further details of the analysis process may be included in the description of the results in the following subsections of this chapter; however, only results that satisfied the criteria for CFA accepted in this study, including statistically significant results, are reported in tables and figures. Results are reported for international students, on the one hand, and for domestic students, on the other hand.

Model 1: Simple Second-Order Factor Model of Academic Engagement

Second-order factoring was applied to hypothesize a measurement model of closely related factors pertaining to academic interactions of students in the study, i.e., interactions with faculty, academic advisors, peers, and other relevant agents. The result of the initial CFA iterations was a simple second-order factor model of community college student academic engagement that included 18 observed variables. These variables produced five first-order latent variables (Interaction with Faculty, Interaction with Academic Advisors, Use of Interactive Academic Practices, Use of Noninteractive Academic Practices, and Classroom Experience). It was hypothesized that three of the five first-order latent variables including Interaction with Faculty, Interaction with Academic Advisors, and Use of Interactive Academic Practices, were caused by a second-order latent variable called

Interactive Engagement. The hypothesized simple second-order factor model of academic engagement for community college students is represented in Figure 4.2.

The results of the CFA for international students are summarized in Tables 4.33 and 4.34. Because only acceptable and statistically significant results are reported, it should be noted that the initial iterations revealed that factor loadings of two variables (I felt I was treated respectfully in class and class size made it difficult to ask questions) consistently failed to reach above the .50 cutoff and were not retained in the final structure of the model.

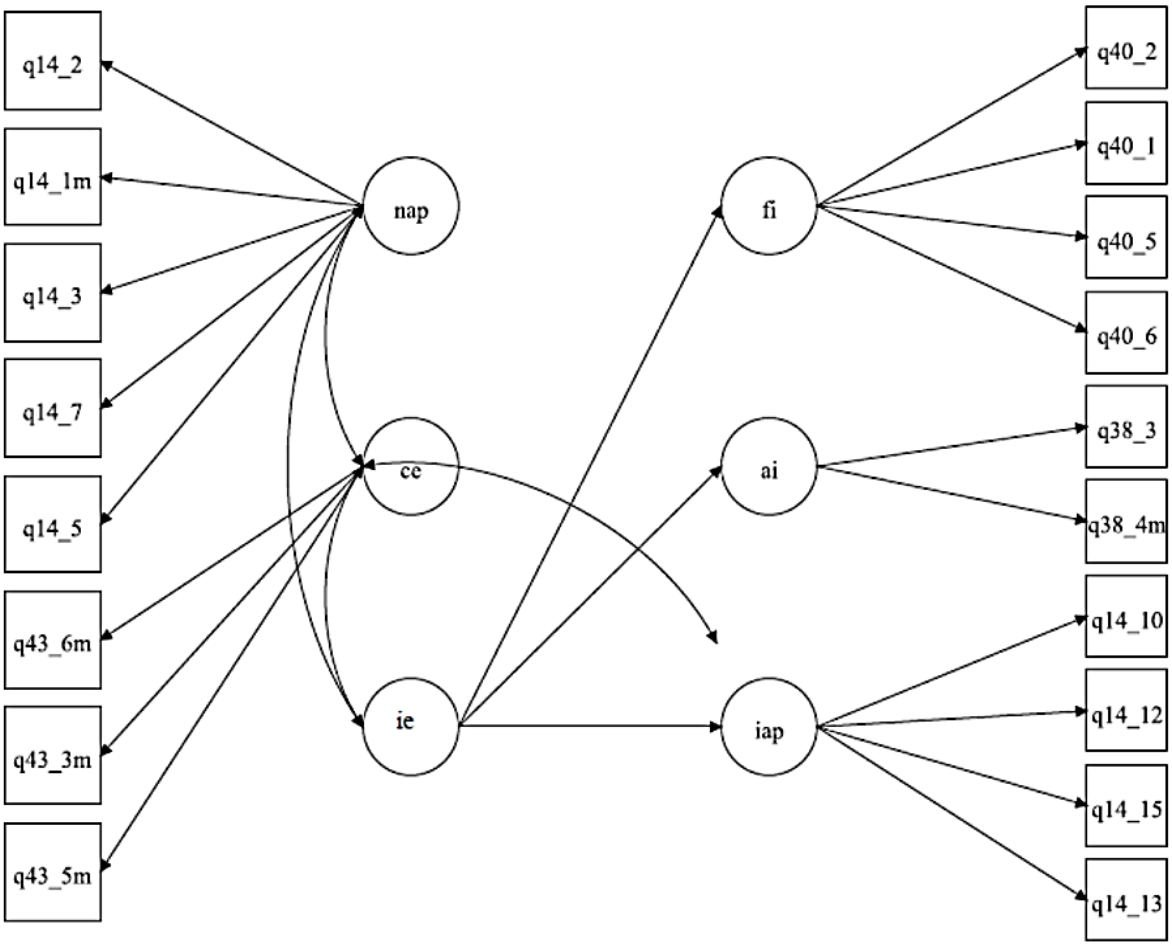

Figure 4.2. Simple second-order factor model of academic engagement (ie: Interactive Engagement; fi: Interaction with Faculty; ai: Interaction with Academic Advisors; iap: Use of Interactive Academic practices; nap: Use of NonInteractive Academic Practices; ce: Classroom Experience).

Table 4.33

*Confirmatory Factor Analysis: Simple Second-Order Factor Model of Academic Engagement of International Community College Students (*n *= 184)*

Construct/variable	Estimate	*SE*	Estimate /*SE*	Two-tailed *p*-value
Interaction with faculty				
Approached faculty outside class	.845	.030	28.602	.000
Visited faculty after class and sought their advice on class projects	.779	.036	21.074	.000
Discussed career plans with faculty	.800	.036	24.074	.000
Asked my instructor for comments and criticism about my work	.725	.041	17.569	.000
Interaction with academic advisors				
I met with academic advisors/counselors on a regular basis	.812	.080	10.195	.000
I talked with an advisor/counselor about courses to take and requirements	.738	.075	9.894	.000
Use of noninteractive academic practices				
Taught myself to study more effectively	.767	.041	18.846	.000
Spent more time studying	.802	.038	20.873	.000
Did all of the assigned readings	.716	.046	15.654	.000
Studied by myself	.527	.061	8.660	.000
Increased lecture attendance	.572	.057	9.974	.000
Use of interactive academic practices				
Studied with other students in the class	.612	.055	11.150	.000
Received informal tutoring	.842	.040	21.144	.000
Used feedback from a TA or professor on a regular basis	.561	.060	9.362	.000
Received academic support outside the class	.712	.047	15.189	.000
Classroom experience				
I felt like I did not fit in	.776	.039	19.793	.000
I felt isolated in class	.833	.036	23.115	.000
Instructor or students made prejudiced comments	.817	.037	21.933	.000
Interactive Engagement				
Interaction with faculty	.784	.036	9.118	.000
Interaction with academic advisors	.537	.067	6.053	.000
Use of interactive academic practices	.636	.047	7.310	.000

Table 4.34

Confirmatory Factor Analysis: Simple Second-Order Factor Model of Academic Engagement for All Students and Domestic Students in the Study

Construct/variable	All students (n = 2,162) Estimate	*SE*	Domestic students (n = 1,931) Estimate	*SE*
Interaction with faculty				
Approached faculty outside class	.807	.010	.804	.011
Visited faculty after class and sought their advice on class projects	.792	.011	.798	.011
Discussed career plans with faculty	.783	.011	.782	.011
Asked my instructor for comments and criticism about my work	.732	.012	.732	.013
Interaction with academic advisors				
I met with academic advisors/counselors on a regular basis	.641	.022	.640	.023
I talked with an advisor/counselor about courses to take and requirements	.606	.024	.609	.026
Use of noninteractive academic practices				
Taught myself to study more effectively	.760	.012	.760	.014
Spent more time studying	.791	.012	.792	.012
Did all of the assigned readings	.675	.014	.670	.015
Studied by myself	.609	.016	.612	.017
Increased lecture attendance	.530	.018	.525	.019
Use of interactive academic practices				
Studied with other students in the class	.541	.018	.534	.019
Received informal tutoring	.753	.015	.752	.016
Used feedback from a TA or professor on a regular basis	.587	.018	.588	.019
Received academic support outside the class	.738	.015	.744	.016
Classroom experience				
I felt like I did not fit in	.831	.014	.834	.017
I felt isolated in class	.794	.014	.786	.016
Instructor or students made prejudiced comments	.596	.017	.558	.019
Interactive Engagement				
Interaction with faculty	.692	.023	.683	.026
Interaction with academic advisors	.750	.035	.734	.038
Use of interactive academic practices	.662	.028	.668	.031

Note. Two-tailed p-value $< .001$ for all estimates.

Goodness-of-fit estimates of the simple model of community college student academic engagement for international students, domestic students, and all students, respectively, are shown in Table 4.35. Overall, the CFA produced a second-order factor model of academic engagement that had a good fit for international students (RMSEA = .038, CFI = .972, TLI = .967). This model's fit against the data for all students and for domestic students was not as good. Although the overall fit for all students and all domestic students could be considered borderline acceptable based on RMSEA, CFI and TLI indicators (RMSEA = .054, CFI = .939, and TLI = .927 for all students and RMSEA = .054, CFI = .937, and TLI = .925 for all domestic students), these indices for the second and third random samples of domestic students were outside the acceptable thresholds. The results suggested that the proposed model of academic engagement fit the international student data best (see Table 4.35). The results of the CFA of the simple second-order factor model of academic engagement for international students are displayed in Figure 4.3.

Table 4.35

Goodness-of-Fit Indicators for Simple Second-Order Factor Model of Academic Engagement of Students at Community Colleges

Student group	*n*	χ^2	*df*	RMSEA	CFI	TLI
International students	184	162.797	128	.038	.972	.967
Domestic students						
All domestic students	1,931	850.642	128	.054	.937	.925
Random sample 1 (appr.10%)	200	201.917	128	.054	.936	.924
Random sample 2 (appr.10%)	181	224.532	128	.065	.901	.882
Random sample 3 (appr.10%)	191	226.826	128	.064	.909	.891
All students	2,162	931.189	128	.054	.939	.927

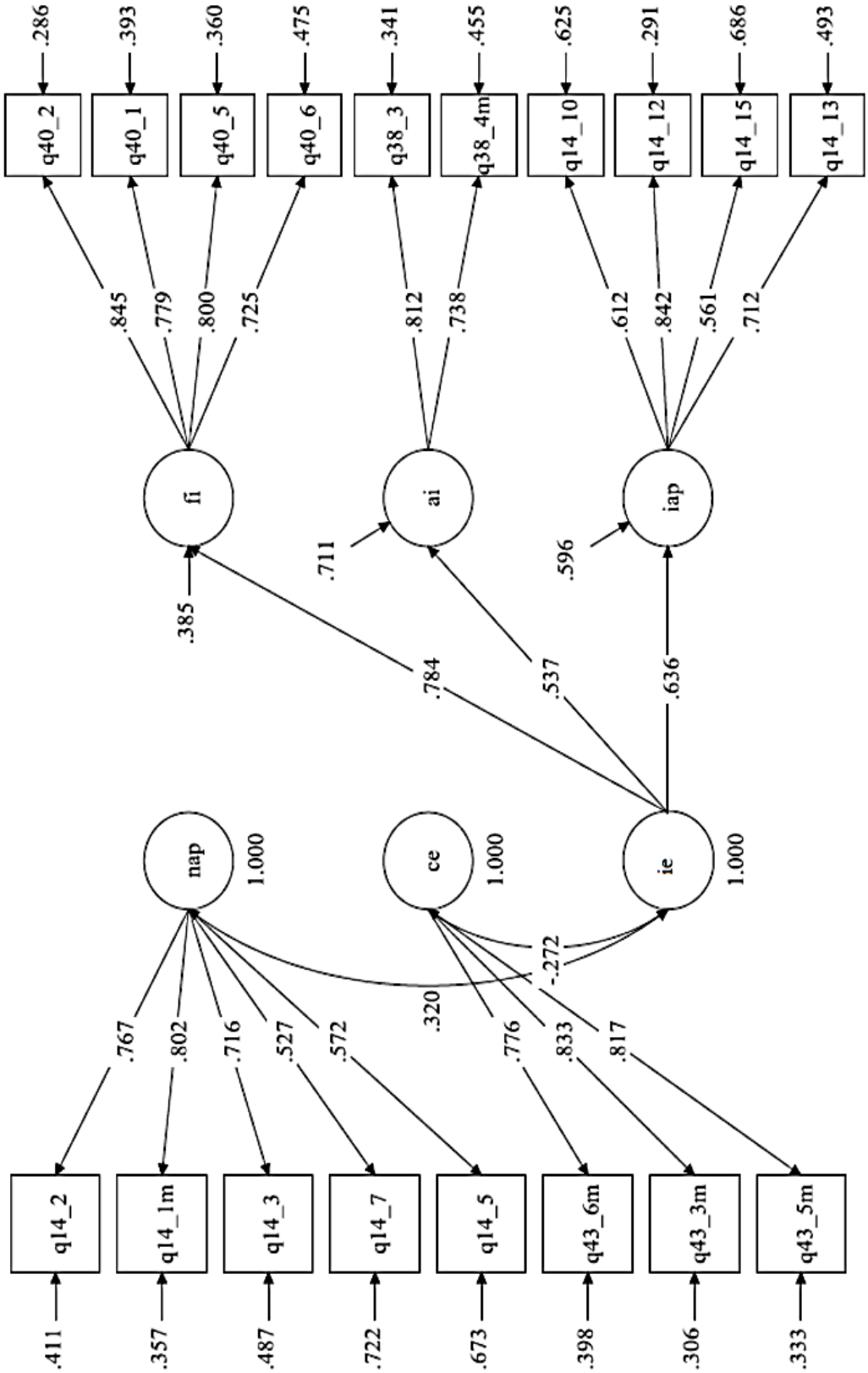

Figure 4.3. Simple second-order factor model of academic engagement for international students: statistical detail. Note: ie: Interactive Engagement; fi: Interaction with Faculty; ai: Interaction with Academic Advisors; iap: Use of Interactive Academic Practices; nap: Use of NonInteractive Academic Practices; ce: Classroom Experience.

Model 2: Extended Second-Order Factor Model of Academic Engagement

As discussed earlier, the research literature suggests that social and cultural backgrounds have an impact on patterns of academic engagement of international students (Anderson et al., 2009; Andrade, 2008; Bodycott, 2012; Evans et al., 2009; Kwon, 2009; Salili & Hoosain, 2007a; Sontam & Gabriel, 2012; Sugahara & Boland, 2010). Family support and expectations, achievement orientation, and academic preparedness were found to be linked to various college outcomes and experiences that both domestic and international students had at American colleges. Studies suggested that the effects of students' sociocultural background may be more profound in academic engagement of international students in all educational settings, including community colleges (Anderson et al., 2009; Burkholder, 2014; Mamiseishvili, 2012; Salili et al., 2007a; Zhao et al., 2005). In the next series of CFA iterations, a model of academic engagement that accounted for the influence of the background factors on academic engagement of international students was tested.

The simple second-order factor model of academic engagement discussed in the previous subsection was extended to include parental support, persistence toward goal, and academic preparedness. The model was based on 26 observed variables caused by nine latent variables at the first level. The second-order latent variable of interactive engagement was hypothesized to be based on three first-order latent variables of interaction with faculty, interaction with academic advisors, and use of interactive academic practices. The extended second-order factor model of academic engagement is presented in Figure 4.4. The results of the CFA tests for the extended second-order factor model of academic engagement of international students at community colleges are shown in Figure 4.5 and Table 4.36.

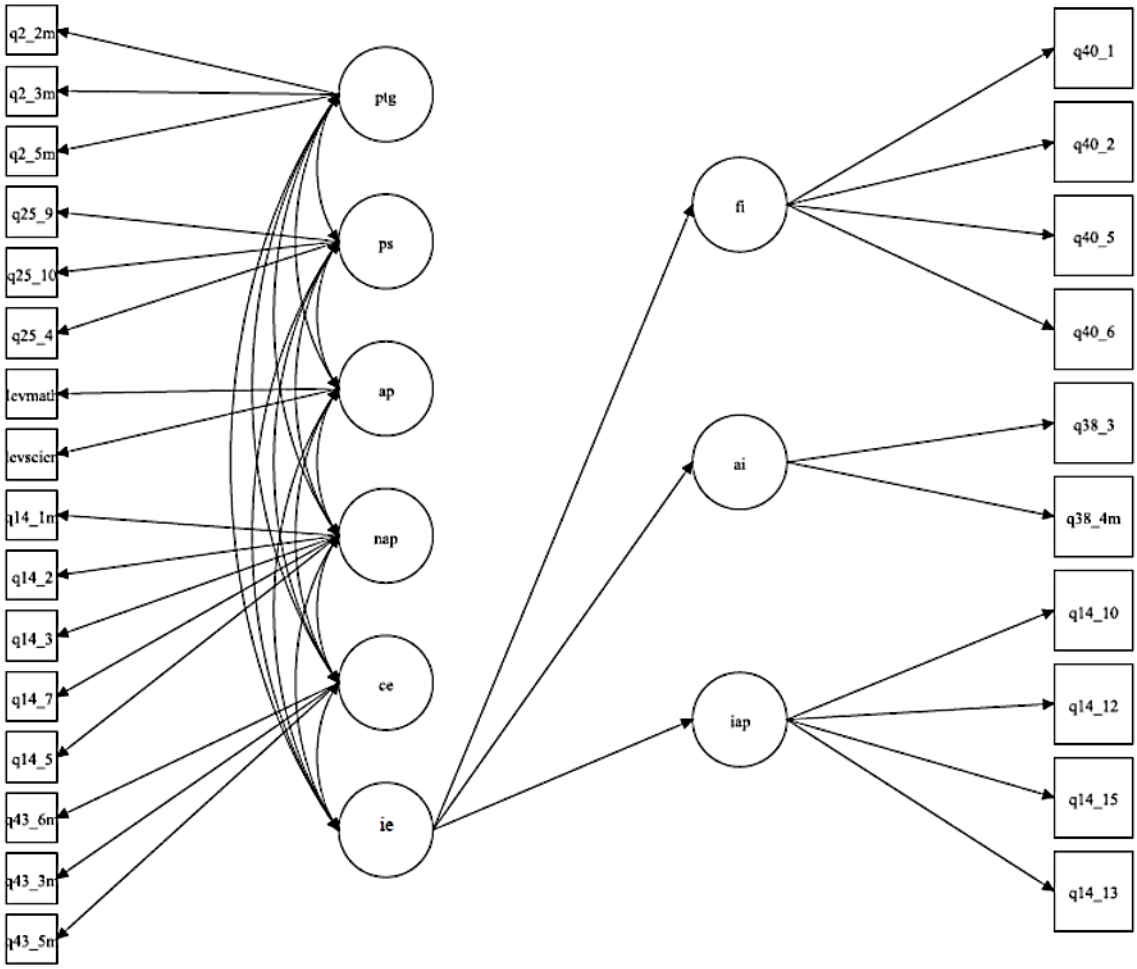

Figure 4.4. Extended second-order factor model of academic engagement of international students at community colleges (ie: Interactive Engagement; fi: Interaction with Faculty; ai: Interaction with Academic Advisors; iap: Use of Interactive Academic Practices; nap: Use of Noninteractive Academic Practices; ce: Classroom Experience; ps: Parental Support, ptg: Persistence Toward Goals; ap: Academic Preparedness).

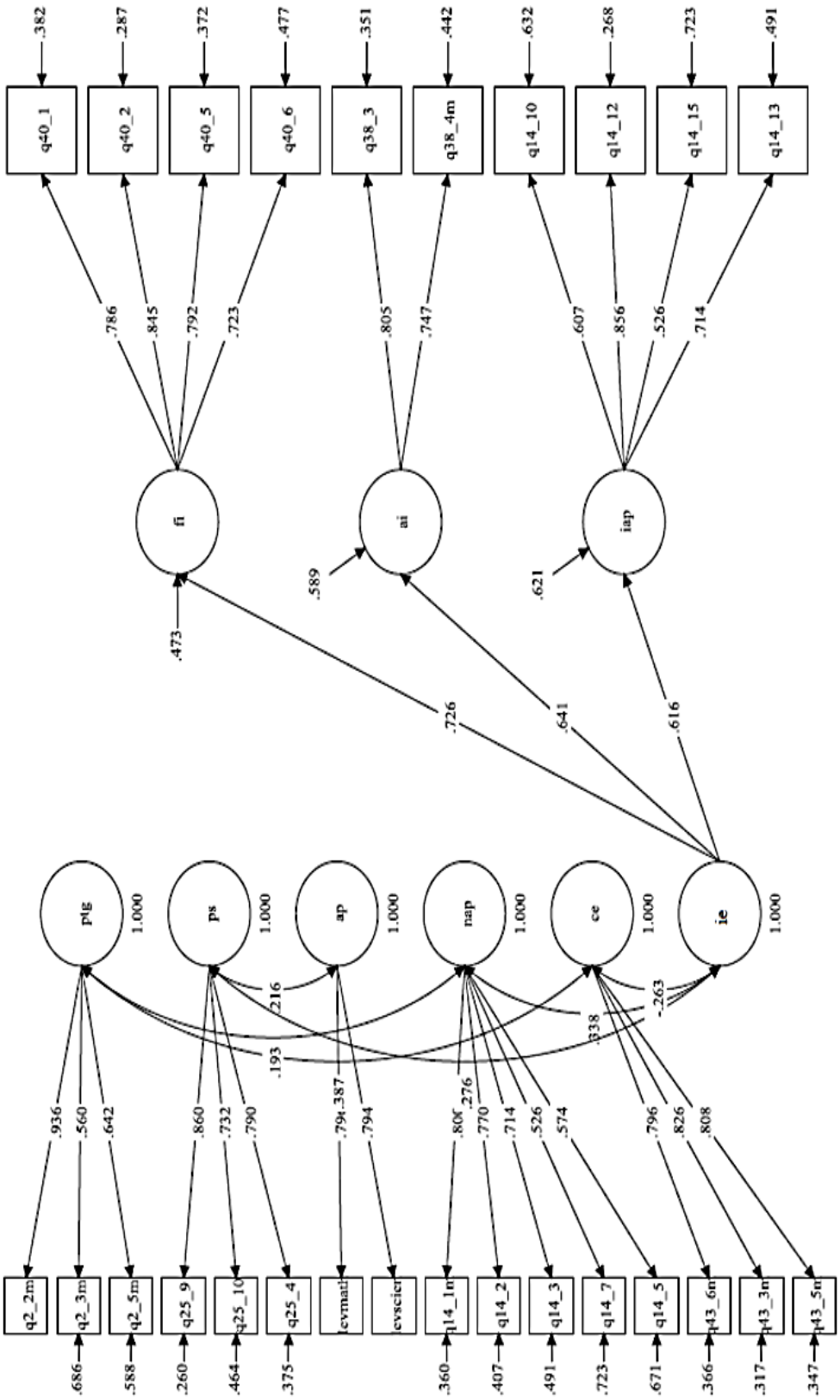

Figure 4.5. Extended second-order factor model of academic engagement of international students at community colleges: statistical detail (ptg: Persistence Toward Ggal, ps: Parental Support, ap: Academic Preparedness; ie: Interactive Engagement; fi: Interaction with Faculty; ai: Interaction with Academic Advisors; iap: Use of Interactive Academic Practices; nap :Use of Noninteractive Academic Practices; ce: Classroom Environment).

Table 4.36

*Confirmatory Factor Analysis: Extended Second-Order Factor Model of Academic Engagement for International Community College Students (*n *= 184)*

Construct/variable	Estimate	*SE*	Estimate/ *SE*	Two-tailed *p*-value
Persistence Toward Goal				
I keep trying until a job is done	.936	.055	17.118	.000
I stick to unpleasant tasks until they are done	.560	.060	9.311	.000
Failure makes me try harder	.642	.059	10.817	.000
Parental Support				
Work with you on your homework	.860	.037	23.472	.000
Discuss your progress in school with you	.732	.044	16.667	.000
Participated in school related activities	.790	.041	19.073	.000
Academic Preparedness				
Level of preparedness in mathematics	.796	.191	4.170	.000
Level of preparedness in science	.794	.199	3.996	.000
Interaction with Faculty				
Visited faculty after class/sought their advice on class projects	.786	.035	22.774	.000
Approached faculty outside class	.845	.030	27.971	.000
Discussed career plans with faculty	.792	.035	22.768	.000
Asked my instructor for comments and criticism about my work	.723	.042	17.317	.000
Interaction with Academic Advisors				
I met with academic advisors/counselors on a regular basis	.805	.070	11.567	.000
I talked with an advisor/counselor about courses to take and requirements	.747	.064	11.585	.000
Use of Noninteractive Academic Practices				
Spent more time studying	.800	.039	20.646	.000
Taught myself to study more effectively	.770	.041	18.855	.000
Did all of the assigned readings	.714	.046	15.439	.000
Studied by myself	.526	.061	8.597	.000
Increased lecture attendance	.574	.057	9.992	.000
Use of Interactive Academic Practices				
Studied with other students in the class	.607	.053	11.355	.000
Received informal tutoring	.856	.039	21.753	.000
Used feedback from a TA or professor on a regular basis	.526	.064	8.270	.000
Received academic support outside the class	.714	.046	15.384	.000
Classroom Experience				
I felt like I did not fit in	.796	.037	21.434	.000
I felt isolated in class	.826	.035	23.412	.000
Instructor or students made prejudiced comments	.808	.037	22.053	.000
Interactive Engagement				
Interaction with faculty	.726	.091	7.965	.000
Interaction with academic advisors	.641	.092	7.007	.000
Use of interactive academic practices	.616	.083	7.400	.000

During testing of the extended model of academic engagement, a decision was made to remove two variables from the model. The variable I give up if initially not successful was deleted from Persistence Toward Goal due to a factor loading value (.439) below the acceptable cutoff. In addition, because extremely high covariances may be a sign of a poor fit of a specific variable with specific model constructs, the variable of spent time just talking to you was removed from the Parental Support factor to improve the proposed model fit.

The comparative results of the CFA tests for the extended model of academic engagement against the data for domestic students and all students in the study are displayed in Table 4.37. As can be seen in the table, factor loading estimates of both factor indicators of the Academic Preparedness construct were found to be not statistically significant for all students and for all domestic students ($p > .05$); these estimates were statistically significant only for international students ($p < .001$; see Table 4.37). However, additional analysis of the smaller-sized samples of domestic students also resulted in statistically significant factor loadings of items loaded on Academic Preparedness (see Table 4.38).

Goodness-of-fit estimates for the extended model of community college student academic engagement for all students, domestic students, and international students are shown in Table 4.39. Overall, the CFA indicated a good fit of the model for international students (RMSEA = .032, CFI = .969, TLI = .965. Although the RMSEA values for all students in the study, domestic students in the study, and three random samples of domestic students were below 0.05, which may be considered a sign of good model fit, the CFI estimates were outside the acceptable threshold of 0.95 (CFI = .935 for domestic students and CFI = .937 for all students). Moreover, the TLI values for two random samples of domestic students at .905 were barely above the .90 cutoff, and for one random sample this indicator

Table 4.37

Confirmatory Factor Analysis: Extended Second-Order Factor Model of Academic Engagement for All Students and Domestic Students in the Study

Construct/variable	All students (n = 2,162) Estimate	*SE*	Domestic students (n = 1,931) Estimate	*SE*
Persistence Toward Goal				
I keep trying until a job is done	.715***	.018	.694***	.019
I stick to unpleasant tasks until they are done	.634***	.018	.651***	.019
Failure makes me try harder	.691***	.018	.694***	.019
Parental Support				
Work with you on your homework	.729***	.017	.732***	.018
Discuss your progress in school with you	.720***	.016	.723***	.017
Participated in school related activities	.740***	.015	.740***	.016
Academic Preparedness				
Level of preparedness in mathematics	.839	.483	.839	.622
Level of preparedness in science	.629	.364	.618	.462
Interaction with Faculty				
Visited faculty after class and sought their advice on class projects	.783***	.011	.781***	.012
Approached faculty outside class	.813***	.010	.804***	.011
Discussed career plans with faculty	.782***	.011	.780***	.011
Asked my instructor for comments and criticism about my work	.731***	.012	.730***	.013
Interaction with Academic Advisors				
I met with academic advisors/counselors on a regular basis	.650***	.022	.648***	.024
I talked with an advisor/counselor about courses to take and requirements	.620***	.023	.623***	.025
Use of Noninteractive Academic Practices				
Spent more time studying	.790***	.012	.792***	.012
Taught myself to study more effectively	.776***	.012	.775***	.012
Did all of the assigned readings	.674***	.014	.668***	.015
Studied by myself	.608***	.016	.609***	.017
Increased lecture attendance	.525***	.018	.518***	.019
Use of Interactive Academic Practices				
Studied with other students in the class	.536***	.018	.526***	.019
Received informal tutoring	.757***	.015	.752***	.016
Used feedback from a TA or professor on a regular basis	.582***	.018	.580***	.019
Received academic support outside the class	.743***	.015	.747***	.015
Classroom Experience				
I felt like I did not fit in	.830***	.014	.834***	.016
I felt isolated in class	.795***	.014	.788***	.016
Instructor or students made prejudiced comments	.592***	.017	.553***	.019
Interactive Engagement				
Interaction with faculty	.685***	.025	.676***	.027
Interaction with academic advisors	.737***	.033	.715***	.036
Use of interactive academic practices	.649***	.029	.655***	.034

***Two-tailed p-value < .001.

Table 4.38.

Confirmatory Factor Analysis: Extended Second-Order Factor Model of Academic Engagement, Random Samples of Domestic Students

Construct/variable	Random sample 1 (n = 200) Estimate	*SE*	Random sample 2 (n = 181) Estimate	*SE*	Random sample 3 (n = 191) Estimate	*SE*
Persistence Toward Goal						
I keep trying until a job is done	.632***	.055	.632***	.064	.734***	.062
I stick to unpleasant tasks until they are done	.769***	.050	.547***	.069	.629***	.064
Failure makes me try harder	.739***	.052	.766***	.062	.629***	.066
Parental Support						
Work with you on your homework	.676***	.059	.902***	.039	.801***	.052
Discuss your progress in school with you	.735***	.056	.677***	.049	.711***	.054
Participated in school related activities	.700***	.058	.779***	.044	.685***	.053
Academic Preparedness						
Level of preparedness in math	.854**	.268	.929**	.279	.689***	.148
Level of preparedness in science	.632**	.205	.507**	.156	.683***	.148
Interaction with Faculty						
Visited faculty after class and sought their advice on class projects	.739***	.039	.807***	.036	.721***	.045
Approached faculty outside class	.807***	.032	.819***	.035	.711***	.046
Discussed career plans with faculty	.793***	.033	.727***	.044	.752***	.043
Asked my instructor for comments and criticism about my work	.843***	.029	.650***	.051	.744***	.043
Interaction with Academic Advisors						
I met with academic advisors/counselors on a regular basis	.626***	.073	.743***	.076	.835***	.091
I talked with an advisor/counselor about courses to take and requirements	.585***	.084	.733***	.076	.598***	.080
Use of Noninteractive Academic Practices						
Spent more time studying	.681***	.049	.765***	.042	.861***	.030
Taught myself to study more effectively	.729***	.044	.841***	.038	.785***	.035
Did all of the assigned readings	.743***	.044	.566***	.059	.674***	.047
Studied by myself	.639***	.051	.545***	.060	.658***	.048
Increased lecture attendance	.532***	.060	.462***	.066	.531***	.058
Use of Interactive Academic Practices						
Studied with other students in the class	.499***	.057	.564***	.061	.505***	.065
Received informal tutoring	.765***	.054	.740***	.050	.755***	.050
Used feedback from a TA or professor on a regular basis	.588***	.064	.493***	.071	.638***	.059
Received academic support outside the class	.726***	.053	.783***	.049	.701***	.052
Classroom Experience						
I felt like I did not fit in	.845***	.060	.931***	.082	.790***	.062
I felt isolated in class	.734***	.059	.643***	.070	.690***	.062
Instructor/students made prejudiced comments	.522***	.060	.406***	.070	.508***	.068

Table 4.38 (continued)

Construct/variable	Random sample 1 (n = 200) Estimate	*SE*	Random sample 2 (n = 181) Estimate	*SE*	Random sample 3 (n = 191) Estimate	*SE*
Interactive Engagement						
Interaction with faculty	.662***	.075	.630***	.100	.672***	.106
Interaction with academic advisors	.684***	.116	.666***	.118	.518***	.103
Use of interactive academic practices	.768***	.097	.511***	.114	.651***	.111

**Two-tailed p-value < 0.05. ***Two-tailed p-value < 0.001.

Table 4.39

Goodness-of-Fit Indicators for Extended Second-Order Factor Model of Academic Engagement

Student group	*n*	χ^2	*df*	RMSEA	CFI	TLI
International students	184	334.749	281	.032	.969	.965
Domestic students						
All domestic students	1,931	1311.939	281	.044	.935	.925
Random sample 1 (~10%)	200	414.383	281	.049	.918	.905
Random sample 2 (~10%)	181	394.068	281	.047	.918	.905
Random sample 3 (~10%)	191	406.383	281	.048	.913	.899
All students	2,162	1411.613	281	.043	.937	.927

was below the cutoff (see Table 4.39). The extended model of academic engagement fit international students better than domestic students or all students in the study.

Final Model: Extended Second-Order Factor Model of Academic Engagement of International Students at Community Colleges

Informed by the results of the CFA tests on Model 1 and Model 2 with the samples of international and domestic students as well as all students in the study, a final second-order factor model for academic engagement of international students at community colleges was designed and tested against the data.

As mentioned earlier, there was an indication that the statistical significance of factor loading estimates for Academic Preparedness may have been affected by sample size.

Further analysis of the CFA results and correlation matrices of the extended model of academic engagement for international students revealed that the construct of Academic Preparedness was significantly correlated with Parental Support (p = .023) and was not correlated at a statistically significant level with any of the constructs measuring academic engagement. Academic Preparedness was removed from the model.

At the same time, although no statistically significant correlation was found between the construct of Classroom Experience and factors related to academic engagement when the model was tested for domestic students, this construct was found to be correlated with Interactive Engagement and Persistence Toward Goal at a significant level when CFA tests for the model were conducted with the sample of international students. Classroom Experience was retained in the final extended model of academic engagement for international community college students. The final model of academic engagement of international students at community colleges is displayed in Figure 4.6.

The final CFA results and goodness-of-fit estimates are presented in Table 4.40 and Table 4.41, respectively. For the purpose of comparison, goodness-of-fit estimates for the model against all student data and domestic student data, as well as three random samples of international students drawn from the original sample, are displayed in Table 4.41.

Persistence Toward Goal was found to be correlated with Use of Noninteractive Academic Practices (p = .029), Parental Support with Interactive Engagement (second-order factor; p = .010), Classroom Experience with Interactive Engagement (second-order factor; p = .018) and Persistence Toward Goal (p < .001). Interactive Engagement was found to be correlated with Use of Noninteractive Academic Practices (p = .002).

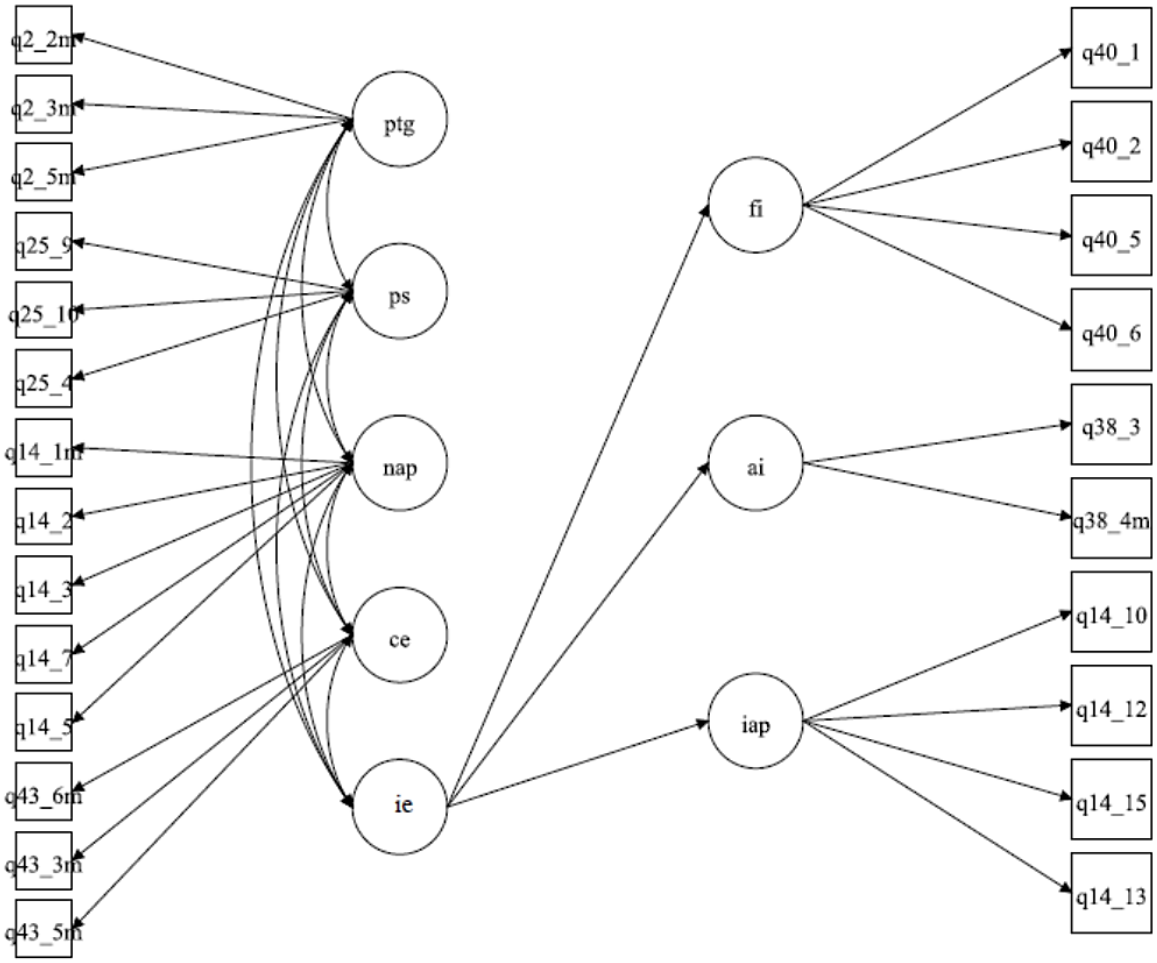

Figure 4.6. Final extended second-order factor model of academic engagement of international students at community college (ptg: Persistence Toward Goal; ps: Parental Support; ie: Interactive Engagement; fi: Interaction with Faculty; ai: Interaction with Academic Advisors; iap: Use of Interactive Academic Practices; nap: Use of Noninteractive Academic Practices; ce: Classroom Experience.

Table 4.40

*Confirmatory Factor Analysis: Extended Second-Order Model of Academic Engagement of International Community College Students (*n *= 184)*

Construct/variable	Estimate	*SE*	Est./*SE*	Two-tailed *p*-value
Persistence Toward goal				
I keep trying until a job is done	.948	.054	17.484	.000
I stick to unpleasant tasks until they are done	.656	.060	9.194	.000
Failure makes me try harder	.631	.059	10.635	.000
Parental support				
Work with you on your homework	.859	.038	22.601	.000
Discuss your progress in school with you	.735	.044	16.574	.000
Participated in school related activities	.788	.041	19.016	.000
Interaction with faculty				
Visited faculty after class and sought their advice on class projects	.785	.035	22.370	.000
Approached faculty outside class	.853	.028	29.937	.000
Discussed career plans with faculty	.800	.033	23.907	.000
Asked my instructor for comments and criticism about my work	.726	.042	17.460	.000
Interaction with academic advisors				
I met with academic advisors/counselors on a regular basis	.812	.070	11.655	.000
I talked with an advisor/counselor about courses to take and requirements	.741	.065	11.375	.000
Use of noninteractive academic practices				
Spent more time studying	.800	.039	20.703	.000
Taught myself to study more effectively	.770	.041	18.809	.000
Did all of the assigned readings	.713	.046	15.404	.000
Studied by myself	.527	.061	8.613	.000
Increased lecture attendance	.573	.057	9.975	.000
Use of interactive academic practices				
Studied with other students in the class	.614	.057	10.81	.000
Received informal tutoring	.851	.039	21.818	.000
Used feedback from a TA or professor on a regular basis	.548	.062	8.856	.000
Received academic support outside the class	.718	.046	15.443	.000
Classroom experience				
I felt like I did not fit in	.794	.037	21.257	.000
I felt isolated in class	.828	.035	23.630	.000
Instructor or students made prejudiced comments	.808	.036	22.208	.000
Interactive Engagement				
Interaction with faculty	.725	.083	8.738	.000
Interaction with academic advisors	.634	.090	7.052	.000
Use of interactive academic practices	.616	.082	7.483	.000

Table 4.41

Goodness-of-Fit Indicators for Extended Second-Order Model of Academic Engagement of International Community College Students

Student group	*n*	χ^2	*df*	RMSEA	CFI	TLI
International students	184	275.967	239	.029	.977	.974
Domestic students						
All domestic students	1,931	1128.898	239	.044	.941	.932
Random sample 1 (~10%)	200	369.779	239	.052	.916	.903
Random sample 2 (~10%)	181	340.478	239	.048	.923	.911
Random sample 3 (~10%)	191	350.668	239	.049	.918	.905
All students	2,162	1079.756	239	.040	.951	.943

As shown in Tables 4.39 and 4.41, removing Academic Preparedness improved the overall measurement model fit against the data on international students (RMSEA = .029, CFI = .977, TLI = .974). Once again, the values of the goodness-of-fit measures indicated a better model fit for the sample of international community college students compared to other samples in the analysis. Moreover, this third model of academic engagement was confirmed for international students with better fit indicators compared to Model 1 and Model 2 previously discussed (see Table 4.42).

Table 4.42

Goodness-of-Fit Indicators for Three Models of Academic Engagement of International Students at Community Colleges

Model	χ^2	*df*	RMSEA	CFI	TLI
Model 1 - Simple second-order factor model	162.797	128	.038	.972	.967
Model 2 - Extended second-order factor model	334.749	281	.032	.969	.965
Model 3 - Final second-order factor model	275.967	239	.029	.977	.974

Finally, a diagram of the model with the CFA results for international students is shown in Figure 4.7. The final extended second-order factor model of academic engagement of international students comprises seven first-order factors including Persistence Toward Goal, Parental Support, Interaction with Faculty, Interaction with Academic Advisors, Use of

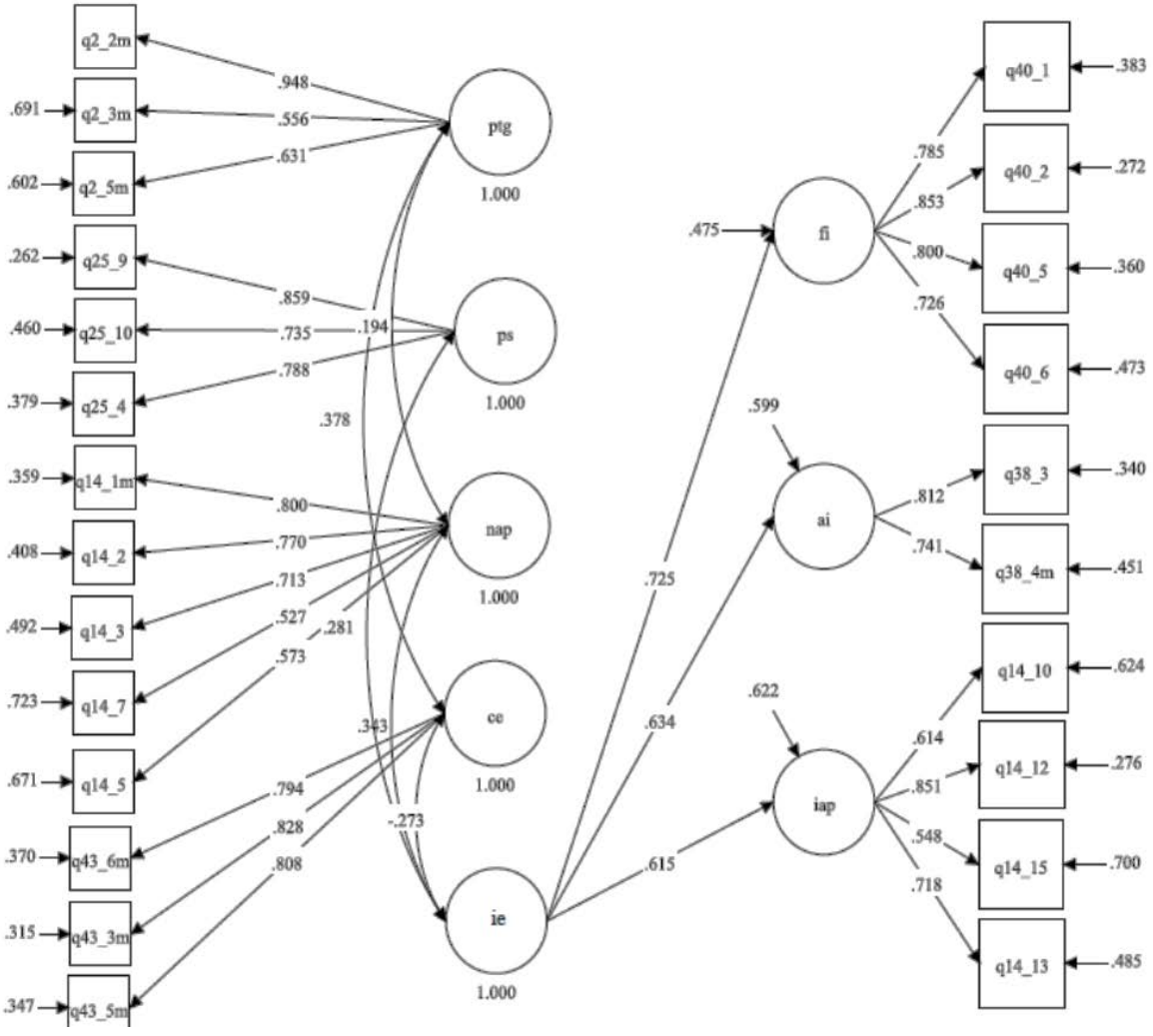

Figure 4.7. Final extended second-order factor model of academic engagement of international community college students: Statistical detail. Note: ptg – Persistence Toward Goal, ps – Parental Support, ie – Interactive Engagement; fi – Interaction with Faculty; ai– Interaction with Academic Advisors; iap – Use of Interactive Academic Practices; nap – Use of Noninteractive Academic Practices; ce – Classroom Experience.

Interactive Academic Practices, Use of Noninteractive Academic Practices, and Classroom Experience, and one second-order factor: Interactive Engagement. This study's results confirmed this model as a culturally sensitive model of academic engagement of international students at community colleges.

Summary

Chapter 4 presented the findings of the Sunshine College SSSL dataset analysis aimed at developing a measurement model of academic engagement for international students at community colleges. It included a descriptive analysis of the demographic and background characteristics of all, domestic, and international student samples; between-groups analysis of demographic and background characteristics of domestic and international students; between-groups analysis of variables pertaining to academic engagement of domestic and international students; an EFA of the variables pertaining to academic engagement and surrounding variables; and a CFA of the academic engagement measurement models constructed based on the results of the previous steps. IBM SPSS Version 22.0 and MPlus Version 7.3 statistical software were utilized to perform the data analyses.

The results of the data analysis were presented in five sections, each section corresponding with one of the research questions framing the study. The first section provided an overview of response frequencies and rates on general demographic, socioeconomic, and academic variables. The second section reported the results of the comparative between-groups analysis of these characteristics for domestic and international students. International and domestic students were found to be statistically different with respect to age, ethnicity, marital status, enrollment status, level of preparedness in

mathematics and science, participation in language development education, degree aspirations, and self-reported GPA.

The third section of this chapter included the results of the differences between domestic and international students on items related to academic engagement. Overall, international students in this study appeared to be more academically engaged than were domestic students. On average, international students spent more time on campus and more time studying and preparing for classes than did domestic students, and they also interacted more with faculty and academic advisors. In terms of engaging in various practices of academic pursuit, there was no statistically significant difference between domestic and international students on the use of interactive academic practices. However, the analysis results revealed that international students were more likely to engage in the use of noninteractive academic practices than were domestic students and, on average, found noninteractive academic practices to be more useful compared to domestic students.

The next section reported the results of the EFA, used to examine relationships between variables related to academic engagement of the students in the study. Two factor structures were identified: first, a structure of six constructs comprising 25 variables measuring academic engagement and, second, a structure of four constructs based on 10 variables related to students' social background and academic preparation. Each structure was examined against the data for all students in the study, international students in the study, and domestic students in the study. Assumptions for sample sizes were taken into consideration, and criteria for reliability of EFA results were checked and met.

Finally, the fifth section presented the results of the CFA. Three second-order factor models of the academic engagement of international community college students were

created and examined for goodness of fit. The results revealed that measurement models that took into consideration factors surrounding academic engagement of community college students, such as classroom experience and sociocultural background, demonstrated noticeably better fit for international students than for domestic students. After a series of CFA tests, a final culturally sensitive model consisting of seven first-order and one second-order factor was proposed to measure academic engagement of international students at community colleges.

Discussion of the major findings reported in Chapter 4 and implications they may have for theory, practice, future research, and educational leadership are presented in Chapter 5.

CHAPTER 5. DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

Introduction

The concept, nature, and impact of student engagement have been discussed in higher education research for decades; yet, the phenomenon of student engagement continues to draw researchers' attention as more relevant factors have been brought into the discussion. This study looked at the academic engagement of international students at community colleges through the lens of culture and its influence on learning. It was inspired by multiculturalism and calls for recognizing the cultural diversity of American campuses through incorporating a cultural dimension into the research of educational concepts in the hope that insights into the impact of cultural background on student learning, experiences, and outcomes would be beneficial to all college constituencies including faculty, administrators, and most importantly, students.

Purpose of the Study

The study's focal point was academic engagement of international students in the United States, and it was based on the analysis of empirical data collected at Sunshine College, a large urban public community college in the southeast United States, as part of a multistage study of American community college students. From a practical perspective, the purpose of this study was threefold: (a) to examine and compare background demographic characteristics and patterns of academic engagement of international and domestic students; (b) based on insights gained from interdisciplinary literature review and preliminary data analysis, to develop a conceptual model of academic engagement of international community college students; and (c) to design a culturally sensitive measurement model of academic

engagement of international students at community colleges and to conduct goodness-of-fit analyses of the model against the data collected at the research site.

Significance of the Study

This study makes a significant contribution to research, policy, and practice in a number of ways. First, it contributes to the current research in higher education by introducing a conceptual framework that blends educational and sociocultural theories. In this study, academic engagement of international students was examined based on the approaches to student engagement in the theories of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005) and based on the sociocultural view of learning that highlights the impact of students' cultural background on learning (Pajares, 2007; Salili et al., 2001; Salili & Hoosain, 2007b; Vygotsky, 1978).

Second, this study expands the knowledge of the concept and structure of academic engagement, specifically for international students at community colleges. Adding a new, cultural perspective to research on student engagement, this study proposes a measurement model of academic engagement for international students that highlights cultural sensitivity regarding the concept of academic engagement and surrounding background factors. The model emphasizes engagement in interactive academic practices and noninteractive academic practices as equally important components of international students' academic engagement. Social capital, academic capital, classroom experience, and persistence in academic pursuit represent surrounding factors as vital elements of the culturally sensitive academic engagement model.

Third, the study adds to the understanding of academic engagement in the current research literature by highlighting a complex second-order factor structure of the construct of

academic engagement. Based on a CFA against the empirical community college data, academic engagement can be conceptualized as a construct with five first-order elements of Interaction with Faculty, Interaction with Academic Advisors, Use of Interactive Academic Practices, Use of Noninteractive Academic Practices, and Classroom Experience. Three of the first-order factors—Interaction with Faculty, Interaction with Academic Advisors, and Use of Interactive Academic Practices—comprise a second-order factor of Interactive Engagement. Thus, measures of academic engagement can be participation in interactive (or collaborative) and noninteractive (or private) academic activities.

Fourth, the new culturally sensitive model of academic engagement is expected to assist faculty and administrators in learning about patterns of international students' academic engagement and assessing its levels. The study's findings highlight the importance of recognizing the influence of international students' cultural background on their integration into academic life in the United States, specifically on the way international students may prefer to engage in learning. This information would be useful for instructional design in specific classes and for program interventions at college level.

Last, but not the least, this study seeks to promote awareness of cultural diversity on American college and university campuses and to help bridge the gap between diverse student populations and those who teach and support student learning. Without a better understanding of the forms and patterns of international students' academic engagement, these students' academic behavior could be misjudged, their learning misinterpreted, and faculty and administrators' physical and emotional investment misplaced.

Alignment of the Study to Research Foundations

The foundations of this study are interdisciplinary. The study was built on the literature that highlights the role student engagement in American higher education (Astin,

1984, 1993; Kuh et al., 2006, 2010; McClenney, 2006, 2007; McClenney et al., 2010; Pascarella, 1985; Pascarella & Terenzini, 2005; Tinto, 1993) and research on the impact of cultural background on learning and academic behavior (Holtbrugge & Mohr, 2010; Pajares, 2007; Salili et al., 2001; Salili & Hoosain, 2007b; Vygotsky, 1978).

Engagement has been recognized as one of the most important factors that contribute to a wide array of college student outcomes including, but not limited to, persistence (Kuh et al., 2008, 2010; Mamiseishvili, 2012; Tinto, 1993), completion and degree attainment (McCormick et al., 2013; Price & Tovar, 2014), student learning (Astin, 1993; Krause, 2005; Kuh et al., 2010; McCormick et al., 2013; Pascarella & Terenzini, 2005), and overall college experience (Kuh et al., 2010; Leask, 2009; Owens & Loomes, 2010; Pascarella & Terenzini, 2005; Zhao et al., 2005). In general, the more students are involved with faculty, academic staff, and peers and participate in college activities, the more they thrive academically, the better their college experience is, and the higher retention rates are for educational institutions (Harper & Quaye, 2009; Kuh et al., 2006, 2008). Studies on international students at American colleges and universities have provided some evidence that this holds true for international students as well (Anderson et al. 2009; Behroozi-Bagherpour, 2010; Korobova, 2012; Kwon, 2009; Mamiseishvili, 2012; Zhao et al., 2005).

However, understanding patterns of engagement of international students as they pertain to learning presents a challenge. International students are different from traditional American college students (Andersen et al., 2009; Andrade & Evans, 2009; Sherry et al., 2010). They may be similar in terms of age, social status, and other demographic characteristics, but there is a fundamental difference in cultural socialization that affects students' academic engagement patterns (Andersen et al., 2009; Andrade & Evans, 2009;

Holtbrugge & Mohr, 2010; Liu, 2001; Salili et al., 2001; Sherry at al., 2010; Sugahara & Boland, 2010; Tan & Liu, 2014; Zhao et al., 2005). This emphasizes the necessity of informing educational research of the insights from sociocultural studies of culture and its impact on learning in educational research.

Despite the importance of cultural background in community college international student academic engagement, research on the role of culture in academic engagement of college students is still relatively scarce. This study attempted to link views of student engagement in educational research (Astin, 1984, 1993; Kuh et al., 2006, 2010; McClenney, 2006, 2007; McClenney et al., 2010; Pascarella, 1985; Pascarella &Terenzini, 2005; Tinto, 1993), sociocultural theories of learning (Pajares, 2007; Salili et al., 2001; Salili & Hoosain, 2007b; Vygotsky, 1978), and cultural transition theories (Bhabha, 1994; Nishida, 1999; Ponterotto et al., 2003) to examine the construct of academic engagement of community college international students and to develop a culturally sensitive measurement model from an interdisciplinary perspective.

Discussion of Major Findings with Respect to Research Questions

Methods of statistical analysis were employed to seek answers to the sequential quantitative research questions. As was described in Chapter 3, this study used Spring 2013 SSSL data collected at Sunshine College, a large urban community college in the southeast United States. Detailed statistical findings and results of the quantitative analysis were reported in Chapter 4. From these findings, conclusions and implications have been drawn and are presented below.

Research Question 1

What is the demographic profile of international students and domestic students who participated in the study?

Major findings. The profiles of international and domestic students at Sunshine College were descriptively analyzed based on response frequencies as well as rates and means of demographic, socioeconomic, and academic background variables. Similarities and differences were the focus of the analysis, and comparisons of the profiles were summarized. The analysis of the survey responses indicated that both domestic and international respondents were predominately female (65.1% and 69.6%, respectively), single and never married (55.6% and 57.1%, respectively), and employed and working over 30 hours a week (50.4%, and 47.8%, respectively). Most of students in both the domestic (50.8%) and international (57.1%) groups came from families with an estimated annual income of $59,000 or less and experienced concerns about their ability to finance college education (84.3% and 84.8%, respectively).

Important differences in the profiles of domestic and international students were noted with respect to age, enrollment status, ethnicity, parental education, levels of academic preparedness, developmental education completed, and degree aspirations. On average, international students tended to be younger than domestic students: 49.5% of international students were between 18 and 24 years of age compared to 38.1% of domestic students). Most international students (63.0%) attended college full time, compared to 47.7% of domestic students. In terms of ethnicity, international students were predominantly Hispanic (43.5%). The levels of father's education were overall higher for international students: 33.2% of international students reported that their fathers held at least a bachelor's degree compared to 21.2% of domestic students. The largest shares of students in both groups had mothers who were high school graduates (26.5% for domestic students and 21.2% for international students); however, the shares of international students whose mothers' level of

education was only elementary school or less (13.0%), on the one hand, or bachelor's or higher (28.7%), on the other hand, were noticeably larger compared to domestic students (5.7% and 22.2%, respectively).

In terms of academic preparedness, international students reported overall higher levels of preparedness in mathematics and science (measured as the number of courses taken). The largest shares of international students had completed seven to nine courses in math (39.7%) and five or six courses in science (30.4%), whereas the largest shares of domestic students had completed four to six courses in math (30.4%) and three or four courses in science (35.5%). International students participated in developmental education at higher rates than did domestic students: 64.1% of international students reported participation in developmental education compared to 57.7% of domestic students. The gap was especially noticeable in developmental education in English. International students reported almost double the rate of participation in developmental education in writing and reading compared to domestic students (51.1% and 27.0%, respectively). Interestingly, the perceived levels of language skills (including reading, writing, and public speaking) were similar for both domestic and international respondents: 67.7% of domestic students and 60.9% of international students perceived themselves to be above average or in the top 10% compared to their classmates in terms of English language skills.

Conclusions and discussion. Based on the descriptive analysis, a typical international student at Sunshine College was between 18 and 24 years of age, single and never married, enrolled full time, and working on campus or outside campus at least 21 hour per week, having a solid academic background in science and math and having completed some sort of developmental or preparatory courses in English. The study demonstrates that

international students were close to the profile of a traditional college student based on age and full-time enrollment status, as defined by Harper and Quaye (2009). Coupled with the fact that the data came from students enrolled in academic programs, as well as the fact that only 1.1% of the respondents aspired to no more than an associate's degree, the international students may have viewed community college as a pathway to higher levels of education. In this sense, the international students represented by the dataset were comparable to international students in the first stages of 4-year programs. However, it should also be kept in mind that, according U.S. Department of State regulations, full-time enrollment is a student visa requirement. For some international students, full-time enrollment may be a necessity rather than a choice.

International students' ethnicity is another factor that draws attention and should be considered in the context of the research site. The analysis showed that about 43.5% of international student respondents were Hispanic. Hispanic students were also the second largest ethnic group among domestic students (26.4%) in the sample, which is not surprising for a college located in a state where, according to the publicly data, about one quarter of the state's population was Hispanic (U.S. Census Bureau, 2014 . A considerable share of the data in this study came from international students who were ethnically similar to domestic students. This may have affected these international students' perception of the campus environment and interactions with other college agents. These international students, as a group, may have blended in better with domestic students and experienced a smoother transition into the American academic environment compared to ethnically and culturally different international students, who, according to previous research, may experience cultural transition difficulties (Anderson et al., 2009; Andrade, 2006; Bertram et al., 2014;

Burkholder, 2014; Evans et al., 2009; Galloway & Jenkins, 2005; Heyn, 2013; Kwon, 2009; Lee, 2010; Poyrazli & Grahame, 2007; Sherry et al., 2010; Stebleton et al., 2014; Tas, 2013b; Yoon & Portman, 2004).

Research Question 2

Are there any differences in demographic and background characteristics between international students and domestic students?

Major findings. The between-groups statistical analysis of the differences in demographic, socioeconomic, and academic characteristics between international and domestic students in the sample revealed that international and domestic students were found to be statistically different with respect to age, ethnicity, marital status, enrollment status, level of preparedness in mathematics and science, participation in language development education, degree aspirations, and self-reported GPA. The effect size of these results was mostly small to medium.

No statistically significant difference was found between domestic and international students with respect to gender; socioeconomic background, including parents' education, estimated parents' income, and financial concerns; employment status and time at a job; participation in developmental education overall; and perceived language skills.

Conclusions and discussion. As was mentioned in the previous subsection, on average, international students were significantly younger than domestic students were and had more preparation in mathematics and science. International and domestic students shared similar, somewhat less affluent and less privileged, socioeconomic backgrounds. Interestingly, although more international students were enrolled full time, there was no significant difference in employment rates between international and domestic students.

This study's finding in the area of English language skills is a matter of special attention. English language skills, both actual and perceived, have been repeatedly reported as one of the most influential factors in international students' college career and experience (Anderson et al., 2009; Andrade, 2008; Wongtrirat, 2010; Yu & Shen, 2012). Researchers have linked inadequate English language proficiency of international students to academic and social struggle (Anderson et al., 2009; Burkholder, 2014; Mathews, 2007; Sherry et al., 2010; Teranishi et al., 2011). According to the results of this study, significantly more international students completed developmental courses in writing and/or reading compared to domestic students. This may be explained by the fact that all international students in this study were nonnative English language speakers, and language development was required to prepare these students for studying in the United States. At the same time, international students in this study demonstrated high confidence in their skills in writing and public speaking and predominately (60.9% of students) rated their language skills above average or in the top 10% compared to others in class.

Based on this study's findings, overall, international students at Sunshine College were as confident in their language skills as domestic students, which made English language skills a less important factor in this particular study. In part, similarities in language skills perceptions could be explained by ethnic similarities and, presumably, origin and cultural closeness between the largest subgroup of international students and domestic students at the research site.

Research Question 3

Are there any differences in academic engagement between international and domestic students?

Major findings. The between-groups analysis of differences in academic engagement patterns between international and domestic students included groups of items related to time invested in college work, interaction with faculty, interaction with advisors, engaging in interactive (or collaborative) academic practices, and engaging in noninteractive (or private) learning practices. The results indicated that domestic and international students were significantly different with respect to most academic engagement variables. Thus, statistically significant differences existed between international and domestic students regarding time spent on campus, time spent studying and preparing for classes, interaction with faculty (including visiting faculty and seeking their advice, approaching faculty outside class, discussing career plans with faculty, and asking faculty for comments about student work), and interaction with academic advisors (including meeting with advisors on a regular basis and talking with an advisor about courses to take, requirement, and education plans). On average, international students appeared to invest more time in college and to be more engaged with faculty and academic advisors compared to domestic students.

In terms of engaging in various academic activities, there were no statistically significant differences between domestic and international students on the use of interactive academic practices such as studying with other students, receiving informal tutoring or academic support outside the class, and using regular feedback from TAs or professors. However, international students were more likely to engage in noninteractive academic practices (including studying on their own, spending more time studying, studying more effectively, doing all of the assigned reading, and increasing lecture attendance) than were domestic students and, on average, found noninteractive academic practices more useful compared to domestic students.

Conclusions and discussion. The analysis revealed that international students were likely to invest more time in college than were domestic students: on average, international students spent more time on campus and more time studying and preparing for classes than did domestic students. Furthermore, on average, international students interacted more often with faculty and were more engaged in discussing academic work and career plans with faculty. Moreover, the results showed that international students tended to interact more with academic advisors than did domestic students, which is in line with previous research findings as well (Andrade, 2006; Brinson & Kottler, 1995; Kwon, 2009; Zhao et al., 2005).

Statistical results in the area of engagement in specific types of academic activities were somewhat unexpected and have important implications. Some of the previous studies that focused on international student academic engagement have pointed to lower levels of international student engagement with peers compared to domestic students, mainly due to restrictions imposed by English language skills (Deardorff, 2009; Hendrickson et al., 2011; Kim & Egan, 2010; Yu & Shen, 2012). The results of this study indicated that international and domestic students at Sunshine College were equally engaged in interactive, or collaborative, academic practices and both groups found these practices useful. However, international students resorted to noninteractive academic practices more than domestic students did and, overall, found noninteractive academic practices more useful than domestic students did. This finding points to the differences in preferences for academic activities highlighted in the previous studies on learning style preferences of international students (Arkoudis & Tran, 2010; Bartram, 2008; Bodycott, 2012; Burkholder, 2014; Holtbrugge & Mohr, 2010; Liu, 2001; Yu & Shen, 2012). From this study's conceptual perspective, the difference in preferences could be explained by cultural differences and the fact that, prior to

coming to the United States, international students had developed learning habits in culturally different academic environments that may have favored noncollaborative academic practices.

Research Question 4

How can academic engagement of international students at community colleges be defined in measurement terms?

Major findings. EFA was used to define measures of academic engagement of international students at community colleges. Two reliable underlying factor structures were produced: one summarizing variables measuring academic engagement, academic experiences, and persistence in academic pursuit of students in the study and the other based on the variables related to students' social background and academic preparation. The construct of academic engagement was operationalized as a complex factor structure consisting of the following components: interaction with faculty, interaction with academic advisors, use of interactive academic practices in academic pursuit, and use of noninteractive academic practices in academic pursuit. Related, or surrounding, components included persistence toward goal in academic pursuit and classroom experience. The second factor structure included variables related to students' social background and academic preparation including parental support, parental education, academic preparedness, and developmental education. Most components in the two structures consisted of four or five observable items.

Conclusions and discussion. The two structures reflect the theoretical underpinnings of student engagement found in the frameworks of student involvement (Astin, 1984, 1993), student integration (Tinto, 1993), and college student development (Pascarella, 1985; Pascarella & Terenzini, 2005). This study found that engagement in noninteractive academic practices was an important element of the academic engagement of international students.

Interestingly, some of the variables selected for the analysis based on previous research did not pass the test against the empirical data analyzed in this study. As mentioned earlier, based on previous research, perceived English language skills were initially assumed to be a pull factor for international students' academic engagement. However, the EFA indicated that the variable of perceived language skills lacked consistent correlation with other variables defining and surrounding academic engagement of international students and had factor loading indicators below the accepted threshold. Coupled with the fact that no significant difference in perceived language skills was found between domestic and international students, this study found English language skills to be irrelevant for academic engagement of international students at Sunshine College. This can be explained by the lack of distinct ethnic and presumably cultural differences between a large share of the international students and the domestic students based on the demographic and comparative analysis.

Another interesting finding involves the variables measuring time students invested in college. Although the previous research (Astin, 1993; Zhao et al., 2005) and established practice (NSSE and CCSSE) often include variables related to time studying or preparing for class as measures of student engagement, this variable, along with the variable time spent on campus, was not found to be reliably associated with any component of the academic engagement construct analyzed in this study. This finding suggests that a more precise definition of time-related variables may be necessary in order to potentially use time invested in academic activities in defining and measuring academic engagement.

Research Question 5

How can a new measurement model of academic engagement of international community college students be defined?

Major findings. The CFA revealed a complex second-order structure of the concept of academic engagement. Three second-order factor models of the academic engagement of international community college students were created and examined for goodness of fit. The results indicated that measurement models that take into consideration factors surrounding academic engagement of community college students, such as classroom experience, and sociocultural background demonstrate a noticeably better fit for international students than for domestic students. The extended second-order factor model of academic engagement of international students at community colleges is proposed to analyze academic engagement of international students enrolled in community colleges.

Conclusions and discussion. This study sheds more light on the concept of academic engagement by revising the structure of academic engagement based on a second-order factor analysis. Although no established definition of academic engagement and no established scales to measure it can be found in the literature besides those found in research on student engagement in general, many studies and practical applications share a similar view of the elements construing academic engagement such as interaction with faculty and peers about academic matters, interaction with academic advisors, engagement in course activities and class participation (e.g., Barbatis, 2010; Bers & Smith, 1991; Korobova, 2012; Krause & Coates, 2008; Mamiseishvili, 2012; Zhao et al., 2005). Student engagement in noninteractive academic pursuit appears to be often overlooked or included as part of other important dimensions of student engagement. For the NSSE, time spent preparing for class is conceptualized as part of the Level of Academic Challenge benchmark (Indiana University Center for Postsecondary Research, 2015; Kuh, 2001, 2009b). From the point of view of the CCSSE's developers, engagement in such noninteractive academic activities as reading

course-related literature and completing readings and assignments are listed as Student Effort benchmark indicators (University of Texas at Austin, 2005; McClenney 2006, 2007). This study's results suggest that noninteractive academic engagement practices should be considered an element of academic engagement.

This study proposes a complex second-order factor structure of academic engagement that includes five first-order factors, namely Interaction with Faculty, Interaction with Academic Advisors, Use of Interactive Academic Practices, Use of Noninteractive Academic Practices, and Classroom Experience, and one second-order factor, Interactive Engagement, consisting of three first-order factors of Interaction with Faculty, Interaction with Academic Advisors, and Use of Interactive Academic Practices. Engagement in noninteractive academic practices stands out as a separate dimension in the structure of academic engagement.

This study provides empirical evidence to support the use of previously employed academic engagement measurement scales related to interaction with faculty, academic advisors, and other students in class, which enhance learning. Most important, this study's results underscore the role of noninteractive forms of academic engagement such as class attendance, private study, completing course assignments and many others not examined in this study. This model of academic engagement, named the simple second-order factor model of academic engagement, highlights a more holistic understanding of the concept and incorporates a variety of academic practices students may rely on in learning and, thus, may have wider applicability compared to other models offered in the literature.

When it comes to measuring academic engagement of international students at community colleges, an array of surrounding factors accounting for the cultural differences

may come into play. Based on the literature and the analyses conducted at earlier stages of this study, persistence in attaining academic goals, parental support, and academic preparedness were included as important elements of the culturally sensitive academic engagement model for international community college students. However, although academic preparedness has been mentioned in research as a factor contributing to international student academic engagement (Andrade & Evans, 2009; Rienties et al., 2012; Terzian & Osborne, 2011), no conclusive empirical results were obtained in this study to retain academic preparedness in the final model. The culturally sensitive second-order factor model of academic engagement of international community college students, presented in Figure 5.1, demonstrates better fit for international students in the study compared to domestic students, and this model fits the international student data better than the simple second-order model of academic engagement.

Implications for Theory, Practice, Educational Leadership, and Future Research

This study has a number of important theoretical and practical implications and also opens up opportunities for further research. First, this study's results can be useful for theoreticians to advance the conceptual understanding of academic engagement itself. Second, this study resulted in findings that provide knowledge for policymakers and practitioners to design and implement programs that foster higher levels of engagement for students of diverse cultural backgrounds as fit for them.

Implications for Theory

The findings of this study, in essence, enhance the literature on international student academic engagement by assuming an interdisciplinary approach and adding a cultural perspective to the theories of student involvement and student engagement. The study points out that, not only is the experiences of education different for all students, but that

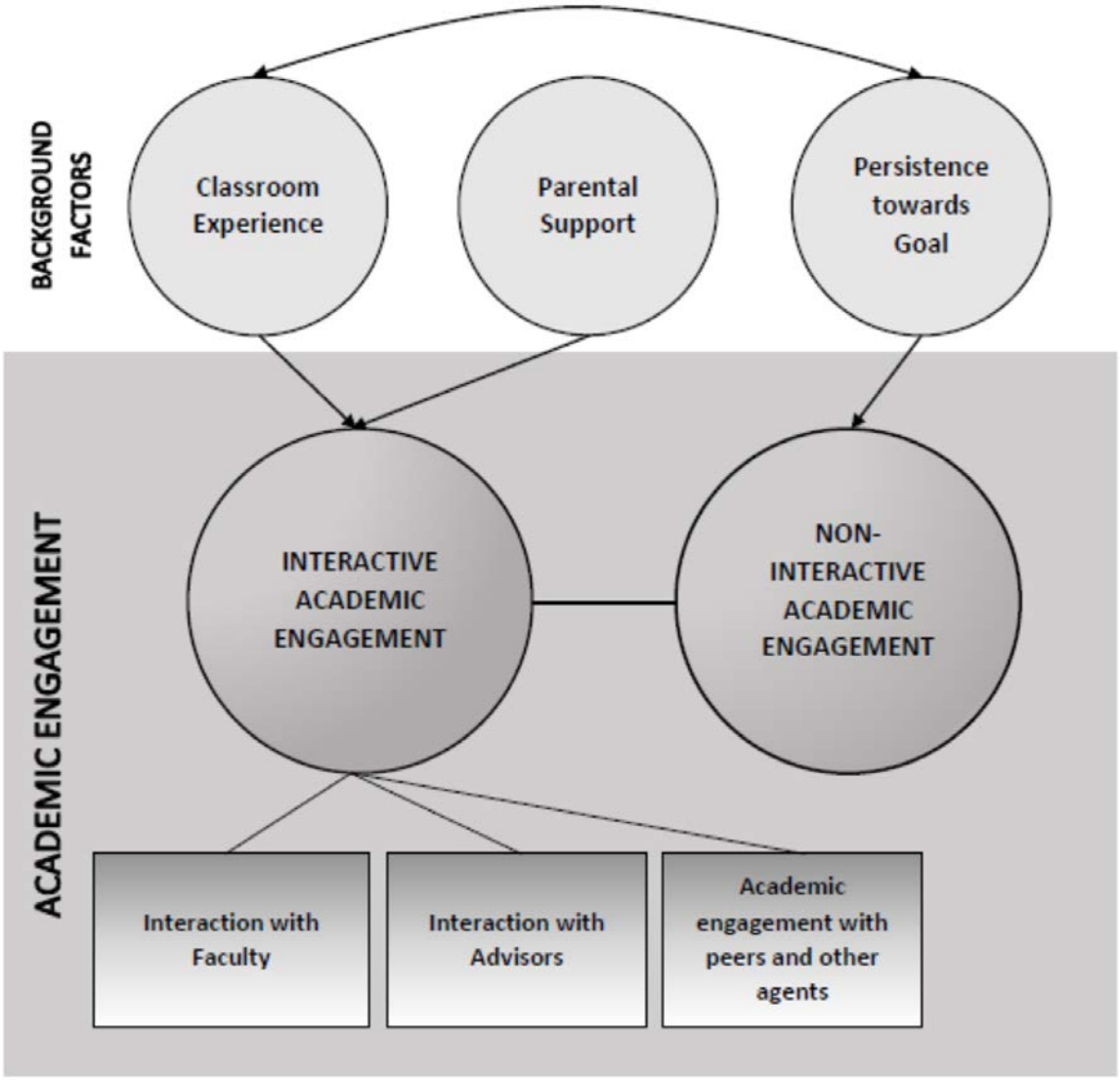

Figure 5.1. Culturally sensitive second-order factor measurement model of academic engagement of international students.

engagement in educational experiences varies based on cultural background. When Vygotsky (1978) stated that learning is a sociocultural process, he not only argued that learning takes place in specific social and cultural contexts which determine what is learned but also suggested that specific cultural contexts determine how learning happens. Schemas of knowledge acquisition are created and stored in people's memory as they go through

socialization (Nishida, 1999). Cultural background is an important factor in shaping approaches to learning, learning style preferences, and ultimately, academic engagement as it is understood in the American educational tradition.

The concept of academic engagement needs a clear definition and measurement models sensitive to the contemporary educational context that is characterized by cultural diversity. This study's findings highlight the impact of cultural background and enhance the role of academic engagement practices that are not collaborative. A broader, more holistic, understanding of academic engagement presented in this study is expected to provide a stronger theoretical foundation for further research on academic engagement of culturally distinct groups of students. The emphasis on collaborative engagement in academic activities that appears to prevail in literature may be a disservice to certain groups of students who are not prepared to learn through interactive and collaborative academic activities based on their cultural background. International students may be but one such group.

This study provides empirical evidence to support a theoretical perspective that views academic engagement in terms of both interactive and noninteractive activities that support academic pursuit and, ultimately, learning. Thus, McClenney's (2006) definition of academic engagement can be revised as follows: academic engagement is the amount of time and effort students intentionally and consciously invest in meaningful interactive and noninteractive academic activities and practices that contribute to their intellectual development and attainment of educational goals.

The measurement model of academic engagement that includes noninteractive academic practices and factors surrounding academic engagement has a very good fit for international community college students. Academic engagement scales that include both

interactive and noninteractive activities may be especially beneficial in research on academic engagement of international students. This study proposes a culturally sensitive second-order factor model of academic engagement reinforced by factors accounting for background and environmental influences such as parental support, persistence toward goals (student effort, in other words), and classroom experience (see Figure 5.1.).

Based on a second-order CFA, the study suggests that academic engagement is a complex multidimensional and multiorder concept for which observable variables can be explained by a two-tier hierarchy of latent variables. Specifically, there is evidence that first-order factors of interaction with faculty, interaction with academic advisors, and use of interactive academic practices are explained by a second-order factor of interactive academic engagement. Second-order factoring has been gaining momentum in social studies and has the potential to expand theoretical knowledge in educational research.

Implications for Practice

This study found that international students at community colleges actively engage in noninteractive academic activities and consider such activities very useful in overcoming academic challenges. This finding, in conjunction with the previous literature on learning patterns preferences of international students, supports the need for a review of curricula and pedagogy to incorporate academic activities, instructional techniques, learning experiences, and support systems that are culturally sensitive. A balance between interactive academic practices and noninteractive academic practices expands academic engagement opportunities for all students and would allow students to engage in learning in ways that are more familiar and, in some cases, more culturally appropriate for certain groups of international students.

Another implication for educational practice is that several culturally defined schemas may coexist in the same educational context without undermining the academic purpose or

disrupting the academic process. As this study's results illustrate, international students may favor both academic engagement practices that involve collaboration with faculty and/or peers and practices that require private or individual effort. Previous research suggested that international students may be less likely than domestic students to interact with faculty inside or outside the classroom and/or to participate in interactive class activities due to language barriers (Anderson et al., 2009; Andrade, 2009; Evans et al., 2009; Sherry et al., 2010) and cultural traditions (Bodycott, 2012; Salili & Hoosain, 2007b; Sugahara & Boland, 2010; Yu & Shen, 2012). However, there was no difference in the self-reported use of interactive engagement between international and domestic students in this study. Provided supportive classroom environments exist for all students irrespective of cultural background, international students may be willing to expand their cultural schemas and seize the opportunity for academic engagement outside their comfort zone.

The culturally sensitive second-order factor model of academic engagement of international students is expected to be a useful tool in educational practice. It allows the assessment of international students' academic engagement in a culturally sensitive way and is expected to provide more accurate information about the patterns and levels of student academic engagement for faculty to use in the classroom and for administrators to consider for institutional purposes.

Implications for Educational Leadership

Attention to diversity and multiculturalism in higher education is not new. Most American universities and colleges have some form of an institutional structure, office, or administrator with the function and responsibility to support and promote cultural diversity. International student offices and centers for multicultural education invest a lot of time and effort in bridging gaps between cultures and assisting students of diverse cultural

backgrounds to succeed in the institution's host culture. However, these efforts often focus on individual students and/or stay at the extracurricular level and do not transcend into classrooms (Deardorff, 2009; Leask, 2009). This study's findings are expected to be especially beneficial for faculty and educational leaders who support educational processes.

Educational leaders are encouraged to consider this study's findings in discussions of strategies to improve student–faculty interactions and to promote culturally responsive curricula and pedagogy that reflect equal respect for the backgrounds and circumstances of all students. This study provides information on patterns of engagement of international students at community colleges and proposes a culturally sensitive measurement model that can be applied in assessing levels of academic engagement of diverse student populations in studies of institutional effectiveness. Information gathered based on this study's approach to academic engagement as a combination of interactive and noninteractive academic practices is expected to provide a better understanding of how students engage in learning and, when gauged against other institutional data, to help seek ways for improving and supporting student learning.

The benefits of this approach are not only in the faculty being more aware of the issues international students may experience and being more helpful, sympathetic, and available to students on students' terms; it allows students to preserve their cultural identity and successfully integrate into the American academic environment without unnecessarily pulling personal physical and emotional resources, as well as institutional resources, away from learning.

Implications for Future Research

Future research must continue to explore the multiple cultures and contexts that exist in contemporary higher education in the United States. Opportunities for future research are offered below.

- Consider using an interdisciplinary conceptual and theoretical framework that blends educational theories with theories from other areas of social studies. Such an approach brings in additional dimensions to the concepts under study and depth to the understanding of the concept and may help uncover new elements.
- Because there was some similarity between domestic students and a large portion of international students at the research site in terms of ethnicity and, presumably, cultural background, further research and testing of the culturally sensitive second-order model of academic engagement of international students at community colleges should be conducted at sites where ethnic and cultural differences within student populations are more pronounced. This may include research at institutions in different geographical regions and nonborder states. Furthermore, the measurement models produced in this study can be tested in other educational settings in addition to community colleges.
- The elements of the culturally sensitive second-order model of academic engagement of international students at community colleges could be expanded to include other factors that explain the link between cultural background and academic engagement. Further research could potentially focus on exploring this link.

- To overcome the limitations of secondary data and proxy measures, another opportunity for future research would be the development of original measures and scales to measure constructs of this study and collect original data for model testing. The inventory of measures could be expanded to include measures not used in this study.
- This study focused on designing and empirically testing a culturally sensitive measurement model for academic engagement of international students at community colleges against a specific dataset. Further research should investigate the use of the culturally sensitive second-order factor model of academic engagement of international students at community colleges suggested in this study for correlational research.
- The review of the literature in the field of academic engagement suggests that academic engagement of international students, as well as academic engagement of community college students, are still areas lacking in studies; the primary focus of studies continues to be on engagement of domestic students at 4-year institutions.

Recommendations

Based on the discussion of the study's results, its implications for theory, practice, educational leadership, and research, recommendations developed from this study can be summarized as follows.

Additional Research on Patterns of Academic Engagement of International Students

Although this study shed some light on the academic engagement of international students at community colleges by uncovering the importance of cultural background and noninteractive academic engagement practices, the suggested culturally sensitive second-

order factor model of academic engagement of international students at community colleges should be tested in other community college and institutional settings.

Expanded Analysis and Research of Academic Engagement for Institutional Effectiveness

This study's focus was on creating and testing a measurement model of academic engagement of international students at community colleges. Community colleges that typically use CCSSE data for information on institutional effectiveness and carefully review each CCSSE data element on an individual basis using descriptive statistics could consider using the conceptual model of academic engagement proposed in this study and adding a correlation analysis, particularly in the areas of the link among student academic engagement, cultural background, and student success. The analysis of student academic engagement, including interactive academic engagement and noninteractive academic engagement, which takes into consideration surrounding factors such as cultural and social background, should potentially have a stronger explanatory power.

Targeted Cultural Awareness Training.

Once an institution admits international students, it assumes a responsibility to facilitate learning for these students the same way it does for domestic students. Understanding and being aware of both the explicit and implicit differences in academic pursuit practices among students of diverse cultural backgrounds will assist faculty, as well academic advisors, in helping all students to be successful, not only those who fit the cultural mold of contemporary American education.

Culturally Sensitive Instructional Techniques

There is no doubt that individual learning styles and engagement patterns may differ. However, more faculty throughout the United States, including community college faculty,

face distinct stand-alone cultural groups of students in their classrooms. Although any large-scale institutional change may be constrained by circumstances, such as a lack of inspired leadership, resources, level of cultural awareness, etc., each individual faculty member and/or academic advisor is encouraged to explore the opportunities to adapt curricula, pedagogy, instructional techniques, and consulting practices to meet the needs of students of different cultural backgrounds. An example of such an opportunity is culturally responsive instruction, originating from culturally responsive teaching in K–12 (Pappamihiel & Moreno, 2011). Culturally responsive teaching is a pedagogy that recognizes the importance of including students' cultural backgrounds in all aspects of learning (Ladson-Billings, 2005). In practical terms, culturally responsive instruction means using the cultural knowledge, prior experiences, and learning styles of culturally diverse students to make learning more appropriate and effective for them.

Noting the benefits of culturally responsive instruction, Gay (2000) mentioned that it helps to bridge the gap between students' sociocultural reality and academic context, uses a wide variety of instructional strategies that are connected to different learning styles, acknowledges the cultural heritage of different ethnic groups, and teaches students to know and appreciate their own and each other's cultural heritage. It is important to mention that culturally responsive instruction does not call for knowing everything about every culture represented in class. Some base understanding of cultural diversity is essential, but equally important is for instructors to know and understand their own cultural identity and how it can impact learners (Pappamihiel & Moreno, 2011).

Cultural Perspective in Assessment of International Student Learning

This recommendation is closely related to the previous one. Faculty often use academic engagement, or involvement in class activities (often called class participation), as

an indicator of student learning. However, in practice, often only interactive academic practices are considered. As this study suggests, international students may rely on noninteractive academic practices in their learning just as much, if not more, than on interactive engagement. For example, students may be apprehensive about participation in group discussions, especially if an instructor—who may be seen as an authority figure or a respected older person—is present or because their cultural background taught them to keep silent if they do not have anything specifically meaningful or new to add to the discussion (Zalaquett, Alvarez McHatton, & Cranston-Gingras, 2007). In some cultures, silence may be a sign of respect rather than a sign of an inability or a refusal to participate in class discussions (Sue & Sue, 2003). Although student involvement in noninteractive academic engagement practices may be more challenging to account for and record, it is recommended that faculty take that aspect into account when designing a course and assessment methods.

Dissertation Summary

Community colleges have emerged as gateways to American higher education for international students, and the number of international students at community colleges has been increasing (IIE, 2014c). This quantitative study sought to foster international students' success and assist community college faculty, administrators, and staff by creating a culturally sensitive measurement model of academic engagement for international students at community colleges that accounts for the influence of cultural background. Based on an interdisciplinary theoretical framework that blended educational theories of student engagement and sociocultural theories of learning and cultural transition, this study uncovered the complex hierarchical structure of the concept of academic engagement that includes interactive, or collaborative, and noninteractive engagement practices and is linked to surrounding factors such as cultural and social background and classroom experience.

This insights provided by this study's findings include an expanded understanding of the concept of academic engagement and a culturally sensitive extended second-order factor of academic engagement of international students at community colleges that demonstrated a very good fit against the empirical data. Theoretical foundations for the model developed in this study include (a) theoretical underpinnings pertaining to the positive role of student engagement in student outcomes (Astin, 1984, 1993; Kuh, 2001, 2009b; Kuh et al., 2010; McClenney, 2006, 2007; McClenney et al., 2010; Pascarella & Terenzini, 2005; Tinto, 1993), (b) the sociocultural theory of learning (Vygotsky, 1978), and (c) the third space theory of cultural transition (Bhabha, 1994). The model is proposed for further testing and use in educational research.

The research findings provide considerations for educational leaders and practitioners regarding patterns of academic engagement of international students compared to domestic students. The study calls for campus-wide cultural awareness and the use of curricula and instructional practices to facilitate academic integration for students of diverse cultural backgrounds through academic engagement opportunities, both interactive and noninteractive, that support the learning of culturally diverse students. In conclusion, this study, along with previous research, shows that cultural awareness and understanding why students engage or disengage in academic activities the way they do are the key to engaging students in educationally meaningful activities that are the best fit for them.

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APPENDIX A. SSSL SURVEY INSTRUMENT

Default Question Block

Q1.
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
starobin@iastate.edu

Q2. Section 1: Self-Efficacy

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
If I canÕt do a job the first time, I keep trying until I can.	O	O	O	O	O	O	O
When I have something unpleasant to do, I stick to it until I finish it.	O	O	O	O	O	O	O
Failure makes me try harder.	O	O	O	O	O	O	O
I often make lists of things to do.	O	O	O	O	O	O	O
I usually mark important dates on my calendar.	O	O	O	O	O	O	O

	Disagree strongly	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Agree strongly
I do not seem capable of dealing with most problems that come up in life.	O	O	O	O	O	O	O
If something looks too complicated, I will not even bother to try it.	O	O	O	O	O	O	O
When trying to learn something new, I soon give up if I am not initially successful.	O	O	O	O	O	O	O
I wish I could have more respect for myself.	O	O	O	O	O	O	O
On the whole, I am satisfied with myself.	O	O	O	O	O	O	O

Q3. 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
It is difficult for me to make new friends.	O	O	O	O	O	O	O
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.	O	O	O	O	O	O	O
I do not handle myself well in social gatherings.	O	O	O	O	O	O	O

Q4. Since you began attending this college, how often do you engage in the following?

	Never	Rarely	Sometimes	Often	Always
Worrying about what others think of me	○	○	○	○	○
Doing things so that others will like me	○	○	○	○	○
Worrying about being called a ÒnerdÓ or ÒbraniacÓ	○	○	○	○	○
Worrying about being accused of not being myself (e.g.Òacting whiteÓ or being a Òsell outÓ)	○	○	○	○	○

Q5. 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
Math skill	○	○	○	○	○	○
Writing skill	○	○	○	○	○	○
Public speaking skill	○	○	○	○	○	○
Social skill	○	○	○	○	○	○
Computer skill	○	○	○	○	○	○

Q6. 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.

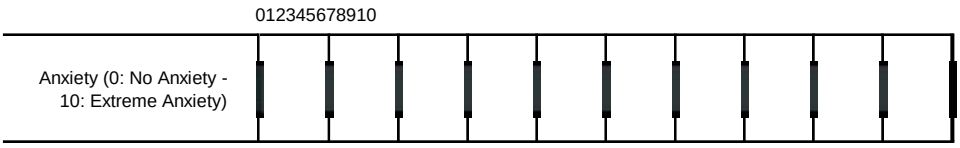
Q7. What subject does this most challenging class belong to?

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

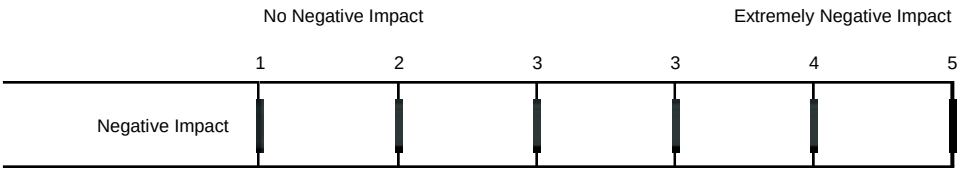
Q8. Why was this class the most challenging?

	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
Did not know how to study for the exams	O	O	O	O	O	O	O
Did not get enough feedback from the professor	O	O	O	O	O	O	O
Professor was not available to answer questions	O	O	O	O	O	O	O
Professor did not encourage interaction with him/her	O	O	O	O	O	O	O
Professor expected a low performance from me	O	O	O	O	O	O	O
The course required a large amount of work	O	O	O	O	O	O	O

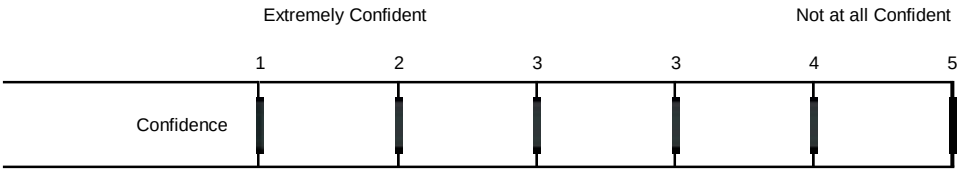
Q9. On a scale of zero to ten (0: No Anxiety - 10: Extreme anxiety), what was your level of anxiety in this class?



Q10. 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).



Q11. 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)



Q12. 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
Your high ability	O	O		O	O	O	O	O
Good luck	O	O		O	O	O	O	O
The task was easy	O	O		O	O	O	O	O
You worked hard	O	O		O	O	O	O	O

Q13. 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
Your low ability	O	O		O	O	O	O	O
Bad luck	O	O		O	O	O	O	O
The task was hard	O	O		O	O	O	O	O
You didn't work hard enough	O	O		O	O	O	O	O

Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.

	Did not use/ not applicable	Used, not helpful		Used, somewhat helpful	Used, very helpful
Spent more time studying	O	O		O	O
Taught myself to study more effectively	O	O		O	O
Did all of the assigned reading	O	O		O	O
Increased lecture attendance	O	O		O	O
Received a sample test from a friend or club/organization to study	O	O		O	O
Studied by myself	O	O		O	O
Cheated on assignments or exams	O	O		O	O
Withdrew from the course	O	O		O	O
Studied with other students in the class	O	O		O	O
Received informal tutoring	O	O		O	O
Received academic support outside the class	O	O		O	O
Used feedback from Teacher Assistant or professor on a regular basis	O	O		O	O

Q15. 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 helpl
Family member or friend	○	○	○	○
Fellow resident or Resident Assistant	○	○	○	○
Fellow classmate	○	○	○	○
Upper-class student who had taken the class	○	○	○	○
Staff person or administrator	○	○	○	○
Professional counselor	○	○	○	○
Advisor	○	○	○	○
Professor or Teacher's Assistant for this class	○	○	○	○
Academic dean	○	○	○	○
Another faculty member	○	○	○	○

Q16. 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

Q17. Section 2: Social Capital

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
Mother	○	○	○	○	○	○	○	○	○
Father	○	○	○	○	○	○	○	○	○

Q18. Are you financially independent (your college expenses are paid by someone other than your parents, e.g., yourself, your employer.)?

- Yes
- No

Q19. 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

Q20. 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
Family resources (parents, relatives, spouse, etc.)	○	○	○	○	○	○	○
My own resources (savings from work, work-study, other income)	○	○	○	○	○	○	○
Employer contributions	○	○	○	○	○	○	○
Aid which need not be repaid (grants, scholarships, military funding, etc.)	○	○	○	○	○	○	○
Aid which must be repaid (loans, etc.)	○	○	○	○	○	○	○
Other sources than above	○	○	○	○	○	○	○

Q21. 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)

Q22. Excluding yourself, how many people (children, grandchildren, brothers, sisters, parents, etc.) are you financially supporting?

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

Q23. 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.

Q24. 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

Q25. 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
Discuss book, films, or television programs with you	○	○	○	○	○
Eat the main meal with you around a table	○	○	○	○	○
Spend time just talking to you	○	○	○	○	○
Work with you on your homework	○	○	○	○	○
Discuss your progress in school with you	○	○	○	○	○
Participate in school related activities (e.g., Parent-Teacher Association)	○	○	○	○	○
Spend time talking with your friends	○	○	○	○	○

Q26. 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

Q27. What is your mother's occupation?

Q28. What is your father's occupation?

Q29. What is your probable career occupation?

Q30. Since arriving at this college, has your occupational expectation changed?

- Yes
- No

Q31. Please indicate WHY your career choice changed:

	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
Lack of high school preparation for career choice requirements	○	○	○	○	○	○	○
Academic difficulty in the major course requirements for the career	○	○	○	○	○	○	○
Academic interests and values have changed since arriving at this college	○	○	○	○	○	○	○
Career interests have changed since arriving at this college	○	○	○	○	○	○	○
Career values have changed since arriving at this college	○	○	○	○	○	○	○
Lack of pre-professional learning opportunities available (e.g., internships, research opportunities)	○	○	○	○	○	○	○

Q33. 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
Child care issues	○	○	○	○
Health issues	○	○	○	○
Debt-need to work more hours because of bills	○	○	○	○
Inability to balance home and school responsibilities	○	○	○	○
Inability to balance work and school responsibilities	○	○	○	○
Insufficient financial aid	○	○	○	○
Lack of money	○	○	○	○
Poor or failing grades	○	○	○	○
Transportation issues	○	○	○	○
Unprepared for college coursework	○	○	○	○
Lack of support services or resources, i.e. tutoring/mentoring/counseling	○	○	○	○

Q34. 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

Q35. Section 3: Transfer knowledge

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

Q36. Have you taken any developmental courses in the following subjects? (check all that apply)

- ☐ Math
- ☐ Reading
- ☐ Writing
- ☐ None

Q37. 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

Q38. 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
I consulted with academic advisors/counselor regarding transfer.	○	○	○	○	○	○	○
Information received from academic advisors/counselors was helpful in the transfer process.	○	○	○	○	○	○	○
I met with academic advisors /counselors on a regular basis.	○	○	○	○	○	○	○
I talked with an advisor/counselor about courses to take, requirements, and education plans.	○	○	○	○	○	○	○
I discussed my plans for transferring to a four-year college or university with an academic advisor/counselor.	○	○	○	○	○	○	○
Advisors/counselors identified courses needed to meet the general education/major requirements of a four-year college or university I was interested in attending.	○	○	○	○	○	○	○

Q39. The following items pertain to your perceptions about the Òtransfer processÓ 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
I researched various aspects of 4-year institutions to get a better understanding of the environment and academic expectations.	O	O	O	O	O	O	O
I visited the 4-year institutions at least once to learn where offices and departments were located.	O	O	O	O	O	O	O
I spoke to academic counselors at 4-year institutions about transferring and major requirements.	O	O	O	O	O	O	O
I spoke to former community college transfer students to gain insight about their transfer experiences.	O	O	O	O	O	O	O

Q40. 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
Visited faculty and sought their advice on class projects such as writing assignments and research papers.	O	O	O	O	O
Approaching faculty outside class.	O	O	O	O	O
Discussed career plans and ambitions with a faculty member.	O	O	O	O	O
Asked my instructor for comments and criticisms about my work.	O	O	O	O	O

Q41. Have you ever felt that the faculty, staff, or administration in this college treated you poorly?

- O Yes
- O No

Q42. 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

Q43. To what extent do the following generally characterize the classroom environment you have experienced at this college?

	Never	Rarely	Sometimes	Often	Always
I felt I was treated respectfully in class	○	○	○	○	○
Class size made it difficult to ask questions	○	○	○	○	○
I felt isolated in class	○	○	○	○	○
Instructor expressed a lack of confidence in my ability to succeed in class	○	○	○	○	○
Instructor or students made prejudiced comments that made me uncomfortable	○	○	○	○	○
I felt like I did not fit in	○	○	○	○	○
I was ignored when I tried to participate in class discussions or ask questions	○	○	○	○	○

Q44. In your opinion, how successful has this college been at providing:

	Not at all successful	Somewhat successful	Successful	Very successful	Extremely successful
Faculty role models similar to you	○	○	○	○	○
Administrative/staff role models similar to you	○	○	○	○	○
Clubs and organizations that match your interest	○	○	○	○	○
Classroom environments that encourage your academic success	○	○	○	○	○
A sense of being a valued member of the community	○	○	○	○	○
Opportunities to interact socially with your friends	○	○	○	○	○

Q69. 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 univeristy
- 4-year private college or university
- Private 2-year college
- Public 2-year college
- Not intend to transfer

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

- Yes
- No

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

Q48. Section 4: Demographic information

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
Basic math, Business math, or Pre-algebra	☐	☐	☐
Algebra I	☐	☐	☐
Geometry	☐	☐	☐
Algebra II	☐	☐	☐
Trigonometry	☐	☐	☐
Pre-calculus	☐	☐	☐
Calculus	☐	☐	☐
Integrated/Applied Mathematics	☐	☐	☐
Probability/Statistics	☐	☐	☐

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
General Biology	☐	☐	☐
Chemistry	☐	☐	☐
Physics	☐	☐	☐
Biology specialty (i.e., microbiology, genetics, botany, cell biology, marine biology, etc.)	☐	☐	☐
Other Earth Sciences (i.e., geology, meterology, etc.)	☐	☐	☐
Physical Science	☐	☐	☐

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

Q68. Are you Hispanic/Latino?

- ○ Yes
- ○ No

Q56. How would you identify your race/ethnic background?

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

Q57. What is your age?

Q58. What is your marital status?

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

Q59. Are your parent(s):

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

Q60. What is your current religious preference?

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

Q61. 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

Q62. 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 (e.g., F1/F2 visa, J1/J2 visa)
- Living outside the United States
- Prefer not to answer

Q63. If you were born outside of the U.S., in what country were you born? Please specify.

Q64. 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

Q65. Is English your native language?

- Yes
- No

Q66. Section 5: Institution Questions

Q67. 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, Offfice of Community College Research and Policy
starobin@iastate.edu

APPENDIX B. INVITATION AND EXPLANATION OF PROCEDURES

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. CODE BOOK

Variable	Survey Item/Description	Coding/Scale	
Grouping Variable			
Immigration Status	Recoded from Q62. What is your citizenship status? and Q65. Is English your native language?	1 =	Domestic student
		2 =	International student
Demographic Variables			
Gender (Q55)	Q55. What is your gender?	0 =	Male
		1 =	Female
Age (Q57)	Q57. What is your age?	1 =	17 and younger
		2 =	18-24 years old
		3 =	25-29 years old
		4 =	30-39 years old
		5 =	40-54 years old
		6 =	55 years and older
Ethnicity	Recoded from Q68. Are you Hispanic/Latino? and Q56. How would you characterize your race/ethnic background?	1 =	Hispanic
		2 =	American Indian/Alaskan Native
		3 =	Asian
		4 =	Black
		5 =	Native Hawaiian or other Pacific Islander
		6 =	White
		7 =	Two or more races
		8 =	Race/ethnicity unknown
Enrollment status (Q49)	Q49. Thinking about this current academic term, how would you characterize your enrollment at this college?	0 =	Full time (12 or more credit hours)
		1 =	Part-time (less than 12 credits)
Marital status (Q58)	Q58. What is your marital status?	1 =	Married
		2 =	Living together (not married)
		3 =	Single, never married
		4 =	Divorced/separated/widowed
Employment status (Q23)	Q23. Are you currently working?	1 =	Yes, I am currently working on campus
		2 =	Yes, I am currently working off campus
		3 =	No, I am not looking for employment
		4 =	No, I am unemployed but looking for employment

Variable	Survey Item/Description	Coding/Scale
Socioeconomic Variables		
Mother's education (Q17_1)	Q17. What is the highest level of education completed by your parents - Mother?	1 = Elementary school or less 2 = Some high school 3 = High school graduate 4 = Some college 5 = Associate degree from 2-year 6 = Bachelor's degree 7 = Some graduate school 8 = Graduate degree 9 = Don't know
Father's education (Q17_2)	Q17. What is the highest level of education completed by your parents - Father?	1 = Elementary school or less 2 = Some high school 3 = High school graduate 4 = Some college 5 = Associate degree from 2-year 6 = Bachelor's degree 7 = Some graduate school 8 = Graduate degree 9 = Don't know
Spend time just talking to you (Q25_8)	Q25. During high school, how often 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
Work with you on homework (Q25_9)	Q25. During high school, how often your parents or other adults: Work with you on your homework?	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
Discuss your progress in school with you (Q25_10)	Q25. During high school, how often your parents or other adults: Discussed 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
Participated in school related activities (Q25_4)	Q25. During high school, how often your parents or other adults: Participated in school-related activities (e.g., Parent-Teacher Association)?	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

Variable	Survey Item/Description	Coding/Scale
Estimated total parents' income (Q19)	Q19. What is your best estimate of your parents' total income last year? Consider income from all sources before taxes.	1 = Less than $20,000 2 = $20,000 - $39,000 3 = $40,000 - $59,000 4 = $60,000 - $79,000 5 = $80,000 or more 6 = I don't know 7 = Prefer not to answer
Financial concerns	Computed from Q21. Do you have any concern about your ability to finance your college education?	0 = No concern 1 = There are concerns
Time at a job (Q24)	Q.24 During your time at the community college, about how many hours a week did you usually spend working on a job for pay?	1 = 1-10 hours per week 2 = 11-15 hours per week 3 = 16 to 20 hours per week 4 = 21 to 31 hours per week 5 = More than 30 hours
Academic background		
Level of math preparation	Computed from Q50. Including this semester, what mathematics courses have you taken? Include courses in high school or previous college work (check all that apply).	1 = 0-3 courses 2 = 4-6 courses 3 = 7-9 courses 4 = 10-12 courses 5 = 13-15 courses 6 = 16-18 courses
Level of science preparation	Computed from Q51. Including this semester, what science courses have you taken? Include courses in high school or previous college work (check all that apply).	1 = 0-2 courses 2 = 3-4 courses 3 = 5-6 courses 4 = 7-8 courses 5 = 9-10 courses 6 = 11-12 courses
Developmental education	Computed from Q.36 Have you taken any developmental courses in the following subjects? (check all that apply)	0 = No 1 = Yes
Language development	Computed from Q.36 Have you taken any developmental courses in the following subjects? (check all that apply)	0 = No 1 = Yes

Variable	Survey Item/Description	Coding/Scale
Perceived language skills level	Computed and recoded from Q5. Compared to the students at your campus, where the average students is at the 50th percent, rate your confidence about your level of skills according to the following scale: Writing skills, Public speaking skills.	0 = Not applicable 1 = I am in the bottom 10% 2 = I'm below average but not in the bottom 10% 3 = I am about average 4 = I am above average but not in top 10% 5 = I am in top 10%
College GPA (Q69)	Recoded from Q.69 At this college, what is your overall grade point average (GPA)?	9 = 3.75-4.00 (mostly As) 8 = 3.25 - 3.74 (about half As and half Bs) 7 = 2.75-3.24 (mostly Bs) 6 = 2.25-2.74 (about half Bs and half Cs) 5 = 1.75-2.24 (mostly Cs) 4 = 1.25-1.74 (about half Cs and half Ds) 3 = Less than 1.25 (mostly Ds or below) 2 = Have not taken courses for which grades were given 1 = Prefer not to answer
Degree Aspirations (Q33)	Q.33 If there were no obstacles, what is the highest academic degree you would like to attain in your lifetime?	1 = Take classes, no degree intended 2 = Vocational certificate/diploma 3 = Associate degree 4 = Bachelor's degree 5 = At least a Bachelor's degree, maybe more 6 = Master's degree 7 = Doctoral degree 8 = Medical degree
Academic Engagement Variables		
Time on campus, per week (Q35)	Q35. About how many hours a week do you usually spend on the community college campus, not counting time attending classes?	1 = None 2 = 1 to 3 hours 3 = 4 to 6 hours 4 = 7 to 9 hours 5 = 10 to 12 hours 6 = More than 12 hours

Variable	Survey Item/Description	Coding/Scale
Time spent studying or preparing for class (Q37)	Q37. About how many hours a week do you usually spend studying or preparing for your classes?	1 = 1 to 5 hours 2 = 6 to 10 hours 3 = 11 to 15 hours 4 = 16 to 20 hours 5 = More than 20 hours
Visited faculty and sought their advice (Q40_1)	Q40. How often did you do each of the following at your community college?	1 = Never or very rarely 2 = A few times per semester 3 = About once a month 4 = Several times a month 5 = Several times a week
Approached faculty outside class (Q40_2)	Q40. How often did you do each of the following at your community college?	1 = Never or very rarely 2 = A few times per semester 3 = About once a month 4 = Several times a month 5 = Several times a week
Discussed career plans with faculty (Q40_5)	Q40. How often did you do each of the following at your community college?	1 = Never or very rarely 2 = A few times per semester 3 = About once a month 4 = Several times a month 5 = Several times a week
Asked instructor for comments/criticism (Q40_6)	Q40. How often did you do each of the following at your community college?	1 = Never or very rarely 2 = A few times per semester 3 = About once a month 4 = Several times a month 5 = Several times a week
Met with advisor on a regular basis (Q38_3)	Q38. The following items address your use of academic advising/ counseling at your community college. Please indicate the extent to which you disagree or agree with each statement.	1 = Strongly disagree 2 = Disagree 3 = Slightly disagree 4 = Neither agree nor disagree 5 = Slightly agree 6 = Agree 7 = Strongly agree
Talked with an advisor about courses to take, requirements, and education plans (Q38_4)	Q38. The following items address your use of academic advising/ counseling at your community college. Please indicate the extent to which you disagree or agree with a statement	1 = Strongly disagree 2 = Disagree 3 = Slightly disagree 4 = Neither agree nor disagree 5 = Slightly agree 6 = Agree 7 = Strongly agree

Variable	Survey Item/Description	Coding/Scale
Studied with other students in the class (Q14_10)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Received informal tutoring outside class (Q14_12)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Received academic support outside class (Q14_13)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Used regular feedback from TA or professor (Q14_15)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Spent more time studying (Q14_1)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Taught myself to study more effectively (Q14_2)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Did all of the assigned reading (Q14_3)	Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Increased lecture attendance (Q14_5)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful

Variable	Survey Item/Description	Coding/Scale
Studied by myself (Q14_7)	Q14. Please indicate the things you did to address the challenges in this class, and how useful they were in improving your performance.	1 = Not used/not applicable 2 = Used, not helpful 3 = Used, somewhat helpful 4 = Used, very helpful
Studied with other students in the class	Recoded into a dichotomous variable from item Q14_10.	0 = Not used 1 = Used
Received informal tutoring outside class	Recoded into a dichotomous variable from item Q14_12.	0 = Not used 1 = Used
Received academic support outside class	Recoded into a dichotomous variable from item Q14_13.	0 = Not used 1 = Used
Used regular feedback from TA or professor	Recoded into a dichotomous variable from item Q14_15.	0 = Not used 1 = Used
Spent more time studying	Recoded into a dichotomous variable from item Q14_1.	0 = Not used 1 = Used
Taught myself to study more effectively	Recoded into a dichotomous variable from item Q14_2.	0 = Not used 1 = Used
Did all of the assigned reading	Recoded into a dichotomous variable from item Q14_3.	0 = Not used 1 = Used
Increased lecture attendance	Recoded into a dichotomous variable from item Q14_5.	0 = Not used 1 = Used
Classroom Experience Variables		
Perception of poor treatment	Q41. Have you ever felt that faculty, staff, or administrators in this college treated you poorly?	0 = Yes 1 = No
Felt I was treated respectfully in class (Q43_1)	Recoded from Q43. To what extent do the following generally characterize the classroom environment you have experienced at this college?	1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always

Variable	Survey Item/Description	Coding/Scale
Class size made it difficult to ask questions (Q43_2)	Recoded from Q43. To what extent do the following generally characterize the classroom environment you have experienced at this college?	1 = Always 2 = Often 3 = Sometimes 4 = Rarely 5 = Never
I felt isolated in class (Q43_3)	Recoded from Q43. To what extent do the following generally characterize the classroom environment you have experienced at this college?	1 = Always 2 = Often 3 = Sometimes 4 = Rarely 5 = Never
Instructor or students made prejudiced comments (Q43_5)	Recoded from Q43. To what extent do the following generally characterize the classroom environment you have experienced at this college?	1 = Always 2 = Often 3 = Sometimes 4 = Rarely 5 = Never

Variable	Survey Item/Description	Coding/Scale
I felt like I did not fit in (Q43_6)	Recoded from Q43. To what extent do the following generally characterize the classroom environment you have experienced at this college?	1 = Always 2 = Often 3 = Sometimes 4 = Rarely 5 = Never
Persistence Toward Goal Variables		
Keep trying until a job is done (Q2_2)	Q.2 For each item below, please indicate the extent to which you disagree or agree with the statement.	1 = Strongly disagree 2 = Disagree 3 = Slightly disagree 4 = Neither agree nor disagree 5 = Slightly agree 6 = Agree 7 = Strongly agree
Stick to unpleasant tasks until they are done (Q2_3)	Q.2 For each item below, please indicate the extent to which you disagree or agree with the statement.	1 = Strongly disagree 2 = Disagree 3 = Slightly disagree 4 = Neither agree nor disagree 5 = Slightly agree 6 = Agree 7 = Strongly agree

Variable	Survey Item/Description	Coding/Scale
Failure makes me try harder (Q2_5)	Q.2 For each item below, please indicate the extent to which you disagree or agree with the statement.	1 = Strongly disagree 2 = Disagree 3 = Slightly disagree 4 = Neither agree nor disagree 5 = Slightly agree 6 = Agree 7 = Strongly agree
Will not try complicated things (Q2_14)	Recoded from Q.2 For each item below, please indicate the extent to which you disagree or agree with the statement.	1 = Strongly agree 2 = Agree 3 = Slightly agree 4 = Neither agree nor disagree 5 = Slightly disagree 6 = Disagree 7 = Strongly disagree
Give up soon if initially unsuccessful (Q2_14)	Recoded from Q.2 For each item below, please indicate the extent to which you disagree or agree with the statement.	1 = Strongly agree 2 = Agree 3 = Slightly agree 4 = Neither agree nor disagree 5 = Slightly disagree 6 = Disagree 7 = Strongly disagree

APPENDIX D. INSTITUTIONAL REVIEW BOARD APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Researc
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 E. INSTITUTIONAL REVIEW BOARD STUDY EXEMPTION

INSTITUTIONAL REVIEW BOARD (IRB)
Amendment for Personnel Changes

Title of Project: Measuring Constructs for STEM Student Success Literacy: Community College Students' Self-efficay, Social Capital, and Transfer Knowledge

Principal Investigator (PI): Soko S. Starobin			Degrees: PhD
University ID: 277792515	Phone: 5152949121	Email Address: starobin@iastate.edu	RECEIVED

FOR STUDENT PROJECTS (*Required when the principal investigator is a student.*)			AUG 05 2013
Name of Major Professor/Supervising Faculty:			
University ID:	Phone:	Email Address: @iastate.edu	By IRB

Changes in Key Personnel:

Key personnel includes any individuals who will have contact with the participants or the participants' data (e.g., interviewers, transcribers, coders, etc.). This information is intended to inform the committee of the training and background related to the specific procedures that each person will perform on the project. For more information, please see Human Subjects - Persons Required to Obtain IRB Training. Personnel who will have contact with human blood, specimens, or other biohazardous materials must also complete Bloodborne Pathogens Training. *If the principal investigator has or will change, a complete new IRB application is required.*

List any individuals to be removed from the study staff: Sulagna Sarkar

Complete the following table to list any new key personnel:

NAME	Interpersonal contact or communication with subjects, or access to private identifiable data?	Involved in the consent process?	Contact with human blood, specimens, or other biohazardous materials?	Other Roles in Research	Qualifications (i.e., special training, degrees, certifications, coursework, etc.)	Human Subjects Training Date
Elena Dodge	☐	☐	☐	Doctoral Research Associate	Master Degree	08/02/2013
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			

FOR IRB USE ONLY	☑ All human subjects training requirements have been met.

IRB Reviewer Signature *Date* 8/8/13

APPENDIX F. DESCRIPTIVE STATISTICS FOR VARIABLES RELATED TO PARENTAL SUPPORT, CLASSROOM EXPERIENCE, AND PERSISTENCE IN ACADEMIC PURSUIT

Table F.1

Descriptive Statistics for Variables Related to Parental Support, Classroom Experience, and Persistence in Academic Pursuit

	All Students		Domestic Students		International Students	
Variable	*n*	%	*n*	%	*n*	%
Spend time just talking to you						
Never or very rarely	205	9.5	185	9.5	19	10.3
A few times a year	156	7.2	131	6.8	20	10.9
About once a month	231	10.7	204	10.5	21	11.4
Several times a month	547	25.3	498	25.7	39	21.2
Several times a week	1,023	47.3	920	47.5	85	46.2
Total	2,162	100.0	1,938	100.0	184	100.0
Work with you on homework						
Never or very rarely	971	44.9	871	44.9	79	42.9
A few times a year	290	13.4	263	13.6	23	12.5
About once a month	319	14.8	288	14.9	24	13.0
Several times a month	290	13.4	252	13.0	33	17.9
Several times a week	292	13.5	264	13.6	25	13.6
Total	2,162	100.0	1,938	100.0	184	100.0
Discuss your progress in school with you						
Never or very rarely	352	16.3	317	16.2	33	17.9
A few times a year	307	14.2	276	14.2	22	12.0
About once a month	373	17.3	335	17.3	31	16.8
Several times a month	521	24.1	474	24.5	40	21.7
Several times a week	609	28.2	539	27.8	58	31.5
Total	2,162	100.0	1,938	100.0	184	100.0
Participated in school related activities						
Never or very rarely	1,076	49.8	965	49.8	88	47.8
A few times a year	394	18.2	358	18.5	29	15.8
About once a month	273	12.6	243	12.5	24	13.0
Several times a month	169	7.8	153	7.9	14	7.6
Several times a week	250	11.6	219	11.3	29	15.8
Total	2,162	100.0	1,938	100.0	184	100.0

Table F.1 (continued)

Variable	All Students		Domestic Students		International Students	
	n	%	*n*	%	*n*	%
Perception of poor treatment						
Yes	410	19.0	372	19.2	32	17.4
No	1,752	81.0	1,566	80.8	152	82.6
Total	2,162	100.0	1,938	100.0	184	100.0
Felt I was treated respectfully in class						
Never	46	2.1	37	1.9	7	3.8
Rarely	12	0.6	10	0.5	2	1.1
Sometimes	116	5.4	102	5.3	10	5.4
Often	831	38.4	784	40.5	42	22.8
Always	1,157	53.5	1,005	51.9	123	66.8
Total	2,162	100.0	1,938	100.0	184	100.0
Class size made it difficult to ask questions						
Always	38	1.8	30	1.5	8	4.3
Often	57	2.6	48	2.5	8	4.3
Sometimes	251	11.6	227	11.7	18	9.8
Rarely	744	34.4	685	35.3	49	26.6
Never	1,072	49.6	948	48.9	101	54.9
Total	2,162	100.0	1,938	100.0	184	100.0
I felt isolated in class						
Always	26	1.2	19	1.0	6	3.3
Often	55	2.5	49	2.5	5	2.7
Sometimes	269	12.4	237	12.2	31	16.8
Rarely	639	29.6	592	30.5	40	21.7
Never	1,173	54.3	1,041	53.7	102	55.4
Total	2,162	100.0	1,938	100.0	184	100.0
Instructor or students made prejudiced comments						
Always	22	1	16	0.8	5	2.7
Often	29	1.3	26	1.3	3	1.6
Sometimes	126	5.8	105	5.4	18	9.8
Rarely	394	18.2	358	18.5	31	16.8
Never	1,591	73.6	1,433	73.9	127	69.0
Total	2,162	100.0	1,938	100.0	184	100.0
I felt like I did not fit in						
Always	35	1.6	27	1.4	7	3.8
Often	63	2.9	58	3.0	5	2.7

Table F.1 (continued)

	All Students		Domestic Students		International Students	
Variable	*n*	%	*n*	%	*n*	%
Sometimes	263	12.2	231	11.9	26	14.1
Rarely	523	24.2	483	24.9	35	19.0
Never	1,278	59.1	1,139	58.8	111	60.3
Total	2,162	100.0	1,938	100.0	184	100.0
Keep trying until a job is done						
Strongly disagree	9	0.4	8	0.4	0	0
Disagree	4	0.2	4	0.2	1	0.5
Slightly disagree	13	0.6	10	0.5	2	1.1
Neither agree nor disagree	25	1.2	23	1.2	2	1.1
Slightly agree	111	5.1	103	5.3	5	2.7
Agree	737	34.1	678	35.0	48	26.1
Strongly agree	1,263	58.4	1,112	57.4	126	68.5
Total	2,162	100.0	1,938	100.0	184	100.0
Stick to unpleasant tasks until they are done						
Strongly disagree	9	0.4	6	0.3	2	1.1
Disagree	25	1.2	22	1.1	2	1.1
Slightly disagree	64	3.0	52	2.7	9	4.9
Neither agree nor disagree	81	3.7	70	3.6	9	4.9
Slightly agree	341	15.8	310	16.0	25	13.6
Agree	931	43.1	846	43.7	70	38.0
Strongly agree	711	32.9	632	32.6	67	36.4
Total	2,162	100.0	1,938	100.0	184	100.0
Failure makes me try harder						
Strongly disagree	12	0.6	10	0.5	2	1.1
Disagree	28	1.3	25	1.3	2	1.1
Slightly disagree	46	2.1	45	2.3	1	0.5
Neither agree nor disagree	99	4.6	92	4.7	5	2.7
Slightly agree	238	11.0	214	11.0	20	10.9
Agree	668	30.9	612	31.6	47	25.5
Strongly agree	1,071	49.5	940	48.5	107	58.2
Total	2,162	100.0	1,938	100.0	184	100.0
Will not try complicated things						
Strongly agree	25	1.2	21	1.1	4	2.2
Agree	36	1.7	26	1.3	8	4.3
Slightly agree	59	2.7	54	2.8	5	2.7

Table F.1 (continued)

	All Students		Domestic Students		International Students	
Variable	*n*	%	*n*	%	*n*	%
Neither agree nor disagree	105	4.9	90	4.6	14	7.6
Slightly disagree	173	8.0	161	8.3	12	6.5
Disagree	723	33.4	660	34.1	52	28.3
Strongly disagree	1,041	48.1	926	47.8	89	48.4
Total	2,162	100.0	1,938	100.0	184	100.0
Give up soon if initially unsuccessful						
Strongly agree	26	1.2	20	1.0	5	2.7
Agree	31	1.4	25	1.3	6	3.3
Slightly agree	64	3.0	59	3.0	5	2.7
Neither agree nor disagree	62	2.9	52	2.7	9	4.9
Slightly disagree	176	8.1	163	8.4	9	4.9
Disagree	670	31.0	608	31.4	47	25.5
Strongly disagree	1,133	52.4	1,011	52.2	103	56.0
Total	2,162	100.0	1,938	100.0	184	100.0

APPENDIX G. SELECT MEASURES OF CENTRAL TENDENCY FOR ORDINAL VARIABLES RELATED TO PARENTAL SUPPORT, CLASSROOM EXPERIENCE, AND PERSISTENCE IN ACADEMIC PURSUIT

Table G.1

Select Measures of Central Tendency for Ordinal Variables Related to Parental Support, Classroom Experience, and Persistence in Academic Pursuit

	All Students (n = 2,169)		Domestic Students (n = 1,938)		International Students (n = 184)	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*
Spend time just talking to you	3.94	1.31	3.95	1.31	3.82	1.39
Work with you on homework	2.37	1.48	2.37	1.49	2.47	1.52
Discuss your progress in school with you	3.34	1.43	3.33	1.43	3.37	1.48
Participated in school related activities	2.13	1.40	2.12	1.39	2.28	1.51
Felt I was treated respectfully in class	4.41	0.80	4.40	0.78	4.48	0.94
Class size made it difficult to ask questions	4.27	0.90	4.28	0.88	4.23	1.08
I felt isolated in class	4.33	0.88	4.33	0.86	4.23	1.04
Instructor or students made prejudiced comments	4.62	0.75	4.62	0.74	4.48	0.94
I felt like I did not fit in	4.36	0.92	4.37	0.90	4.29	1.06
Keep trying until a job is done	6.46	0.81	6.45	0.08	6.58	0.81
Stick to unpleasant tasks until they are done	5.94	1.09	5.95	1.06	5.89	1.26
Failure makes me try harder	6.15	1.142	6.13	1.15	6.30	1.10
Will not try complicated things	6.10	1.24	6.11	1.21	5.90	1.53
Give up soon if initially unsuccessful	6.18	1.22	6.19	1.19	6.07	1.50

APPENDIX H. SKEWNESS OF OBSERVED VARIABLES BEFORE AND AFTER DATA TRANSFORMATION

Table H.1

Skewness of the Observed Variables Before and After Data Transformation

Variable	Skewness	Transformation technique applied	Skewness after transformation
Time on campus	0.874	N/A	N/A
Time spent studying on preparing for class	0.760	N/A	N/A
Visited faculty and sought their advice	.0755	N/A	N/A
Approached faculty outside class	0.997	N/A	N/A
Discussed career plans with faculty	0.979	N/A	N/A
Asked instructor for comments	0.359	N/A	N/A
Met with an advisor	0.193	N/A	N/A
Talked with an advisor about courses	–1.063	Reflect and inverse	0.746
Studied with other students in class	0.204	N/A	N/A
Received informal tutoring	0.488	N/A	N/A
Received academic support outside class	0.452	N/A	N/A
Used regular feedback from TA or professor	0.107	N/A	N/A
Spent more time studying	–1.243	Reflect and inverse	
Taught myself to study more efficiently	–0.852	N/A	N/A
Did all of the assigned readings	–0.744	N/A	N/A
Increased lecture attendance	–0.607	N/A	N/A
Studied by myself	–0.793	N/A	N/A
I felt isolated in class	–1.333	Reflect and inverse	–.308
I felt like I did not fit in	–1.501	Reflect and inverse	–.513
Instructor/students made prejudiced comments	–2.354	Reflect and inverse	-1.002

Table H.1 (continued)

Variable	Skewness	Transformation technique applied	Skewness after transformation
Class size made it difficult to ask questions	–1.381	Reflect and inverse	-0.155
I felt I was treated respectfully in class	–1.920	Reflect and inverse	-0.277
Give up soon if initially not successful	–2.100	Reflect and inverse	-0.344
I will not try complicate things	–1.908	Reflect and inverse	-0.175
I keep trying until job is done	–2.599	Reflect and inverse	-0.483
Failure makes me try harder	–1.792	Reflect and inverse	-0.203
I stick to unpleasant tasks until they are done	–1.516	Reflect and inverse	-0.406
Mother's education	0.591	N/A	N/A
Father's education	0.613	N/A	N/A
Estimated parents' income	0.256	N/A	N/A
Spent time just talking to you	–1.001	N/A	N/A
Work with you on your homework	0.575	N/A	N/A
Discuss your progress in school with you	–0.364	N/A	N/A
Participated in school related activities	0.941	N/A	N/A
Time at a job	–1.452	Reflect and inverse	-0.202
Level of math preparation	0.526	N/A	N/A
Level of science preparation	0.526	N/A	N/A
Perceived language skills	–0.770	N/A	N/A
Degree aspirations	–0.527	N/A	N/A