Model of International Student Persistence: Factors Influencing Retention of
International Undergraduate Students at Two Public Statewide Four-Year University
Systems

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Abstract

The current global economy has created a new middle class around the world, making higher education more accessible to a wider population. The increasing diversity in U.S. higher education is not only the result of minority American students, but also due to the increasing enrollment of international students. This study examined the factors influencing retention from fall 2006 to fall 2007 of international undergraduate students (N = 454) in two public statewide four-year university systems. The model used in the study was based on a combination of retention models by Tinto (1975) and Astin (1970), and revisions made by Tierney (1992) and Pascarella and Terenzini (1980).

The data in this study were analyzed using stepwise binomial logistic regression as the primary statistical technique. The findings of this study showed that the results were consistent with other retention studies where there was no single factor or model to predict the persistence of postsecondary students in U.S. higher education institutions. Results for most variables studied were either unclear or inconsistent. Only academic achievement was consistently shown to have a statistically significant and positive effect on persistence into the second year of international students in this study.

The difference in the results of this study, in comparison to studies of factors affecting the retention of domestic students, is intriguing. In a way, this study raises more questions than it answers. In conclusion, this study indicated that variables, such as spring semester GPA, credit hours attempted, and on-campus employment have a positive effect on retention into the second year of international undergraduates.

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CHAPTER 1

Introduction

Demographic shifts are creating a more diverse student population in institutions of higher education in the United States (U.S.). Due to the significant population increases of some minority groups, especially Asian Americans, Hispanic Americans, and African Americans, the current generation is more ethnically diverse than previous generations (Levine & Cureton, 1998). Changing social views, wider access to financial aid, refocused mission statements, and specific institutional initiatives are also contributing to greater diversity (Dey & Hurtado, 1994). Diversity in U.S. higher education is not only the result of increasing minority student enrollments, but is also due to the increasing enrollment of international students. Institutions of higher education in the U.S. enrolled over 564,766 international students in 2005/2006. Although this is a five percent decline (not statistically significant) in total international students in the U.S. from the previous year's total enrollment, new international student enrollment increased by eight percent from 2004/2005 (Chin & Bhandari, 2006). Not only do international students augment the diversification of higher education institutions, they contribute financially. In the 2005/2006 academic year, international students contributed over $13.5 billion dollars to the U.S. economy (Chin & Bhandari, 2006).

According to the latest IIE Open Doors 2008 report, the number of international students at colleges and universities in the United States increased by seven percent to a record high of 623,805 in the 2007/2008 academic year. This 2007/2008 growth builds

on a three percent increase reported for 2006/2007, and the total number now exceeds

by six percent the previous all-time high of 586,323 reported in 2002/2003. Open Doors

data show an even stronger increase in the number of "new" international students, those

enrolled for the first time at a U.S. college or university in fall 2007. New international

student enrollments rose by ten percent, following increases of ten percent and eight

percent for the previous two years (Chin & Bhandari, 2008).

In terms of revenue, international students contributed over $15.5 billion dollars

to the U.S. economy during the academic year 2007/2008, through their expenditures on

tuition and living expenses. U.S higher education is one of the country's largest service

sector exports, as international students provide revenue to the U.S. economy and

individual host states for living expenses, including room and board, books and supplies,

transportation, health insurance, support for accompanying family members, and other

miscellaneous items. IIE Open Doors 2008 reports that 62 percent of all international

students receive the majority of their funds from personal and family sources. When other

sources of foreign funding are included, such as assistance from their home country

governments or universities, 67 percent of all international students' primary funding

comes from sources outside of the United States (Chin & Bhandari, 2008).

A diverse student body provides educational value and benefits for American

society, such as the competitive advantage of a diverse workforce (Carnevale & Fry,

2000). However, the primary focus of current diversity initiatives, such as recruitment

and retention, is on American minorities and immigrants. International students "have

always remained one of the most quiet, invisible, underserved groups on the U.S.

campus" (Mori, 2000, p. 143).

This research examines the progress to degree completion (i.e., retention) of

international undergraduate students in the United States after completing the first

academic year of study in two separate statewide public higher education systems in a

midwestern state. The study examines the relative contribution of pre-entry attributes

(prior schooling and family background), institutional experience (academics, co-

curricular involvement, and peer group interaction), and on-campus integration

(academic and social) in predicting international undergraduate students' retention rate

after completing their first academic year in public four-year university systems.

The study begins with a definition of international students and a definition of

educational attainment in terms of retention rate in the U.S. The second section is an

explanation of interchangeable words used throughout this research. Next, a statement of

the problem and specific research questions will be addressed to provide a more defined

analysis of the factors influencing international undergraduate students' persistence. This

research focuses on international undergraduate students in two statewide higher

education systems. Since there is a lack of study and research on progress of degree

completion on international students in the U.S., this research is critical.

Statistical information is presented next, including a brief chronological history of

international students in the U.S. and the impact of their college attendance. The

historical section considers only international students studying in the U.S., and does not

address U.S. students studying abroad or international students studying in other

countries besides the U.S. The historical overview is followed by a literature review of studies on persistence. This section will present models of retention from researchers such as Tinto (1975, 1986, 1993), Astin (1970, 1975, 1985, 1993), and others.

The next section describes the methodology of the research design. This section will explain, in detail, the description of the data, the data collection methodology and the statistical analysis that was performed. A detailed description of each variable is also included in this section.

Results of the data analysis will be presented next. This chapter includes a detailed presentation of the statistical findings and additional explanation of the data analysis. The model of international student persistence (i.e. factors influencing retention of international undergraduate students at public statewide four-year university systems) will be reviewed.

Findings, limitation, recommendations for future research and implications of the study will be discussed in the last portion of this dissertation.

Definition

For purpose of this research, an *international student* is defined as an individual who is enrolled in courses at a higher education institution in the U.S. on a temporary visa, and who is not an immigrant (permanent resident with an I-151 or "Green Card"), a U.S. citizen, an illegal alien (undocumented immigrant), or a refugee in the U.S. (Chin, 2004). This definition was used by Gallup-Black (2004), who further stated that the most useful and globally relevant definition should focus on "nonimmigrant or non-permanent resident" status.

Pascarella and Terenzini (2005) defined *educational attainment* as the number of years of schooling completed or degrees earned. Pascarella and Terenzini also stated that even though educational attainment research typically focuses on completion of a degree or certificate (whether associate, bachelor's or advanced degree), student persistence in terms of progressive re-enrollment and the factors that shape it cannot be ignored. Persistence is generally characterized to be the progressive re-enrollment in college, whether continuous from one term to the next, or temporarily interrupted and then resumed. In this paper, the words *persistence* and *retention* are used synonymously to represent re-enrollment.

Course completion is not included as part of Pascarella and Terenzini's definition of educational attainment, unlike Olsen, Burgess, and Sharma (2006), who studied the academic performance of 338,000 full-time students at 22 Australian universities in 2003 using Australia's "student progress rate." The Australian "student progress rate" is similar to the completion rate used by U.S. higher education financial aid offices in determining eligibility. It is computed by using the rate of courses (or credit hours) completed as compared to courses attempted.

America and the United States (U.S.) are used interchangeably in this paper to reflect the country, the United States of America. Foreign students and international students are used interchangeably to represent non-U.S. students studying in the U.S. Throughout, educational attainment is used to represent retention, while the words retention and persistence are used interchangeably to represent reenrollment in a college or university.

The term *study abroad* is used to describe the event or undertaking of an international student pursuing higher education in the U.S. This definition is used to represent degree-seeking international students in the U.S., and excludes exchange or non-degree seeking international students in the U.S. The words International Student Office, International Student Program, International Student and Scholar Services or Programs are used throughout this paper synonymously to represent the offices at U.S. colleges and universities that provide services to international students. The international student services function was developed as a branch of general student services activities in response to the needs of a growing population of students in U.S. higher education institutions in the 1960s and 1970s (Barr & Upcraft, 1990). Services were initially provided by various offices and locations throughout U.S higher education campuses, as they were for the general student population. However, as the numbers of international students increased, a more centralized system was deemed necessary on most campuses in order to respond to the unique needs of international students. Interestingly, even though student services are typically decentralized for the general student population, these services are more often than not centralized for international students. Hence, the international student services office generally attempts to provide comprehensive services needed by international students such as academic advising, immigration advice and personal counseling (Johnson, 1993).

Statement of Problem

The persistence rate in U.S. higher education has been an area of interest in recent decades. Pascarella and Terenzini (2005) stated that educational attainment may not be

an educational outcome in and of itself, but education clearly has a powerful influence on a student's future occupational, social, and economic status, as well as on other factors that affect an individual's subsequent quality of life. For this reason, the ways in which colleges and universities shape educational attainment are worth studying. Pascarella and Terenzini (2005) further stated that it is important to consider not only the factors and dynamics involved in earning a degree or certificate (a typical measure of educational attainment), but also student persistence and the experiences students have along the way that influence whether they complete a postsecondary credential.

Colleges and universities are implementing appropriate policies and co-curricular initiatives to support ethnically diverse students (Bowen, Bok, & Burkhart, 1999). According to Mori (2000), international students have received little attention in student persistence studies and related first-year experience research and programming. These students face not only many of the transitional challenges of traditional college students, but they also have to adjust to a new language, culture, educational system, immigration regulations, and sometimes, financial difficulties. According to Rajapaksa and Dundes (2003), international students are also more likely to feel lonely and homesick, and have greater adjustment challenges and less social support than their American counterparts.

In spite of these transition challenges, graduation rates of international students are often higher than or similar to those of the total student population on campuses in the United States. Six-year graduation rates for non-resident alien students reported by the National Collegiate Athletic Association (NCAA) were around 70 percent in 2002. This rate is higher than the NCAA six-year graduation rate of 54 percent for all students in all

divisions in the same year (NCAA, 2007). Though statistics provide useful information,

they cannot identify reasons for departure, persistence or insights into transition

experiences. Few empirical studies have focused on the success or failures of

international students in American higher education institutions (Andrade, 2006).

According to Evans (2001), similar to minority students, international students

may have characteristics defining them as at-risk, such as being specially admitted, first-

generation college students, disadvantaged, ethnic minorities, non-English speaking,

learning disabled, or poorly prepared. Evans (2001), in his unpublished dissertation,

interviewed Polynesian students from a particular freshman cohort at one institution and

found five reasons for their departure: a cultural background that did not prepare them for

the freedom they experienced at the university, an emphasis on relationships with friends

rather than academic studies, family crises at home, lack of focus due to unfamiliarity

with higher education, college as a reason to leave home rather than to obtain a degree, or

misunderstandings about general education requirements.

The current body of literature surrounding the success of international students

consists primarily of studies within a single institution and tends to refer to studies

conducted prior to September 11, 2001 (Etish-Andrews, Roscoe, & Terkla, 2007). This

research aims to shed light on the factors influencing international students' retention rate

in public statewide higher education systems by including multiple institutions post

September 11, 2001. This is important because after September 11, 2001, Hrdinova

(2003) and NAFSA (2003) stated that current federal policies and the perception of U.S.

lawmakers' attitudes contributed to the overall declining enrollment of international

students in U.S. institutions of higher education (IHE), primarily due to difficulties in obtaining student visas, and perceptions abroad that international students may no longer be welcome in the U.S.

Research Questions

This study explores the concept of integration into campus life as it relates to international student persistence. According to Andrade (2006), no study to date has examined the degree to which international students integrate into the campus community and how such interaction affects persistence. The question that this study addresses is: What factors influence the persistence of international undergraduate students from year-one to year-two in public four-year universities? Other questions that this study will attempt to answer are:

1) Do categories such as pre-entry attributes, institutional experience, and on-campus interaction influences persistence of international students?

2) Does proficiency in English influence persistence rate of international students?

3) Does country of citizenship have any effect on retention rate of international students?

4) Does the source of financial sponsorship have any effect on international students' persistence?

5) Is gender related to retention of international undergraduate students?

6) Does the first and or second semester Grade Point Average (GPA) and/or Cumulative Grade Point Average (CGP) have an effect on the retention of international students?

7) Does the number of credit hours attempted in the first and/or second semester have any effect on retention rate of international students?

8) Does living on campus affect the retention rate of international students?

9) Does working on campus impact the retention rate of international students?

10) Does the number of appointments with International Student Office affect the retention rate of international students?

CHAPTER 2

Review of Literature

This first segment of the review of literature will summarize trends of foreign

students' mobility, a historical account of international students studying in the United

States, and a profile of international students studying in U.S. higher education

institutions. The second segment will discuss of the positive and negative impact of

international students studying in the United States. This section will be further divided

into individuals, country of origin, and host country's impact. A discussion on retention

data of international students studying in the United States will conclude this chapter.

Foreign Student Mobility Trends

According to NAFSA (2003), the United Kingdom (U.K.) and Australia have

achieved average annual growth rates of new foreign students in excess of 20 percent in

recent years. The British and Australian success has heightened the competition for

foreign students, and the U.S. may be losing its competitive advantage in the face of such

combined governmental and institutional initiatives. The concern about losing foreign

students to other countries is exacerbated by the acknowledgement that U.S. IHE lacks

national backing for foreign student policy in contrast to other countries, according to the

NAFSA Strategic Task Force on International Student Access.

Historical Account of International Students Studying in the United States

Melby (1966) and Wheeler, King, and Davidson (1925), in their attempts to

depict the history of foreign students in the U.S., speculated that traditionally during the

early nineteenth century, Americans studied in Europe but a very small number of students came to the U.S. to study. Perhaps the first foreign student could have been Francisco de Miranda of Venezuela, one of the first advocates of Latin American's independence. A more commonly stated account found in the literature attributed the beginnings of foreign students in the U.S. to the sponsorship of Christian missionaries propagating Christianity in developing countries during the nineteenth century (Du Bois, 1962).

Besides religious-based promotion of educational exchanges, there were no organized efforts to bring international students to the U.S. prior to the end of World War I. At the end of World War I, a number of organizations emerged to promote world peace through increased understanding among peoples, and education was used as a vehicle to accomplish this goal. The Institute of International Education (IIE), founded in 1919, was created to promote, facilitate, and administer exchange programs between the United States and other nations. IIE began collecting data in 1921 on foreign students studying in America. Today, IIE is known as the organization that collects and analyzes international education enrollments. In 1921, 6,740 foreign students were reported to be studying in the U.S. This number gradually increased to 10,000 in 1930. From the 1930s to the end of World War II, there were only slight increases to 10,300 foreign students in 1946 (Knowles, 1977).

During the four-year period between 1946 and 1949, the number of international students studying in the U.S. increased from 10,300 to 25,400, a 247 percent increase (Knowles, 1977). According to Du Bois (1962), this increase was caused by the turmoil

in Europe and Asia during World War II, while the U.S. was mostly unaffected by the turmoil. Du Bois attributed the increase to scholars seeking refuge to continue their research and to students avoiding the draft or escaping prosecution. Alternatively, Knowles (1977) credited the increase to the formation of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1944 and the Fulbright Act by the United States in 1945. Both organizations were charged with promoting cooperation among nations of the world through cultural exchanges and education.

Beginning in the late 1940s and continuing to 2001, the United States enjoyed a steady increase of international students from all parts of the world. According to the 2003 IIE Open Doors Report, international students studying in the U.S. increased from 75,000 in the 1963/1964 academic year to 586,323 international students in 2002/2003, a 782 percent increase over a 40-year period. The 586,323 international students studying in the U.S., in 2002/2003 represented a .6 percent increase from the year before. While this .6 percent increase was the smallest increase since 1995, there have been periods of strong growth followed by periods of slow growth throughout the history of the International Student Census reported in the Open Doors Report by IIE (Chin, 2003).

According to the 2004 Open Doors Report on International Exchange by the IIE, the number of international students enrolled in U.S. higher education institutions decreased by 2.4 percent in the academic year 2003/2004, as compared to the previous academic year, and another decrease of .05 percent from 2004/2005 as compared to 2005/2006 (Chin, 2004; Chin & Bhandari, 2006).

Study Abroad Trends of International Students in the U.S.

According to IIE's website, the United States has been the destination of choice for most foreign students seeking to study abroad in the twenty-first century (Chin, 2004). It is widely believed that the U.S. benefits economically, politically, and academically from educating international students. For example, the 2003 Open Doors Report noted that, in the 2002/2003 academic year, international students contributed $12.9 billion dollars to the U.S. economy, making higher education the country's fifth largest service sector export (Chin, 2003).

From a political standpoint, educating the future leaders of foreign countries helps spread U.S. political values and influence, creating goodwill towards the U.S. throughout the world (NAFSA: Association of International Educators, 2003). Academically, international graduate students have become a key component of teaching and research in higher education, particularly in the scientific fields (Altbach, 1991). Examples of this are the countless world leaders who have been educated in the U.S., such as Mexico's former President Vicente Fox, former United Nation Secretary General Kofi Anan, and many other Nobel Prize scientists.

Even though the United States has been the destination of choice for most foreign students, according to the Institute of International Education (IIE) the enrollment trend of international students studying in the U.S. has been experiencing a decline. The number of international students enrolled in U.S. higher education institutions decreased by 2.4 percent in the academic year 2003/2004 as compared to the year before. In monetary terms, international education contributed nearly $13 billion dollars to the U.S.

economy in 2003/2004, while in 2002/2003 the amount was $12.9 billion dollars (Chin, 2004). If there had been no decline of international students in the U.S., the economy might have gained an estimated $4.1 billion dollars more in 2003/2004.

Hrdinova (2003) and NAFSA (2003) attribute the overall declining enrollment trend of international students in U.S. institutions of higher education (IHE) primarily to (1) difficulties in obtaining student visas, (2) rising U.S. tuition costs, (3) vigorous recruitment activities by other English speaking nations, and (4) perceptions abroad that international students may no longer be welcome in the United States.

Profile of International Students in U.S. Higher Education Institutions

Explanations for the decline of international students in the U.S. in recent years are quite complex. While undergraduate enrollments declined by five percent, graduate enrollments increased by 2.4 percent in 2003/2004 (Chin, 2004). The sharp drop in undergraduate enrollments began in 2001/2002, and may have been accelerated by parental concerns about whether the U.S. is a safe and welcoming place for young adults after the terrorist attack of September 11, 2001. The modest gains in graduate enrollments were primarily at smaller institutions, including those granting mainly masters and professional degrees. At the same time, large research institutions, both public and private, suffered losses at the graduate level. Although the overall percentage declines were small (less than 1%), the impact was great because these types of institutions serve the largest percentage, approximately 70 percent, of international graduate students (Chin, 2004).

Among the top 20 countries that send international students to the U.S., there were more declines in student enrollment than increases. For example, the number of students from China declined by almost five percent to 61,765 in 2003/2004 from 64,757 in 2002/2003. Other declines ranged from less than two percent for Turkey and Malaysia to almost 15 percent for Indonesia during the same time period. The increases among the top 20 senders were generally smaller than the declines, ranging from seven percent for India to just over one percent for the United Kingdom (Chin, 2004).

According to the 2004 IIE Open Doors Report, international students in the U.S. pursue a full range of fields of study, but in 2003/2004 nearly half (48 percent) were in three fields of study: business and management, engineering, and mathematics and computer sciences. The leading field of study remained business and management, with 109,187, or 19 percent of all international students. Engineering, with 95,183 students, comprised almost 17 percent of the total, followed by mathematics and computer sciences, with 67,736 students, almost 12 percent of the total. All three fields saw declines, minus five percent, minus one percent, and minus six percent, respectively, for a combined decline of four percent from the previous year (Chin, 2004).

Unlike the field of study, which has changed over time, some characteristics of international students studying in the U.S. have remained fairly consistent. For example, the vast majority of international students who come to study in the U.S. are single (85 percent), which has been the case since the beginning of the census. In 1977/1978, three quarters of all international students were male, but the gender gap has been closing

steadily since then, with females comprising almost half (44 percent) of all

international students in 2003/2004 (Chin, 2004).

An analysis of where international students have been studying in the U.S. for the

three academic years 2000/2001, 2001/2002, and 2002/2003, concluded that less than 30

percent of international students were attending private institutes of higher education out

of the top 20 U.S. schools with the highest international student enrollment (Chin, 2004).

Positive Impact of International Students Studying in the United States

Higher education in the U.S. is investing more on globalization, such as academic

curriculum, and foreign students are among the most pivotal and visible elements of this

internationalism. International students in the U.S. contribute to the research enterprise,

scholarly publication, and the promotion of English as the world's major scientific

language. International students in the U.S. are considered the human embodiments of a

world-wide trend towards the internationalization of knowledge and research in an

integrated world economy (Altbach, 1991).

Individuals

The value of study abroad in acquiring second language skills by international

students, as with U.S. students studying abroad, is confirmed by Fry's (1984) analysis of

data sources from (1) study of education and occupational attainment in Thailand; (2)

study of the origin of the Thai elite; (3) study of the social and educational backgrounds

of Thailand's highest-ranking civil servants; and (4) impressionistic qualitative databased

on approximately 10 years of practical experience in working with many Thais who were

former foreign students abroad. Fry (1984) concluded that competency in a foreign

language is particularly important for professionals in countries where the national

language is not used internationally. For example, professionals in countries like Japan,

Malaysia, Nepal, and Thailand greatly need knowledge of an international language, such

as English, to be able to interact with professionals in other parts of the world, as well as

in their own regions. English is used in these countries in scientific fields, to promote

economic growth through foreign trade, and in international relations, such as diplomacy

negotiations.

Another impact of education abroad is upward social mobility. The prestige of

studying abroad can in some cases compensate for deficiencies in socioeconomic

background, a conclusion supported by the review of a major study of education and

occupational attainment in Thailand (Fry, 1977). This finding is also supported by

Altbach's (1991) analysis of research literature from the psychological field, higher

education organizations, such as IIE, NAFSA and the United Kingdom Council on

Overseas Students Affairs (UKCOSA), and studies sponsored by UNESCO.

Fry (1977) also indicated that women in third-world countries who study abroad

are more likely to be of higher socioeconomic background than men studying abroad.

Therefore, this avenue of mobility seems much less open to women. In societies where

both educational and occupational opportunities may be limited for certain cultural

minorities, overseas study can be an important alternative source of mobility.

In a more recent study, Habu (2000) conducted informal interviews with 25

Japanese women studying in Britain, and supported the positive impact of study abroad

on Asian women by Fry (1977). Habu (2000) stated that women from developed

countries studying abroad are not primarily concerned with economic betterment or a source of social mobility, but rather with gaining self-fulfillment that they could not achieve in their home country. Habu (2000) also stated that the motivation of Japanese women to study abroad is only partly related to career ambitions; a more salient motivation is to seek independence which is difficult to achieve back home.

The impact of social mobility is also confirmed by Ball and Chik's (2001) study of 400 recent Malaysian graduates. Ball and Chik reported that the Malaysian government's policy on sponsoring Malaysians to study abroad resulted in enabling 57.5 percent of students whose parents had only primary (elementary) education to attend and graduate from a foreign university.

Students gain mobility and acquisition of foreign language skills from studying abroad. Another widely accepted motivation for study abroad by most third world countries' nationals is the acquisition of technical skills and personal career advancement. Study abroad can also be an intensive cross cultural or global mindedness experience which has deep and fundamental meaning for many sojourners (Brislin, 1981).

Country of origin

During the early phase of Japanese technological development in the late 1960s, there was a strong emphasis on sending Japanese technicians and students abroad to acquire new technical skills in a wide variety of fields relevant to national development (Wilkinson, 1983; Fry, 1984). Even today, Japan continues to send thousands of students abroad, particularly in fields related to science and technology. According to the 2003 Open Doors Report by IIE, Japan ranks fourth in sending students to the U.S. behind

India, China, and The Republic of Korea (South Korea). In 2002/2003, Japan sent a total of 45,960 students to the U.S., which is 7.8 percent of the total number of international students in the U.S. (Chin, 2004).

Given the strong extended family ties in a typical third-world setting, children with high ability who have migrated abroad will commonly return financial remittance to their families at home after completing their education abroad. Rao (1979) strongly emphasized this phenomenon from the empirical research on foreign students in Australia, the United States, Canada, and France. According to Ranson (2006), in the *Christian Science Monitor* online article, every year $100 billion dollars is sent from the U.S. to family and relatives living abroad. This positive impact of study abroad for the countries sending international students is also supported by Altbach's (1991) analysis of research literature.

Besides the benefits of increased technical skills and economic gain, home countries of international students also benefit from the cross-cultural skills and global mindedness achieved by their students after they return home. This impact is illustrated by Kitsantas's (2004) study of 232 undergraduate students enrolled in study abroad courses over a period of three to six weeks in 2002. Kitsantas stated that as businesses globalize and the demand for employees prepared for international assignments increases, training programs designed to develop their cross-cultural skills acquired while studying abroad provide countries of origin with a global workforce equipped for transnational corporations.

Host country

Rao (1979) stated that a potential positive impact of study abroad is "brain overflow." Individuals from third-world countries may do important research work which has implications for developing nations. An example is Jamaican Sir Arthur Lewis, a Princeton professor who received the Nobel Prize for his research on development economics. By migrating, Lewis contributed not only to Jamaica but also to the development process globally. A number of talented professionals who have migrated from third-world countries have become prominent and influential in key international organizations, such as the World Bank and other specialized agencies of the United Nations. Their presence in such organizations provides a greater opportunity for viewpoints and perspectives from third world countries to be heard. Hence, brain overflow may have significant positive distribution effects.

In terms of economic impact, international education in the U.S. contributed nearly $13 billion dollars to the U.S. economy during the academic year 2002/2003, an increase of nearly $1 billion dollars from the year before (Chin, 2002 & 2003). According to the National Committee for International Trade in Education (NCITE), U.S. international education is ranked in the top five service exports of the U.S. (NCITE, 2002; Chin, 2003).

Negative Impact of International Students Studying in the United States

Mazrui's (2002) literature review, concluded that in the twenty first century, brain drain has been attributed to two interrelated forces: the developed countries versus the developing or third-world countries; and the flexibility or mobility fostered by

globalization. The economic and social disparities between the developed world and the third world have produced dissatisfaction among the educated in the third-world countries, which has created the temptation for some individuals to migrate abroad do seek personal fulfillment. In turn, this process has produced a globalized labor market and interconnected economy and social classes.

Individuals

As with U.S. students returning home from study abroad, international students returning to their home country also face reversed cultural shock or cultural collisions. Labrack (2006) listed ten reentry challenges of students at the University of The Pacific returning to their home country after study abroad: (1) boredom, (2) no one wants to hear, (3) you can't explain, (4) reverse homesickness, (5) relationships have changed, (6) people see "wrong" changes, (7) people misunderstand, (8) feelings of alienation, (9) inability to apply new knowledge and skills, and (10) loss or compartmentalization of experience (or "shoeboxing"). These challenges were identified as factors contributing to the depression experienced by some returning students (Citron & Mendelson, 2005).

Country of origin

In a *New York Times* opinion article, Greer (1983) stated that approximately one-third of foreign students coming to the United States do not return to their country of origin. This is confirmed by Barclay's (2002) citation of information provided by California House Representative Lofgren. The number of foreign students staying in the U.S. after completing their education has been consistently about one-third of the total international student population in U.S. institutions of higher education. In 2002, nearly

194,332 international students out of the total of 582,996 remained in the U.S. after graduation (Chin, 2002). This phenomenon is normally referred to negatively as "brain drain"; however, it can also be viewed positively from an international economic perspective. For certain highly skilled professionals with specialized training, it may well be that their economic contribution is significantly higher in a foreign country such as the United States or the United Kingdom than it would be in their own country (Fry, 1984; Altbach, 1991). This phenomenon positively impacts developed countries where students are studying, while negatively impacts the student's country of origin.

Besides cultural impacts that are sometimes more intangible, a more concrete impact is the cost of foreign exchanges or trade deficits. In most third-world countries, a trade deficit is a considerable development constraint. A trade deficit or foreign exchange imbalance occurs when a student from a third-world country is spending money for school in a developed country, when its country of origin does not have a trade surplus with the developed country. As foreign study has become increasingly expensive, it definitely represents a serious loss in the cost of foreign currency exchanges (Fry, 1984; Altbach, 1991). For example, 572,509 international students were studying on U.S. campuses during the academic year 2003/2004, and during that academic year alone international education contributed nearly $13 billion dollars to the U.S. economy (Chin, 2004), a substantial sum in foreign exchange.

Another form of economic loss is opportunity cost. Study abroad, particularly at the doctoral level, may involve considerable opportunity cost. Key professionals of high talent may be lost to a nation for periods of between three and ten years. In countries

such as the Philippines and Egypt, with large pools of educated manpower available, such opportunity costs may not be serious. But for many smaller countries with less educated talent to draw on, particularly some poorer African nations, the opportunity costs associated with study abroad can be considerable (Fry, 1984; Altbach, 1991).

Host country

In a "how to opinion paper," Bus (2002) stated that the negative impact of hosting international students in the U.S. is mainly the cost of recruiting and servicing international students on U.S. college and university campuses. In most cases the positive effects of having international students on university campuses outweigh the negative effect. This sentiment is echoed by Altbach (1991).

Retention Data of International Students Studying in the United States

Data from IIE and researchers such as Altbach (1991), Fry (1977), Habu (2000), and others have indicated that there is a great interest in pursuing a higher education degree in the United States by foreign students from around the world. However, a recent electronic search in The Scholarly Journal Archive (JSTOR) and Education Resources Information Center (ERIC) discovered no study on the topic of retention of international students studying in the U.S. There were a very small number of studies on foreign students studying in Australia and England but no study based in the United States. Likewise, there were only two sources that separated international students or non-resident students in the U.S. from the general college student population when reporting on retention rates. The first source is the National Collegiate Athletics Association (NCAA) and the second is The Consortium for Student Retention Data

Exchange (CSRDE) at the University of Oklahoma. CSRDE tracks only data from its own member organization and does not include all higher education institutions in the United States.

Retention Models

The following section (second section of this chapter) presents a review of literature on retention and persistence model by Tinto (1975, 1986, 1993), Bean (1980, 1985), and Pascarella and Terenzini (1980, 1983, 2005). This will be followed by a summary of criticisms of Tinto's model of persistence. The last section of this chapter presents recommended future models of persistence and the need for a retention model for international students.

Theoretical models of persistence

There is a tremendous amount of literature on persistence, and Tinto is most often cited and associated with student persistence research, although Astin's (1975) groundbreaking research on access and persistence provided a framework for many subsequent researchers.

In earlier studies, Astin (1970) presented an input-process-output model of student persistence; however, in later research, Astin presented a talent development model, whereby student involvement in higher education resulted in the development of certain talents inherent to both the student and the system. Additional research by Astin (1970) focused on establishing a foundation for future studies on variables affecting persistence in college. Astin (1970) suggested that when students become involved in college, the level and intensity of their involvement in the institutional environment will

affect their potential and willingness to persist. Simply stated, Astin's involvement

theory is "students learn by becoming involved" (Astin, 1985, p. 133). Essentially,

learning is the reason for persistence, and student involvement has become a guiding

principle in undergraduate education in the United States.

While Tinto's (1975, 1986, 1993) model of student persistence is similar to

Astin's involvement theory, the detailed theoretical structure proposed by Tinto provided

researchers with opportunities to study student change and to develop additional models

for investigating influences on student persistence; thus, a theoretical foundation was

established for empirical research.

Tinto's theoretical model of persistence

Tinto's initial theory of student departure began with his collaboration with

Cullen in 1973 (Tinto, 1975). Cullen was Tinto's research assistant and investigated and

reviewed longitudinal studies on student attrition. Cullen's collaboration with Tinto

produced a theoretical model of attrition and persistence that included the following

components: pre-entry attributes (prior schooling and family background), goals or

commitment (student aspirations and institutional goals), institutional experiences

(academics, faculty interaction, co-curricular involvement, and peer group interaction),

integration (academic and social), a second set of goals or commitments (intentions and

external commitments), and outcomes (departure decision – graduate, transfer, dropout).

While the academic and social integration variables from this collaboration formed the

foundation for Tinto's 1975 model, Tinto's subsequent inclusion of additional

environmental variables was adapted from Van Gennep's (1960) rites of passage theory.

Tinto (1975) suggested that students enter college with various individual characteristics, including those related to family background, individual attributes, and pre-college schooling experiences. Family background characteristics defined by Tinto are family socioeconomic status, parental educational level, and parental expectations. Individual attributes described by Tinto included academic ability, race, and gender. Pre-college schooling experiences included the characteristics of the student's secondary school, high school academic achievement, and social attainments. These individual pre-entry characteristics were hypothesized by Tinto to directly influence student departure decisions.

According to Braxton, Sullivan, and Johnson (1997), institutional experience can be explained in terms of academic performance. Academic performance reflects a student's degree of structural integration into the academic system of a college or university, since grades reflect assessments of a student's ability to meet an institution's values and objectives for student academic achievement. Tinto (1975) viewed intellectual development as an aspect of normative integration because it reflects the student's appraisal of the institution's academic system.

Tinto's (1975) academic integration should not be confused with active learning. Academic integration reflects a student's experience with academic systems and academic communities of a college or university. Academic integration typically has been operationally defined and measured as a student's estimation of their academic and intellectual development, grade point average and student's perception of faculty concern for teaching and student development (Pascarella & Terenzini, 1983). In contrast, active

learning and other classroom-based experiences are antecedents or precursors of academic integration. Tinto (1975) further stated that informal peer group associations, extracurricular activities, and interactions with faculty and administrators are mechanisms of social interaction.

Van Gennep (1960) pointed to the use of ritual and ceremony as necessary components to a person's integration into a new surrounding. Van Gennep's theory also incorporated fundamental sociological perspectives previously identified with Durkheim's (1953) theories of suicide and departure. Using Durkheim's (1953) theories, Van Gennep noted that as a person moves from one place or stage to another, certain rites of passage occur and are celebrated or marked with socially significant events. These events provide tangible evidence of a person's integration into the social setting and serve as evidence of accomplishment and acceptance. The anthropological base of Van Gennep's theory provided Tinto with a foundation to apply his own theory of student departure to institutions of higher education (Metz, 2004).

Tinto's extension of the idea of rites of passage into the higher education arena provided examples of a student's need to navigate through the higher education system, and eventually to acclimate to a specific environment setting or the community's culture. An individual's failure to acclimate to an environmental setting continued to be a focus of Tinto's studies identifying reasons for student departure from college. Tinto (1975, 1986, 1993) claimed that college students who failed to integrate into the social and academic system of the institution would likely leave the institution.

Tinto (1993) employed Van Gennep's (1960) rites of passage theory to explain

the process of students adjusting to college in three stages. The Separation stage is

characterized by a decline in interactions with past associates and a change in behavior.

In the Transition stage, students acquire the necessary knowledge and skills to interact

with members of a new group, and finally during the third Incorporation stage, new

interaction patterns are established. The ability to successfully move through these

phases may be dependent on the differences between a student's past norms and behavior

patterns and those that are accepted in the new environment. Students from families,

communities, and schools with widely different norms and behaviors from those in the

college environment may have difficulty adjusting to the new environment, requiring

rejection of culturally-unique aspects of their past lives in order to persist. Tinto (1993)

suggested that students who do not disassociate from their own cultures do not benefit

from the full rewards of membership in the college community and are at risk of

departure.

Tinto's research (1975, 1986, 1993) continues to be prevalent in much of the

literature on student departure. Many studies by other researchers have used Tinto's

(1975) model as a starting point in their investigations into student persistence and

attrition.

Other models of persistence

Other researchers (Bean, 1980) developed a causal model of student attrition

using a theory based on organizational behavior to explain student persistence and

attrition. Bean's (1980) research focused on student attrition and the factors influencing

non-persisters, focusing on the similarities between leaving the world of work and leaving college. By applying the theoretical concept of job turnover to postsecondary education, Bean (1980) suggested the reasons for employee departure could be applied to student departure from higher education. At the same time, Bean also expanded on the previous work of Tinto and Astin by integrating academic variables, student intent, goals, expectations, and external and internal environmental factors into a revised model of persistence. Bean and Metzner (1985) further investigated the interaction between student and institution and reviewed external factors influencing student's intent and departure.

Pascarella and Terenzini (1980) also expanded on the work of Tinto (1975, 1986, 1993), Astin (1970, 1975, 1985, 1993), and Bean (1980, 1985). Social and academic integration formed the basis for Pascarella and Terenzini's theories on student intent and persistence. They outlined student involvement theory from the perspective of student interaction with faculty and peers, and provided a causal relationship model addressing both direct and indirect effects of student involvement and interaction. Pascarella and Terenzini (1980) concluded that the amount of time a student spent with faculty, both in and out of the classroom, strongly influenced student intent and persistence. Pascarella and Terenzini (2005) later moved beyond Tinto's (1975) single institution model and began addressing multi-institutional perspectives on student attrition and persistence.

Critics of Tinto's model of persistence

The later works of researchers such as Bean (1980, 1985), and Pascarella and Terenzini (1983, 2005) addressed the weaknesses of Tinto's early model of persistence.

These criticisms of Tinto's (1975) study led Tinto to emphasize the applicability of his model, which included stages of separation, transition, and incorporation, and suggested that these factors were integral in understanding why students leave college (Metz, 2004). Tinto (1993) revised his 1975 model by positing five major theoretical bases for developing and understanding the evolving nature of student persistence. Those bases included psychological, societal, economic, organizational, and interaction factors.

Despite the revisions to Tinto's (1993) theory, criticism of his models of student persistence continued. Tierney (1992) suggested that Tinto's model relied on information about only traditional-age students. In addition, by not individualizing results from institutional specific data, Tinto's generalizability of findings may not be plausible.

Tierney (1992) cited Tinto in arguing that using the term "dropout" has a negative connotation and instead, the term such as "departure" which is "value-neutral" should be used. While Tinto stated that student departure is "value-neutral," Tierney (1992) asserted that the anthropological foundation associated with this concept does not apply to all individuals in all settings, as Tinto suggested. Tierney's exception to the inclusion of the term "departure" suggested Tinto's limited understanding and appreciation of the minority element present in America higher education, and how these groups tend to be alienated by the mainstream identity. Despite the criticism, Tierney noted Tinto's awareness of his own theory's imperfections. Tinto recognized that specific segments of the student population were ignored, including adults and students attending non-residential campuses (Tierney, 1992).

Tierney (1992) responded to Tinto's Rites of Passage model with a close examination of Van Gennep's (1960) work on Tribal Society Theory, describing how individuals move from one development stage to the next within their own culture. According to Tierney (1992), Van Gennep did not propose that his model be used to describe the initiation of a member of one culture into another culture, which is how Tinto employed it. Tierney (1992) also argued that Tinto's model assumes that college is a ritual that all students pass through in order to be full members of that society. However, Tierney interpreted the concept of integration to mean assimilation in the sense of rejection of one's home culture. Therefore, he concluded that according to Tinto's model, individuals who differ by gender, ethnic group, and social class are expected to renounce their cultures and values in order to assimilate into the dominant culture of the institution. Tierney argued that rather than blame individuals from non-dominant groups for their inability to assimilate, institutions should be viewed as contributing to the problem due to their inability to operate in a multi-cultural world (Tierney, 1992).

In summary, Tierney (1992) took exception to a significant element of Tinto's Academic and Social Integration theory by suggesting that Tinto misinterpreted Van Gennep's anthropological rites of passage and that his misinterpretation may "hold potentially harmful consequences for racial and ethnic minorities" (Tierney, 1992, p. 603).

Other researchers have analyzed Tinto's Rite of Passage model with varying results. Elkins, Braxton, and James (2000) examined first-to-second semester retention rate of first-time, full-time college freshmen at four-year public universities, focused on

Tinto's (1993) concept of separation. Data were generated from 689 full-time

freshmen. Elkins, Braxton, and James (2000) found that students who reported receiving

strong support for college attendance were less likely to leave the institution. However,

these students also indicated a willingness to reject the attitudes and values of their past if

necessary, responses which partially support Tinto's separation and integration concepts.

The study also found that members of racial and ethnic minority groups reported less

community and family support. On the other hand according to Andrade (2006), Tinto

would probably argue that these students will have more difficulty in the separation stage

and may need to reject the attitudes and values of their former cultures in order to be

successful in college.

Hurtado and Carter's (1997) study examined the integration aspect of Tinto's

model by measuring students' sense of belonging. They found that Latino students who

tutored other students and who talked frequently with faculty in their third year had a

strong sense of belonging. Also, participating in a religious organization in the first and

second years and in a social-community organization in the third year strongly affected a

student's sense of belonging. These latter types of participation demonstrate that

involvement external to the campus and those that link students to their home cultures

help them to feel comfortable in the university community. Such findings contradict

Tinto's separation concept.

Berger and Milem's (1999) study centered on refining and applying an integrated

model of undergraduate persistence, accounting for both behavioral and perceptual

components, to examine first-year retention at a private, highly selective research

university. Their research concluded that behaviorally based measures, such as self-confidence on involvement, improves their model's explanatory power concerning how students interact with the college environment as a precursor to academic and social integration. Their research also concluded that students who did not possess the dominant cultural behavior patterns, norms, and values on campus were least likely to persist. Their findings support the idea that the institution expects individuals who do not share the dominant norms of the institution to adapt the dominant culture. Berger and Milem's (1999) findings are consistent with Tinto's integration concept. However, Tierney's (1992) main contention with Tinto's model was that students whose values, particularly their political beliefs, differed from those of the dominant group, had significant problems and were less likely to be involved or to interact with peers and faculty. Such differences may decrease the likelihood of persistence. For example, African-American students who had high levels of initial institutional commitment, but who perceived the institutions as unsupportive, were more likely to drop out of college.

On the other hand, Astin (1975) described interaction or involvement as behavioral, and stated that behavior is what an individual does, and not what the individual thinks or feels. Astin's (1975) theory of involvement is rooted in a longitudinal study of college student persistence from which Astin concluded that factors contributing to persistence were associated with students' involvement in college life, whereas, factors contributing to departure from college were associated with students' noninvolvement.

Attinasi (1989) critiqued Tinto's (1975) model from a different perspective. Attinasi focused primarily on the manner in which Tinto constructs theory. Attinasi affirmed that there is a need for qualitative research into the issue of student departure and its connection with culture. While Tinto regards qualitative research as a useful tool for complementing and extending theory, Attinasi considers it to be the fundamental mode of theory-building and theory-testing. Attinasi criticized Tinto's theory as having been "developed on the basis of, and tested with, data collected from institutional records and/or by means of fixed-choice questionnaires … methods of data collection that effectively strip away the context surrounding the student's decision to persist or not to persist in college and exclude from consideration the student's own perceptions of the process" (1989, p. 250). Attinasi (1989) further stated that Tinto's theory is inherently flawed, performing well only when the institutional culture is relatively homogeneous, a claim supported by Pascarella and Terenzini (1983) and to some extent by Braxton, Sullivan, and Johnson (1997) as well.

Recommended future models of persistence

As empirical research on student persistence continues, new topics focusing on ethnicity and two-year college students are emerging. Nora (1990) investigated campus-based aid programs as a determinant of student persistence and retention for Hispanics at two-year colleges. Nora noted that persistence studies involving the inclusion of Hispanics had not previously been completed. Additionally, he observed that most studies on student persistence neglected to investigate the importance of including financial aid as an influence on student persistence at the two-year college level. Nora

found that campus-based aid programs had a significant impact on student retention at these institutions and concluded that all types of financial aid awards had an influence on Hispanic student persistence.

In their review of the persistence literature, Pascarella and Terenzini (2005) noted that the focus of previous research was mainly on four-year colleges; the absence of research on two-year colleges was a missing component in previous research. Pascarella and Terenzini further suggested that research should focus on non-residential colleges to ascertain the factors that influence degree attainment and persistence at two-year colleges, whether public or private, large or small. They also recommended that future studies on student persistence should include race and gender as variables. They further suggested that new studies focus on the interrelationship between social and academic integration and how these factors influence retention, persistence, and goal attainment. Pascarella and Terenzini (2005) concluded that future studies on involvement theory, first piloted in the 1970s by Astin (1970, 1975) and Tinto (1975), should be expanded to include the influence of peers, faculty, and advisor relationships, as well as the role college major and financial aid may have on student persistence and goal attainment.

Other minority groups that are missing in the literature include those students with disabilities, gay, lesbian, bi-sexual and transgender students, and sub-groups of non-traditional students, such as students over a specific age or students deemed to be at-risk of leaving (Metz, 2004). Emerging research in recent year appears to recognize that gaps do exist in the research, as evidenced by the movement from the four-year perspective to

the two-year level and inclusion of groups not found in previous research studies (Pascarella & Terenzini, 2005).

Elkins, Braxton, and James (2000) concluded that certain individual variables, such as gender, race, parent income and parent education level affecting persistence need to be reexamined, and suggested replicating previous studies of four-year college persistence studies at the two-year college level. They emphasized the need to understand the influences on student persistence, perhaps through revision of Tinto's (1975) traditional theoretical model of student departure. The recommendation of Elkins, Braxton, and James (2000) should be extended to include international students as an independent group.

Elkins, Braxton, and James (2000) also recommended supporting the factors Bean and Metzner (1985) incorporated into their study. These factors included student satisfaction, a personal sense of usefulness, and stress. Bean and Metzner felt that these influences would be appropriate variables to include in a detailed examination of how college affects students. Their findings suggested that these factors do, in fact, impact and influence persistence and degree attainment. Additionally, Bean and Metzner suggested that other outside environmental influences, specifically family involvement and commitment, should be considered as variables influencing student success or failure.

Persistence studies continue to evolve and incorporate new variables into the research, thus reflecting the changing dynamics in U.S. higher education. Results of

these persistence studies suggest the influences on student departure remain mixed

(Metz, 2004).

Braxton, Sullivan, and Johnson (1997) concluded that a comparable, fully

developed model based on a critical theory perspective, however, does not yet exist for

scholars to weigh further the potential contributions of critical theory to understanding

retention, and that such a theory is needed before scholars can fully determine the value

of a student departure model derived from a critical theory perspective. Braxton,

Sullivan, and Johnson (1997) further stated that although the empirical internal

consistency of Tinto's set of formulations is tenuous, they do not recommend that it be

totally abandoned. They recommended some form of revision which might entail

attempts to integrate some of Tinto's propositions with tenets of other theoretical

perspectives on student departure, such as organizational, economic and psychological

perspectives.

The Need for an International Student Retention Model

The idea that Tinto (1975) proposed, in which he stated that it is necessary for an

international undergraduate student to integrate into the mainstream culture of an

American university or college in order to be successful, needs further study. Tierney

(1992) contended that Tinto's model has resulted in an integrationist position which is

harmful to individuals who are not from the dominant institutional culture. These

individuals, such as international students are expected to separate from their former

communities, beliefs, cultures, values, and attitudes, and to adopt those of a different

culture and perspective in order to be successful. Tinto's model assumed "that it is the

individual's task to adapt to the system" (Tierney, 1992, p. 607). A preponderance of research supports the claim that involvement and integration are necessary ingredients to student persistence. However, much of this research has examined mainstream, traditional American students for whom the transition to college is quite different than for students who are from other cultures and socioeconomic backgrounds. Institutional norms and values more closely reflect those of mainstream students and do not present such a significant challenge to American students.

CHAPTER 3

Methodology

This study examined two statewide public higher education systems within a state. The first system consists of two-year technical and community colleges, and four-year universities. The second system is made up of four-year colleges and universities, including one research university with very high research activity.

Initially, the research design was based on the assumption that the data necessary to conduct the study could be provided through the central data system of one of the two public systems in the state. When it became necessary instead to collect data from each of the seven universities in that system, not all of the institutions had the capacity to provide the necessary data. The procedures used to obtain the participation of individual campuses are described below, and resulted in the participation of three of the seven universities. To increase the number of campuses represented in the study and to have a larger number of international students to test the statistical model, a request was made to the second public system to obtain institutional data on the international undergraduates and their persistence into the second year. Of the five campuses in that system, data were collected from four of the five campuses. Although data were available for a fifth campus, the numbers of new entering international students were too small for inclusion in the database.

The first public system is comprised of 32 colleges and universities, including 25 two-year colleges and seven four-year universities. The system serves about 240,000 students per year in credit-based courses, and an additional 130,000 students in non-credit courses, and graduates about 33,500 students each year. An estimated 64 percent of all undergraduates in this state are educated in this public statewide system (MNSCU, 2007).

The second public system has five campuses located throughout the state. Two are considered to be four-year undergraduate campuses, one is a master's university, one is a master's university with applied doctoral programs, and one is a research university with very high research, based on the Carnegie Classification (Carnegie Foundation of Advancement of Teaching, 2007).

The study concentrated on only new degree-seeking international undergraduate students first enrolled at one of the seven four-year universities in the first statewide public system and five institutions in the second statewide public system during fall semester 2006. New freshmen and new transfer students were included in the study. The reason to limit this study to only new degree seeking students is to be able to predict factors influencing the retention rate of new students after their initial academic year of full-time enrollment. Freshmen and transfer students are included in order to determine if there is any difference in retention rate between the two groups, and to test the validity of the proposed model for both freshmen and transfer students. The basis for using new students in Fall 2006 semester is because Fall 2006 was the beginning of the most current completed academic year when this research was initiated.

Freshmen in this study were defined by their admission status (point of admission) in both public statewide college and university system's internal database classification. New students with zero credits were defined as entering new freshmen, while students with college credits at the point of admission were defined as transfer.

The study does not include non-degree seeking students, which includes exchange students at either public college or university system schools, who usually are in the U.S. for a semester or two, or students taking courses for professional development or courses required for licensure. The rationale is that exchange and study abroad students in the system are classified as non-degree seeking students. Counting non-degree seeking international students who do not intend to complete a degree would skew the retention rate of students after their first year, since most exchange and study abroad students are typically attending a four-year state university for not more than two semesters.

Statewide Public College and University Systems

In this study, the public statewide higher education systems are located in a state within the Midwest region of the United States of America. The subjects in this study are all new degree-seeking international undergraduate students who initiated their attendance at the two public statewide systems' four-year universities in the fall term of 2006. The purpose of this model is to generalize from the sample subjects to a larger population, so that inferences can be made about some characteristics or behaviors of the national population of new international undergraduates.

Description of Institutions

In public system 1, the seven state universities involved in this study are: Institution A, B, C, D, E, F, and G. In public system 2, the institutions are: Institution A, B, C, and D. These institutions were noted alphabetically in this study to mask their identity.

In public system 1, institution A is in a rural setting located in the northwest part of the state with a total student population of 6,449 during fall 2006. Institution B is located in a city bordering the largest city of a neighboring state, and was home to 9,025 students in the fall of 2006. The system's largest university in terms of student population is Institution C. Institution C enrolled 19,573 students in the fall of 2006. This institution is located in the northeast part of the state with a city population of over 63,000 residents. The only university located in a metro area is Institution D. It is located in the capital city of the state. Institution D was home to 9,318 students in the fall of 2006. Institution E is located in the southwest part of the state in a small farming city with over 12,000 residents. Institution E had an enrollment of 7,221 students during Fall 2006. The second largest state university is Institution F. Institution F is located about 80 miles south of the capital of the state and enrolled about 16,260 students during the fall semester of 2006. The most southern state university is Institution G, located at the southeastern tip of the state. Institution G enrolled 9,199 students in fall 2006 (MNSCU, 2007).

Public system 2 enrolled almost 80,000 undergraduate and graduate students. Campus A is the most northwestern campus in public system 2 and is also located at the northwest region of the state. Campus A is a baccalaureate institution and enrolled about 1,200 students. Located on the eastern border of the state is campus B. Campus B enrolled 11,184 undergraduate and graduate students in 2007, of which 9,184 were undergraduate students. Campus C is a liberal arts institution located in the middle region of the state and enrolled 1,700 students. The flagship campus of the second statewide system is campus D. Campus D is located in the most populated region and largest cities of the state. Campus D is a comprehensive research institution with very high research activity. Campus D enrolled over 65,000 undergraduate and graduate students (University Of Minnesota, 2008).

New International Undergraduates Fall 2006

As the numbers in Table 1 indicate, the number of new degree-seeking international undergraduate students enrolled in all seven state four-year institutions in public system 1 during fall semester 2006 was 874, indicated at the bottom of column two "Total New International Students Fall 2006." This total represents 260 non-degree seeking, 265 freshmen and 349 transfer students. Institution A enrolled 95 new degree seeking international undergraduate students, of whom 26 were freshmen and 69 were transfers. Institution B had 72 new international undergraduate degree seeking students, 28 freshmen and 44 transfers. The largest university in public system 1, Institution C, enrolled 152 new degree seeking international undergraduate students, of whom 59 were freshmen and 93 were transfer. Institution D had 15 new freshmen and 93 transfers,

Table 1

New International Undergraduate Students at Public Four-Year Universities, Fall 2006

Public System 1 University	Total New International Student Fall 2006	Non Degree Seeking or Exchange	Degree Seeking Freshmen	Transfer
Institution A	119	24	26	69
Institution B	123	51	28	44
Institution C	249	97	59	93
Institution D	116	8	15	93
Institution E	92	0	77	15
Institution F	69	12	31	26
Institution G	106	68	29	9
Total	874	260	265	349

Public System 2 University	Total New International Student Fall 2006		Degree Seeking Freshmen	Transfer
Institution A	24		9	15
Institution B	32		25	7
Institution C	21		7	14
Institution D	130		68	62
Total	207		109	98

totaling 108 new degree seeking international undergraduate students. Institution E

during Fall 2006 enrolled 92 new degree seeking international undergraduate students,

with a breakdown of 77 freshmen and 15 transfers. The second largest statewide

system's university in student enrollment, Institution F enrolled 57 new degree seeking

undergraduate students; 31 were freshmen, while 26 were transfers. Institution G,

located at the southeastern tip of the state, had 38 new degree seeking undergraduate

students, including 29 freshmen and 9 transfer students.

As the numbers in Table 1 for public system 2 indicate, campus A had 24 new

degree seeking students in fall semester 2006, 9 new freshmen and 15 transfer students.

Campus B had 32 new degree-seeking students where 25 were new freshmen and 7

transfer students. There were 21 new degree-seeking students in campus C, out of which

7 were freshmen and 14 transfer students. The largest group of new international

undergraduate students came from campus D. There were 132 new degree-seeking

students, 70 new freshmen and 62 transfer students.

Research Design

The purpose of this study was to develop a retention model for degree-seeking

undergraduate international students in statewide higher education systems. The model

in Figure 1 uses a combination of Tinto's (1975) and Astin's (1970) models, and

revisions made by Tierney (1992) and Pascarella and Terenzini (1980).

Figure 1

Conceptual model

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                              ┌──────────────────────────────┐
                              │   Institutional experience   │
                              │                              │
                              │   First semester credit hours│
                              │        attempted             │
                              │   First semester grade point │
                              │        average (GPA)         │
                              │   Second semester credit hours│
                              │        attempted             │
                              │   Second semester grade point│
                              │        average               │
                              │   Total number of credit hours│
                              │   attempted after first academic│
                              │        year                  │
                              │   Cumulative GPA (CGPA)      │
                              └──────────────────────────────┘

┌──────────────────────┐                                        ┌──────────────┐
│      Pre-Entry       │                                        │  Outcomes:   │
│                      │                                        │  Retention   │
│   Country of         │                                        └──────────────┘
│   origin/citizenship │
│   Financial sponsorship│
│   Freshman or transfer│
│       students       │
│   Gender             │
│   TOEFL scores       │
└──────────────────────┘

                              ┌──────────────────────────────┐
                              │   On campus Integration      │
                              │                              │
                              │   Appointments with International│
                              │       Student Office         │
                              │   On campus employment       │
                              │   On or off campus housing   │
                              └──────────────────────────────┘
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Data Source

Data from public system 1 for this study was assembled from the system's in-house database, the Integrated Statewide Record System (ISRS) by the individual participating institutions. In this system, the ISRS serves as the structure for the information database for all campuses in the system. Initially, the researcher believed that most of the variables included in the model could be obtained from the central database, but unfortunately that was not feasible. Instead, the researcher had to work with institutional research staff on the campuses of each of the seven universities to obtain the data necessary for the analysis. Not all of the seven universities were able to provide the data, so the analysis for public system 1 was based on international students entering three of the seven campuses.

ISRS is part of a comprehensive in-house database, which consists of a Human Resources module, an Accounting module, a Facility and Maintenance module, and a Student module. The Student module of ISRS consists of many smaller modules. The Accounts Receivable module deals with student billing, the Registration module deals with course registration and grading, and the Admissions modules are set up to handle all student information from the application stage to enrollment at the university. The International Student module is part of ISRS that was originally developed to comply with the implementation of the federal Student and Exchange Visitor Information System (SEVIS) in 2003. Since its inception, this module has evolved to fully integrate with the main statewide higher education system database. Other modules in ISRS that are fully integrated with the system's main database are the Housing and Student Payroll modules.

This study utilized data extracted from the Admissions, International Student, Registration, Housing, and Student Payroll modules.

In public system 2, the data resides in the system's comprehensive system database through a *PeopleSoft* program. The data is managed by the system's Office of Institutional Research, located in institution D.

The target subjects for this study were new international undergraduate degree-seeking students who initiated their attendance at one of the public statewide higher education systems' four-year universities in the Fall semester in 2006. The subjects were not selected randomly, as all identified new degree-seeking international undergraduate students were included. The total number of target subjects in public system 1of this study was 874, and in public system 2, 207. Information about this specific population was collected from ISRS in public system 1 and through *PeopleSoft* in public system 2, by separating international undergraduate students or non-resident aliens from the entire undergraduate student population in the system. The data was then refined by separating undergraduate and graduate students. The international undergraduate students were separated from other undergraduates by using their citizenship code in the database. Degree-seeking international undergraduate students were separated from non-degree seeking international undergraduate students using the admission status of individual students. The researcher used a "search and find" feature in Microsoft Access and performed a visual inspection of the data generated ensuring that only the admission status of degree-seeking, and freshman or transfer were present in the data generated for the analysis.

The data for this study was collected to develop the retention or persistence model of international undergraduate students who began their enrollment at one of the seven institutions public system 1 and five in public system 2 for Fall 2006. Not all of the variables in the both system's database were used to develop the model. This study concentrated on 13 variables in the databases and one from individual institutional record. The rationale for choosing the variables that were included in this study was based on a combination of departure and retention models of Tinto (1975) and Astin's (1970) and revisions made by Bean (1980), Bean and Metzner (1985), Tierney (1992), and Pascarella and Terenzini (1980). The factors that were used in developing the model were divided into three categories, based partly on Tinto's (1975) theoretical model of attrition and persistence. These categories are (1) pre-entry attributes (prior schooling and family background), (2) institutional experience (academics, co-curricular involvement, and peer group interaction), and (3) on-campus integration (academic and social). Table 2 lists the variables for each category stated above and the source of the data.

Table 2

Categories and Factors Influencing Retention

Categories	Variables	Source of Data	
		Public System 1	Public System 2
Pre-entry attributes	Country of origin/citizenship	Institution IRO	Office of IR
	Financial sponsorship	Institution IRO	Not Available
	Freshman or transfer students	Institution IRO	Office of IR
	Gender	Institution IRO	Office of IR
	TOEFL scores	Institution IRO	Office of IR
Institutional experience	Number of first semester credit hours attempted	Institution IRO	Office of IR
	First semester grade point average (GPA)	Institution IRO	Office of IR
	Number of second semester credit hours attempted	Institution IRO	Office of IR
	Second semester grade point average	Institution IRO	Office of IR
	Total number of credit hours attempted during first academic year	Institution IRO	Office of IR
	Cumulative GPA (CGPA)	Institution IRO	Office of IR
On-campus Integration	Number of appointments with International Student Office	ISO	Not Available
	On campus employment	Institution IRO	Office of IR
	On or off campus housing	Institution IRO	Office of IR

Note. Institutional Research Office (IRO), International Student Office (ISO), and Institutional Research (IR).

Pre-Entry Attributes

This category consisted of five variables: country of citizenship, financial sponsorship, admission status (freshmen or transfer), gender, and standardized English score (TOEFL).

Country of citizenship. Citizenship was used to group subjects either by individual country or regions of the world. This was used to determine retention rate based on country of citizenship, and to determine if citizenship has any influence on retention. Depending on the statistical analysis, different retention models were developed based on individual countries or regions of the world. The codes developed for this variable were Africa (1), Asia (2), Europe (3), Latin America (4), Middle East (5), North America (6), and Oceania (7). The breakdown of countries and categories of regions of the world was based on IIE's Open Doors Report classification. For example, the Asia (2) category included countries such as China, Hong Kong, Japan, Democratic People's Republic of Korea, Republic of Korea (South), Macau, Mongolia, and Taiwan. Table 3 indicated the codes and countries, grouped by regions.

Table 3

Countries of The World by Regions

Africa (1)	Asia (2)	Europe (3)
Burundi	Bangladesh	Finland
Cameroon	Cambodia	France
Congo/Zaire (Former)	China	Germany
Cote d'Ivoire/Ivory Coast	Hong Kong	Greece
Ethiopia	India	Macedonia
Gabon	Indonesia	Moldova
Gambia	Japan	Netherlands
Ghana	Kazakhstan	Norway
Guinea-Bissau	Macau	Poland
Kenya	Malaysia	Russia
Mali	Nepal	Serbia
Morocco	Pakistan	Sweden
Nigeria	Singapore	Switzerland
Rwanda	South Korea	United Kingdom
Senegal	Sri Lanka	Yugoslavia (Former)
Tanzania	Taiwan	
Togo	Thailand	
Zambia	Vietnam	

Latin America (4)	Middle East (5)	North America (6)
Bahamas	Bahrain	Canada
Brazil	Israel	
Colombia	Lebanon	
Jamaica	Saudi Arabia	
Mexico	Syria	**Oceania (7)**
Navassa Island	United Arab Emirates	
Peru		Australia
Trinidad & Tobago		New Zealand

Financial sponsorship. Financial sponsorship reflects the socio-economic status of each student's family. Federal immigration regulations require that, prior to being admitted, all international students in the U.S. must prove that their sponsor is capable of supporting them through college. The types of sponsorship can be classified into family or loans from home country (1), charitable or religious organizations (2) and government scholarship (3). The sources of sponsorship might have an effect on retention rate.

Freshman or transfer. Freshman or transfer student is a non-numeric variable, or dummy variable. Freshmen were coded as (11), while transfer undergraduates were coded as (12), consistent with the system's database coding. This variable was used to determine if there is any difference between entering freshmen and transfer students' preparation prior to entering an initial four-year university in the system will affect retention. Depending on the outcome of the statistical analysis, two different models, one based on freshmen and the second based on transfer students, may be developed.

Gender. Gender is a dummy variable used for indicating a student's identification as either male (0) or female (1). This variable was used to determine if there is any difference in retention rate between male and female students.

TOEFL Score. TOEFL, IELTS or some form of standardized English test score, was used to determine if higher proficiency in the English language prior to beginning college had any effect on persistence. All standardized English scores were converted to equal a TOEFL paper-based test score, based on ETS's conversion guideline as described in Table 4. A TOEFL score was used in lieu of high school GPA typically used in

developing retention models for domestic students. The many different high school

grading systems around the world are often not comparable to the U.S. high school GPA

system of grading. Secondly, most higher education institutions in the U.S. require some

form of standardized English test score from international students.

Table 4

Standardized English Test Conversion Table

TOEFL Paper	TOEFL Computer	TOEFL iBT	IELTS equivalent
625-680	263-300	113-120	7.5-9.0
600-625	250-263	100-113	7.0-7.5
575-600	232-250	90-100	6.5-7.0
550-575	213-232	79-90	6.0-6.5
525-550	196-213	69-79	5.5-6.0
500-525	173-196	59-69	5.0-5.5
475-500	152-173	49-59	4.5-5.0
450-475	133-152	39-49	4.0-4.5
425-450	113-133	29-39	3.5-4.0
under 425	under 113	under 29	under 3.5

Institutional Experience

The second category of variables included six factors that could be further re-

grouped into two sub-categories: GPA and credit hours. The variables are first-semester

GPA, second-semester GPA, and cumulative first-year GPA, and first-semester credit

hours, second-semester credit hours, and total credits hours attempted.

First and Second Semester GPA. The first semester GPA (earned during the

initial semester) has typically served as one of the best retention predictors in other

models (Indiana University-Bloomington, 2002). This is a numeric variable and was used in this study to predict the retention rate of international undergraduate students. Second-semester GPA is also a numerical variable. In this study, second-semester GPA is defined as the GPA obtained by individual students at the end of their spring semester only. This GPA does not include fall semester grades.

Cumulative GPA. CGPA at the end of student's first academic year is a numerical value. The end of spring semester CGPA, which includes both fall and spring semesters, was used in this study. This variable was used to compare the first and second semester GPA to determine if there was any difference between first or second semester GPA, or the end of academic year CGPA in predicting retention rates.

Number of first and second semester credit hours attempted. Both first and second semester credit hours attempted by international undergraduate students are numeric variables. The general hypothesis is that the more first and/or second semester credit hours attempted, between 12 and 18 credits, the more likely students are to persist. This variable was used to test as a covariate with motivation, with the assumption that the more credit hours attempted, the higher the student's motivation.

Total number of credit hours attempted during first academic year. Total number of credit hours attempted at the end of an academic year, also a numeric variable, was compared to first semester and second semester credit hours attempted.

On-Campus Integration

The third and final category of variables included three factors: on-campus employment, on-or-off campus housing, and number of appointments with the International Student Office on campus.

On-campus employment. According to Indiana University-Bloomington (2002), the more hours students expect to work per week during their freshman year (on or off-campus), the greater their chances of not being retained. For example, if a student were to report he/she planned to work 11 to 15 hours per week instead of 1 to 10, the chance of being retained would decrease. In the present study, whether a student worked or did not work on-campus was used to test this hypothesis. Off-campus employment was not included in this study because international students are not permitted to work off campus unless authorized by U.S. Citizenship and Immigration Services (USCIS) through a special application for an Employment Authorization Card (EAD). The subjects of this study did not meet the requirements for a work permit, because to be eligible for a work permit, USCIS requires international students to complete a minimum of one academic year of study. Since subjects in the present study were new entering freshmen and new transfer students, none of them were eligible for an off-campus work permit.

On-campus housing. This study used campus housing to better understand how on-campus interactions relate to student retention. Two design variables were created, students living on campus and students living off campus. The hypothesis is that students living on campus are more likely to persist than those living off campus. Housing was a dummy variable used for indicating whether a student is living on campus (0) or off campus (1).

Number of appointments with International Student Office. Another factor in this study is appointments made by international students with the International Student Office. This factor could have multiple contributions toward retention of international students. It can be viewed from the perspective of interaction between student and advisor (Indiana University-Bloomington, 2002), a student's pre-existing initiative to reach out for help, and/or policy on required visits by individual institutions.

The researcher recorded through informal interviews with international student advisors if the individual institution has any formal or informal policy requiring international students to meet with an international student advisor. This is to eliminate the possibility that required appointments would skew the results of the earlier two measurements and nullify the potential influence of motivation.

To gather this data, the researcher used the appointment books (paper or electronic) of international student advisors of individual campuses to determine the number of appointments made by an individual student over the duration of fall and spring semester of academic year 2006/2007. The frequency of appointments measures the total interactions (in minutes) between student and advisor(s).

Not all seven universities used the same appointment systems, so different schemes were developed to collect the information from individual universities. In the final study, four institutions – Institutions A, B, D and E in public system 1 reported that the International Student Office does not keep records of student appointments. No campuses in public system 2 kept records of student appointments that were accessible for analysis. Based on this information, there are two different models – one including

all the factors, including student appointments with the International Student Office, and the other excluding student appointments with the International Student Office.

The above pre-entry data was extracted by individual institutional research offices in public system 1 and the central office of institutional research of public system 2, which contains undergraduate students' demographic data such as country of citizenship, standardized English test scores, gender and admission status. The data is combined with institutional experience data on students' first-semester grade point average (GPA), second-semester GPA, cumulative GPA, first-semester credit hours attempted, second-semester credit hours attempted, and number of credit hours completed each semester. Table ST3001UG from the ISRS international module of public system 1 provided information on financial sponsorship of international students for the pre-entry attributes category. Students' on-campus employment for the campus integration variable was determined through the systems' student payroll. This was obtained by running a query on all international students in the system's student payroll while excluding exchange students, graduate students, and restricting data of students who initiated their enrollment in the fall of 2006. International students' housing status (on or off-campus) was extracted from the housing databases of both systems, and was obtained by extracting all new international students living on-campus in fall of 2006, excluding exchange students. The on-campus housing list was compared with the total sample listing. Those not on the on-campus housing list, were considered as living off-campus. Since this category is meant to test for on-campus integration, the type of off-campus housing was not investigated.

All the data for this study for public system 1 was collected through individual institutions' Institutional Research (IR) Offices and their International Students and Scholars Offices. The list of contacts at each IR Office in the system was established by using the individual institution's online staff directory. An email was sent to the IR directors to introduce the research topic and researcher and to confirm the correct contact person. The email was then followed by a letter to each contact person to obtain confirmation of their assistance in providing the data requested. Out of seven letters, only two were returned confirming unavailability to comply with data request due to the shortage of manpower. Three other institutions responded by email to indicate that they will be able to assists with the data request. There was no response from two institutions. The researcher followed up with telephone calls to the two non-respondent institutions however none of the telephone calls were returned.

The final result of the data count from public system 1 was comprised of three institutions out of seven. The three institutions were Institution C, F and G. Through this process, data were available for TOEFL score, freshman or transfer student, country of citizenship, financial sponsorship (from institutions F and G only), gender, first-semester GPA, second-semester GPA, cumulative GPA, first-semester credit hours, second-semester credit hours, total number of credit hours attempted during first academic year, on campus employment, campus housing, and appointments with international student offices (from institutions F and G only)

Data from the statewide public system 2 was collected from the university system's central IR office. All the same variables from public system 1 were used for

public system 2 with the exception of financial sponsorship and appointments with international student offices. The central IR office was given all the variables and the definition of each variable from statewide public system 1. A total of 209 records were obtained from the statewide public system 2. The data came from four campuses – Campus A, B, C, and D. There was no data from the fifth campus – campus E.

<div align="center">Data Treatment</div>

The data collected was divided into two major data analysis sets. The first set of data consisted of data from the statewide public system 1 with 247 student data, while the second set of data was comprised of data from the statewide public system 2 with 207 student data.

The first set of data was further divided into two categories. The first, labeled Public System 1 Model One (PS1 M1) was constructed from Institutions F and G. These two institutions had complete data on all 14 variables. Missing data such as TOEFL scores was replaced by the average score of students' data from individual campuses.

The second category marked as Public System 1 Model Two (PS1 M2) consisted of data from Institution C, where the IR office was unable to provide the data on number of appointments with International Student Office due to the loss of data in the personnel changes and a new operating system and Institutions F and G. TOEFL scores that were not recorded were replaced by the average TOEFL scores of the individual institution.

The third set of data, Public System 2 Model 1 (PS2 M1) was extracted from the second set of data where the data was only available from twelve out of the fourteen variables. This is due to the limitation of data collection in the statewide public system

2's data collection structure. The variables that were not available were financial

sponsor and number of appointments with International Student Office. Missing data

such as TOEFL scores was replaced by the average score of students' data from

individual campuses.

The final collection of data comprised of data from all campuses in public system

1 and 2. This group of data was labeled <u>Combined Public System Model 1</u> (CPS M1).

Only 12 of the 14 variables were included in CPS M1. CPS M1 was created to test the

validity of the analysis of the research questions.

Figure 2, illustrates the division and combination of data sets into the different

models: PS1 M1, PS1 M2, PS2 M1, and CPS M1. Figure 2 also shows the number of

variables in each model.

Figure 2

Data Categorized by Public Systems and Models

Public System 1 Model 1 (PS1 M1) Institutions F and G All 14 variables

Public System 1 Model 2 (PS1 M2) Institutions C, F and G 12 variables

Note. Excluded variables: Financial Sponsorship and Appointment

Public System 2 Model 1 (PS2 M1) Institutions A, B, C, and D 12 variables

Note. Excluded variables: Financial Sponsorship and Appointment

Combined Public System Model 1 (CPS M1) All combined institutions 12 variables

Note. Excluded variables: Financial Sponsorship and Appointment

Summary of Data Availability

Pre-Entry Attributes

Country of Citizenship.

A hundred percent of original records were obtained for this variable in all three

data sets. PS1 M1 (N = 95), PS1 M2 (N = 247), PS2 M1 (N = 207), and CPS M1 (N =

454). This is due to federal immigration regulations requiring all higher education

institutions to report the citizenship of all international students in the U.S.

Financial sponsorship.

A 100 percent of original records were obtained for this variable in PS1 M1, with

no missing data (N = 95). There were no data obtained from the Institutional Research

Offices for PS1 M2, PS2 M1, and CPS M1.

Freshman or transfer students.

A hundred percent of the records included this variable in PS1 M1, PS1 M2, PS2

M1, and CPS M1. PS1 M1 had 60 (63.2%) freshmen and 35 (36.8%) new transfer

international undergraduate students, PS1 M2 had 119 (48.2%) freshmen and 128

(51.8%) new transfer international undergraduate students, PS2 M1 had 109 (52.7%)

freshmen and 98 (47.3%) new transfer international undergraduate students and CPS M1

had 228 (50.2%) freshmen and 226 (49.8%) new transfer international undergraduate

students.

Gender.

A hundred percent original data was available in all models. There were no

missing data in this variable across all models. PS1 M1 consisted of 49 (51.6%) male

and 46 (48.4%) female students, PS1 M2 consisted of 156 (63.2%) male and 91

(36.8%) female students, PS2 M1 consisted of 113 (54.6%) male and 94 (45.4%) female

students, and CPS M1 consisted of 269 (59.3%) male and 185 (40.7%) female students.

TOEFL score.

There were 69.5 percent original data collected in PS1 M1 i.e., 66 out of the total

95 data had original scores but the rest had no reported scores. This is due to a number of

possible reasons, including the fact that most international undergraduate students

transferring from other higher education institutions within the U.S. are not required to

report a TOEFL score. A second reason is the possibility of students who had completed

high school in the U.S. and had applied for admission using SAT or ACT scores instead

of TOEFL. The mean TOEFL score in DS 1 is 580.96 with a standard deviation of

36.3850.

In PS1 M2, there were 51.8 percent of transfer students. Transfer students are

usually not required to submit TOEFL scores for admission purposes. Students who were

initially admitted to "Institution C" in Public System 1's English as a Second Language

(ELS) center were also not required to submit a TOEFL score. Total percentage of

original TOEFL data were around 60 percent.

In PS2 M1, there were 48.3 percent of original TOEFL score reported, which

corresponds to 101 out of 207 records. This is almost the same percentage as the total

number of new transfer international undergraduate students (N = 98) 47.3 percent. The

reasons are that for transfer students a TOEFL score is not required to be submitted as

part of the admission procedure, and the possibility of students using ACT or SAT scores instead of TOEFL.

Institutional Experience

Number of first semester credit hours attempted.

All data sets obtained reported a 100 percent original data. There were no missing data in this variable across all models. The mean attempted credit hours of the first semester (Fall 2006) in PS1 M1 is 15.2 with a standard deviation of 2.2, PS1 M2 is 14.4 with a standard deviation of 1.94, PS2 M1 is 14.8 with a standard deviation of 2.14, and CPS M1 is 14.6 with a standard deviation of 2.05.

First semester grade point average (GPA).

All data sets obtained reported a hundred percent original data. There were no missing data in this variable across all models. The mean GPA of the first semester (Fall 2006) in PS1 M1 is 3.18 with a standard deviation of .75, PS1 M2 is 3.05 with a standard deviation of .79, PS2 M1 is 3.00 with a standard deviation of .81, and CPS M1 is 3.02 with a standard deviation of .80.

Number of second semester credit hours attempted.

All data sets obtained reported a 100 percent original data. There were no missing data in this variable across all models. The mean attempted credit hours of the second semester (Spring 2007) in PS1 M1 is 14.9 with a standard deviation of 4.54, PS1 M2 is 13.9 with a standard deviation of 4.24, PS2 M1 is 14.5 with a standard deviation of 4.69, and CPS M1 is 14.13 with a standard deviation of 4.46.

Second semester GPA.

All data sets obtained reported a hundred percent original data. There were no

missing data in this variable across all three data sets. The mean GPA of the second

semester (Spring 2007) in PS1 M1 is 2.96 with a standard deviation of 1.04, PS1 M2 is

2.83 with a standard deviation of 1.04, PS2 M1 is 2.74 with a standard deviation of 1.08,

and CPS M1 is 2.79 with a standard deviation of 1.06.

Total number of credit hours attempted during first academic year.

All data sets obtained reported a 100 percent original data. There were no

missing data in this variable across all models. The mean attempted total credit hours of

the first academic year (academic year 2006/2007) in PS1 M1 is 30.1 with a standard

deviation of 5.45, PS1 M2 is 33.7 with a standard deviation of 6.27, PS2 M1 is 29.3 with

a standard deviation of 5.74, and CPS M1 is 31.7 with a standard deviation of 6.43.

Cumulative GPA (CGPA).

All data sets obtained reported a 100 percent original data. There were no

missing data in this variable across all models. The mean CGPA of the first academic

year (academic year 2006/2007) in PS1 M1 is 3.15 with a standard deviation of .71, PS1

M2 is 3.05 with a standard deviation of .68, PS2 M1 is 2.98 with a standard deviation of

.75, and CPS M1 is 3.02 with a standard deviation of .72

On-Campus Integration

Number of appointments with International Student Office.

A hundred percent of original records were obtained for this variable in PS1 M1 and there were no missing data. There were no data obtained from the individual institutions for the other models.

On-campus employment.

All data sets obtained reported a 100 percent original data. There were no missing data in this variable across all models. PS1 M1 reported 45 (47.4%) students worked on-campus, PS1 M2 reported 75 (30.4%) students worked on-campus, PS2 M1 reported 38 (18.4%) students worked on-campus, and CPS M1 reported 113 (24.9%) students worked on-campus during academic year 2006/2007.

On or off-campus housing.

A 100 percent of original records were obtained for this variable in all models. There were 32 (33.7%) students living on campus and 63 (66.3%) students living off campus in PS1 M1, 91 (36.8%) students living on campus and 156 (63.2%) students living off campus in PS1 M2, 55 (26.6%) students living on campus and 152 (73.4%) students living off campus in PS2 M1, and 146 (32.2) students living on campus and 308 (67.8%) students living off campus in CPS M1.

Statistical Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 16.0. First, descriptive statistics for each of the variables included in the study obtained were analyzed. The purpose of these descriptive statistics is to

describe the distribution of frequencies, and to ensure that the data is free of outliers.

Next, correlational analysis among all the variables was examined to provide an overview

of bivariate relationships within the data structure and to examine likely multicollinearity

problems in the data set.

The analysis of variance (ANOVA) was used to tests whether the models were

significantly better at predicting the outcome than using the mean as a "best guess"

predictor. Specifically, the F-ratio represents the ratio of the improvement in prediction

that results from fitting the model, relative to the inaccuracy that still exists in the model.

Multiple regression was used to predict the factors affecting retention of

international undergraduate students. Retention of international undergraduate students

in the both the state four-year university systems (Persist) was the dependent variable

denoted by (Y). The predictors TOEFL score (X_1), freshman or transfer student (X_2),

country of citizenship (X_3), financial sponsorship (X_4), gender (X_5), first semester GPA

(X_6), second semester GPA (X_7), cumulative GPA (X_8), first semester credit hours (X_9),

second semester credit hours (X_{10}), total number of credit hours attempted during first

academic year (X_{11}), on campus employment (X_{12}), campus housing (X_{13}), and

appointments with international student offices (X_{14}) are the independent variables.

Hence the regression equation is: $Y = b_0 + b_1X_1 + b_2X_2 + \ldots + b_{14}X_{14}$ where b_0 represents

the intercept and b_1, b_2, ... b_{14} are the regression coefficients for the predictors X_1, X_2, ...

X_{14} respectively. SPSS was used to determine the correlations between the predictors

and the criterion (Y). From the SPSS results the researcher was able to determine if there

were any highly correlated predictors among themselves, sometimes referred to as

collinearity. From the regression equation, it could be determined that if all other variables were held constant the predicted value of Y would be determined in terms of the predictors $(X_1, X_2, \ldots X_{14})$.

Stepwise binomial logistic regression, resulting in generating the Chi-square was used to analyze the data to address all the research questions, and to verify the finding from the analysis of multiple regression. The stepwise method was used because it adds variables in the forward direction and tests at each stage to see whether a variable that has previously been entered should now be removed.   Logistic regression is useful for this situation because this study's intent was to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is similar to a linear regression model but is suited to models where the dependent variable is dichotomous. In this study, the dichotomous dependent variable was Retention of international undergraduate students in the state four-year university systems (Persist) while the independent variables were TOEFL score, freshman or transfer student (status), country of origin/citizenship (country), financial sponsorship (Fin), gender, first semester GPA (FGPA), second semester GPA (SGPA), cumulative GPA (CGPA), first semester credit hours attempted (FCrHrs), second semester credit hours attempted (SCrHrs), total number of credit hours attempted during first academic year (CCrHrs), on campus employment (AvgHrs), on campus housing (Hse), and appointments with international student offices (Appt).

Multiple regression and logistic regression were used to analyze the data. The causal model of international undergraduate student retention was regressed on all

variables which preceded it in the causal sequence. Prevailing variables significantly

related to retention were then regressed on pre-entry variables, institutional variables, and

on campus interaction variables.

CHAPTER 4

Results

The purpose of this study is to explore the concept of integration into campus life as it relates to student persistence of entering new freshmen and transfers. In particular, it seeks to answer the question: Do international student connections with the International Student Program or Services affect their persistence at the college or university after their first year of attendance? Other questions that this study attempts to answer are: (1) Does proficiency in English influence the persistence rate of international students? (2) Does country of citizenship have any effect on the retention rate of international students? (3) Does the source of financial sponsorship have any effect on international students' persistence? (4) Is gender related to retention of international undergraduate students? (5) Does the first and/or second semester Grade Point Average (GPA) and/or Cumulative Grade Point Average (CGPA) have an effect on the retention of international students? (6) Does the number of credit hours attempted in the first and/or second semester have any effect on retention rate of international students? (7) Does living on campus affect the retention rate of international students? (8) Does working on campus impact the retention rate of international students? and (9) Does the number of appointments kept with International Student Office affect the retention rate of international students?

This chapter first presents descriptive statistics for all the variables, and also provides the results of the statistical analysis, first for the results of univariate analyses

related to the aforementioned research questions and then for the results of the multivariate analyses.

<div align="center">Descriptive Statistics for Study Variables</div>

Retention Statistics

In considering the results of the present study, the statistics on the retention of international students should be examined in the context of overall retention statistics for new entering students at students beginning at each of the public systems (fall semester 2006). The basic question here concerns whether retention rates for international students are higher, lower or about the same as the institutional average. In Public System 1, the average first-to-second year retention rate for all entering students in fall 2006 was 73.7 percent, which is 13.3 percent less as compared with new international students. In Public System 2, the average first-to-second year retention rate for all entering students in fall 2006 was 78.3 percent. This is lower by 2.4 percent as compared to new entering international students. International students have higher retention rates than the total student population.

In order to have the "big picture" transparent to factors affecting the retention of undergraduate international students, the first set of results simply presents the retention rates of new students into the second year. The results in Table 5 summarize, the persistence rates of individual data models developed for this study. The persistence rate of model PS1 M1 is 82.1 percent, PS1 M2 is 87.0 percent for Public System 1, PS2 M1 is 80.7 percent for Public System 2, and CPS M1 is 84.1 percent. Included in Table 5 were the average persistence rates of total students of all the institutions in the study. In

comparison, international students persisting rates were higher than total students in all

models.

Table 5

Persistence Rate of Statistical Models of International Students

	N	Persisted	%	Attrition	%	Total student Persisted Rate %
PS1 M1	95	78	82.1	17	17.9	74.5
PS1 M2	247	215	87.0	32	13.0	73.7
PS2 M1	207	167	80.7	40	19.3	78.3
CPS M1	454	382	84.1	72	15.9	76.3

Public System 1

In Public System 1, a total of three institutions out of seven were included in the

study because the other four four-year universities did not submit any data for this study.

A total of 247 of the original population of 614 international undergraduate degree-

seeking students enrolled across the seven institutions were obtained with complete data

(variables). The total return rate of complete data was 40.2 percent. These data were

labeled Public System 1 Model 1 (PS1 M1) and Public System 1 Model 2 (PS1 M2).

Table 6 provides the descriptive data for the first data analysis set in public

system 1 (PS1 M1). There were a total of 95 subjects (N = 95) in this model with 13

independent variables for each subject. There were 60 (63.2%) freshmen and 35

(36.8%) transfer international undergraduate students in this model. This model was

represented by international students from six regions of the world, Africa (N = 19,

20.0%), Asia (N = 56, 59.0%), Europe (N = 6, 6.3%), Latin America (N = 2, 2.1%),

Middle East (N = 5, 5.3%), and North America (N = 6, 7.4%). The costs of education

were financed by family (N = 82, 86.3%), company or religious organizations (N = 10,

10.5%), and home government scholarships (N = 3, 3.2%). Out of the 95 international

students, 49 (51.6%) were males and 46 (48.4%) were females. Thirty two (33.7%) out

of the 95 lived on-campus while 63 (66.3%) lived off-campus. 45 (47.4%) out of 95 new

international undergraduate students in this model held an on-campus part-time job.

Statistics concerning connections with the International Student Program or Services

indicated that 70.5% (N = 67) of the subjects in this model had an appointment with the

International Student Office.

Table 6

Descriptive Statistics of Public System 1 Model 1 of New International Students for Academic Year 2006/2007

	N	Mean	%	Std. Dev.
Persist	95		82.00	
TOEFL	95	580.96		36.3850
Class	95			
Freshmen		60	63.16	
Transfer		35	36.84	
Country/Region	95			1.3750
Africa		19	20.00	
Asia		56	58.95	
Europe		6	6.32	
Latin America		2	2.11	
Middle East		5	5.26	
North America		7	7.37	
Oceania		0	0.00	
Financial	95			
Family		82	86.32	
Organizations		10	10.53	
Government		3	3.16	
Gender				
Male		49	51.58	
Female		46	48.42	

Table 6 (continued)

	N	Mean	%	Std. Dev.
Fall GPA	95	3.18		0.7488
Spring GPA	95	2.96		1.0417
Cum GPA	95	3.15		0.7104
Fall Cr Hrs	95	15.15		2.2020
Spr Cr Hrs	95	14.93		4.5360
Cum Cr Hrs	95	30.07		5.4470
Housing	95			
On-Campus		32	33.68	
Off-Campus		63	66.32	
CmpEmply	95			
Wrk on-Cmp		45	47.37	
Did Not		50	52.63	
Appointments	95			
Had Appt		67	70.53	
Did Not		28	29.47	

The next set of results in Table 7 presents the characteristics of the subset of students in the PS1 M1 who persisted into the second year. There were 78 students who persisted from academic year 2006/2007 to 2007/2008; 49 (62.8%) of the persisted students were freshmen and 29 (37.2%) were transfer students. Out of the 78 persisted students, 15 (19.2%) were from Africa, 46 (59.0%) from Asia, six (7.7%) from Europe, two (2.6%) from Latin America, four (5.1%) from the Middle East, and five (6.4%) from North America. The students in this model financed their education in the United States primarily through family, a total of 68 (87.2%), company or religious organizations

outside of the U.S. 7 (9.0%), and three through government scholarships (3.9%).

There were 36 (46.2%) male and 42 (53.8%) female students in this category, and 39

(50%) out of 78 persisted students worked on campus and 27 (34.6%) out of 78 lived on

campus. Fifty six (71.8%) of persisted students made at least one appointment with the

International Student Office on their respective campuses, while 22 (28.2%) did not meet

with the International Student Office.

Table 7

Descriptive Statistics of Public System 1 Model 1 of Persisting International Students
from Academic Year 2006/2007 to
2007/2008

	N	Mean	%	Std. Dev.
Persist	78			
TOEFL	78	581.00		37.448617
Class	78			
Freshmen		49	62.82	
Transfer		29	37.18	
Country/Region	78			
Africa		15	19.23	
Asia		46	58.97	
Europe		6	7.69	
Latin America		2	2.56	
Middle East		4	5.13	
North America		5	6.41	
Oceania		0	0.00	
Financial	78			
Family		68	87.18	
Organizations		7	8.97	
Government		3	3.85	

Table 7
(continued)

	N	Mean	%	Std. Dev.
Gender	78			
Male		36	46.15	
Female		42	53.85	
Fall GPA	78	3.29		0.6676571
Spring GPA	78	3.27		0.8417386
Cum GPA	78	3.36		0.5964483
Fall Cr Hrs	78	15.00		2.2671994
Spr Cr Hrs	78	16.00		3.5592366
Cum Cr Hrs	78	31.00		4.7877529
Housing	78			
On-Campus		27	34.62	
Off-Campus		51	65.38	
CmpEmply	78			
Wrk on-Cmp		39	50.00	
Did Not		39	50.00	
Appointments	78			
Had Appt		56	71.79	
Did Not		22	28.21	

Table 8 summarizes the characteristics of the students included in the model PS1

M1 who did not persist. There were 17 students who did not continue their enrollment

from academic year 2006/2007 to 2007/2008. Out of the 17, 11 (64.7%) were freshmen

and six (35.3%) were transfer international students. The students were represented from

Africa (N = 4, 23.5%), Asia (N = 10, 58.8%), the Middle East (N = 1, 5.9%), and North

America (N = 2, 11.8%). Family was the main source of financial resources to these

students, which represented 82.4 percent (N = 14), while the rest (N = 3) came from

other company or religious organizations outside of the United States. There were 13

(76.5%) male and four (23.5%) female students in this category. Five (29.4%) out of the

17 students lived on campus and six out of the 17 worked on campus. Eleven (64.7%) of

the 17 non-returning students met with the International Student Office while they were

enrolled.

Table 8

Descriptive Statistics of Public System 1 Model 1 of Non-Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Did Not Persist	17			
TOEFL		581.00		32.0682
Class	17			
Freshmen		11	64.71	
Transfer		6	35.29	
Country/Region	17			
Africa		4	23.53	
Asia		10	58.82	
Europe		0	0.00	
Latin America		0	0.00	
Middle East		1	5.88	
North America		2	11.76	
Oceania		0	0.00	
Financial	17			
Family		14	82.35	
Organizations		3	17.65	
Government		0	0.00	

Table 8 (continued)

	N	Mean	%	Std. Dev.
Gender	17			
Male		13	76.47	
Female		4	23.53	
Fall GPA	17	3.33		1.0392
Spring GPA	17	2.75		1.5344
Cum GPA	17	3.12		1.0599
Fall Cr Hrs	17	16.00		1.8728
Spr Cr Hrs	17	16.00		7.0820
Cum Cr Hrs	17	32.00		7.5542
Housing	17			
On-Campus		5	29.41	
Off-Campus		12	70.59	
CmpEmply	17			
Wrk on-Cmp		6	35.29	
Did Not		11	64.71	
Appointments	17			
Had Appt		11	64.71	
Did Not		6	35.29	

Table 9 presents the descriptive characteristics of students in Public System 1 Model 2 (PS1 M2), which includes the total set of international students in the three institutions that provided data. There were a total of 247 students in this model, and 11 independent variables for each subject. The variables "Financial Sponsorship" and "Appointments" were not included because 152 (61.5%) records out of 247 did not have

complete information on "Financial Sponsorship" and "Appointments." There were

119 (48.2%) freshmen and 128 (51.8%) transfer international undergraduate students in

this

Table 9

*Descriptive Statistics of Public System 1 Model 2 of New International Students
for Academic Year 2006/2007*

	N	Mean	%	Std. Dev.
Persist	247		87.00	
TOEFL	247	570.51		25.2980
Class	247			
Freshmen		119	48.18	
Transfer		128	51.82	
Country/Region	247			
Africa		48	19.43	
Asia		149	60.32	
Europe		15	6.07	
Latin America		8	3.24	
Middle East		11	4.45	
North America		14	5.67	
Oceania		2	0.81	
Gender	247			
Male		156	63.16	
Female		91	36.84	
Fall GPA	247	3.05		0.7852
Spring GPA	247	2.83		1.0360
Cum GPA	247	3.05		0.6843
Fall Cr Hrs	247	14.36		1.9410
Spr Cr Hrs	247	13.86		4.2440
Cum Cr Hrs	247	33.74		6.2730
Housing	247			
On-Campus		91	36.84	
Off-Campus		156	63.16	
CmpEmply	247			
Wrk on-Cmp		75	30.36	
Did Not		172	69.44	

model. The students in this model were represented from Africa (N = 48, 19.4%), Asia

(N = 149, 60.3%), Europe (N = 15, 6.1%), Latin America (N = 8, 3.2%), Middle East (N

= 11, 4.5%), North America (N = 14, 5.7%), and Oceania (N = 2, 1.0%). Out of the 247

international students, 156 (63.2%) were males and 91 (36.8%) were females. Of the 247

students, 91 (36.8%) lived on campus, while 156 (63.2%) lived off campus. Of the 247,

75 (30.4%) students in this model held an on-campus part-time job.

Table 10 contains the descriptive statistics for all study variables included in

Public System 1 Model 2 (PS1 M2). There were 215 students who persisted from

academic year 2006/2007 to 2007/2008 of which 101 (47.0%) who persisted were

freshmen and 114 (53.0%) were transfer students. Out of the 215 persisting students, 37

(17.2%) were from Africa, 132 (61.4%) from Asia, 15 (7.0%) from Europe, eight (3.7%)

from Latin America, nine (4.2%) from the Middle East, 12 (5.6%) from North America,

and two (1.0%) students from Oceania. There was no information on the financial

sources of students in this model. There were 135 (62.8%) male and 80 (37.2%) female

students in this category. Of the 215 persisting students, 69 (32.1%) worked on campus

and 82 (38.1%) lived on campus.

Table 10

Descriptive Statistics of Public System 1 Model 2 of Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Persist	215			
TOEFL	215	564.00		25.4236
Class	215			
Freshmen		101	46.98	
Transfer		114	53.02	
Country/Region	215			
Africa		37	17.21	
Asia		132	61.40	
Europe		15	6.98	
Latin America		8	3.72	
Middle East		9	4.19	
North America		12	5.58	
Oceania		2	0.93	
Gender	215			
Male		135	62.79	
Female		80	37.21	
Fall GPA	215	3.16		0.7367
Spring GPA	215	3.10		0.8324
Cum GPA	215	3.11		0.6049
Fall Cr Hrs	215	14.00		1.9398
Spr Cr Hrs	215	15.00		3.0010
Cum Cr Hrs	215	35.00		5.3229
Housing	215			
On-Campus		82	38.14	
Off-Campus		133	61.86	
CmpEmply	215			
Wrk on-Cmp		69	32.09	
Did Not		146	67.91	

Table 11 contains descriptive statistics for international students from the model PS1 M2 who did not persist. There were 32 students who did not continue their enrollment from academic year 2006/2007 to 2007/2008. Out of the 32, 18 (56.3%) were freshmen and 14 (43.8%) were transfer international students. The students were represented from Africa (N = 11, 34.4%), Asia (N = 17, 53.1%), the Middle East (N = 2, 6.3%), and North America (N = 2, 6.3%). There was no data on the students' financial sources. There were 21 (65.6%) male and 11 (34.4%) female students in this category. Nine (28.1%) out of the 32 students lived on campus, while six (18.8%) out of the 32 students worked on-campus.

Public System 2

In Public System 2, a total of four institutions out of five were included in the study, because one four-year universities did not have any international students for the period of this study. There were a total of 207 students included in the analyses for this model. There were 11 independent variables for each subject. The variables "Financial Sponsorship" and "Appointments" were not available for international students in Public System 2.

Table 11

Descriptive Statistics of Public System 1 Model 2 of Non-Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Did Not Persist	32			
TOEFL	32	581.00		24.6052
Class	32			
Freshmen		18	56.25	
Transfer		14	43.75	
Country/Region	32			
Africa		11	34.38	
Asia		17	53.13	
Europe		0	0.00	
Latin America		0	0.00	
Middle East		2	6.25	
North America		2	6.25	
Oceania				
Gender	32			
Male		21	65.63	
Female		11	34.38	
Fall GPA	32	3.33		1.0434
Spring GPA	32	2.75		1.5639
Cum GPA	32	3.12		1.0446
Fall Cr Hrs	32	16.00		1.9665
Spr Cr Hrs	32	16.00		7.4531
Cum Cr Hrs	32	32.00		8.0411
Housing	32			
On-Campus		9	28.13	
Off-Campus		23	71.88	
CmpEmply	32			
Wrk on-Cmp		6	18.75	
Did Not		26	81.25	

Table 12 contains descriptive statistics for international students in Public System 2 Model 1 (PS2 M1). There were 109 (52.7%) freshmen and 98 (47.3%) transfer international undergraduate students in this model. The students in this model were represented from Africa (N = 20, 9.7%), Asia (N = 131, 63.3%), Europe (N = 19, 9.2%), Latin America (N = 6, 3.0%), Middle East (N = 8, 3.9%), North America (N = 19, 9.2%), and Oceania (N = 4, 2.0%). Out of the 207 international students, 113 (54.6%) were males and 94 (45.4%) were females. Of the 207, 55 (26.6%) lived on campus while 152 (73.4%) lived off campus. Of the 207, 38 (18.4%) in this model held an on campus part-time job.

Table 13 contains descriptive statistics for study variables for students included in PS2 M1 who persisted into the second year. There were 167 students persisted from academic year 2006/2007 to 2007/2008, of which 92 (55.1%) of the persisted students were freshmen and 75 (44.9%) were transfer students. Out of the 167 persisted students, 16 (9.6%) were from Africa, 107 (64.1%) from Asia, 14 (8.4%) from Europe, four (2.4%) from Latin America, seven (4.2%) from the Middle East, 16 (9.6%) from North America, and three (1.8%) students from Oceania. There was no information on the financial sources of students in this model. There were 91 (54.5%) male and 76 (45.5%) female students who persisted. Of the 167, 32 (19.2%) of the persisting students worked on campus, and 48 (28.7%) lived on campus.

Table 12

Descriptive Statistics of Public System 2 Model 1 of New International Students for Academic Year 2006/2007

		N	Mean	%	Std. Dev.
Persist	207		0.81	81.00	
TOEFL	207		587.05		36.3320
Class	207				
Freshmen		109		52.66	
Transfer		98		47.34	
Country/Region	207				
Africa		20		9.66	
Asia		131		63.29	
Europe		19		9.18	
Latin America		6		2.90	
Middle East		8		3.86	
North America		19		9.18	
Oceania		4		1.93	
Gender	207				
Male		113		54.59	
Female		94		45.41	
Fall GPA	207		3.00		0.8124
Spring GPA	207		2.74		1.0791
Cum GPA	207		2.98		0.7501
Fall Cr Hrs	207		14.84		2.1380
Spr Cr Hrs	207		14.46		4.6890
Cum Cr Hrs	207		29.30		5.7440
Housing	207				
On-Campus		55		26.57	
Off-Campus		152		73.43	
CmpEmply	207				
Wrk on-Cmp		38		18.36	
Did Not		169		81.64	

Table 13

Descriptive Statistics of Public System 2 Model 1 of Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Persist	167			
TOEFL	167	587.00		37.38543
Class	167			
Freshmen		92	55.09	
Transfer		75	44.91	
Country/Region	167			
Africa		16	9.58	
Asia		107	64.07	
Europe		14	8.38	
Latin America		4	2.40	
Middle East		7	4.19	
North America		16	9.58	
Oceania		3	1.80	
Gender	167			
Male		91	54.49	
Female		76	45.51	
Fall GPA	167	3.17		0.68779
Spring GPA	167	3.08		0.659766
Cum GPA	167	3.14		0.57794
Fall Cr Hrs	167	15.00		1.887037
Spr Cr Hrs	167	16.00		2.311055
Cum Cr Hrs	167	31.00		3.452445
Housing	167			
On-Campus		48	28.74	
Off-Campus		119	71.26	
CmpEmply	167			
Wrk on-Cmp		32	19.16	
Did Not		135	80.84	

The next table, Table 14, presents similar descriptive statistics for the students in PS2 M1 who did not persist. There were 40 students who did not continue their enrollment from academic year 2006/2007 to 2007/2008. Out of the 40, 17 (42.5%) were freshmen and 23 (57.5%) were transfer international students. The students were represented from Africa (N = 4, 10.0%), Asia (N = 24, 60.0%), Europe (N = 5, 12.5%), Latin America (N = 2, 5.0%), the Middle East (N = 1, 2.5%), North America (N = 3, 7.5%), and Oceania (N = 1, 2.5%). There was no data on the students' financial sources. There were 22 (55.0%) male and 18 (45.0%) female students in this category. Of the 40 students, seven (17.5%) lived on campus, and six (15.0%) out of the 40 worked on campus.

Table 14

Descriptive Statistics of Public System 2 Model 1 of Non-Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Did Not Persist	40			
TOEFL	40	587.00		31.12671
Class	40			
Freshmen		17	42.50	
Transfer		23	57.50	
Country/Region	40			
Africa		4	10.00	
Asia		24	60.00	
Europe		5	12.50	
Latin America		2	5.00	
Middle East		1	2.50	
North America		3	7.50	
Oceania		1	2.50	
Gender	40			
Male		22	55.00	
Female		18	45.00	
Fall GPA	40			1.14006
Spring GPA	40			1.51715
Cum GPA	40			1.15301
Fall Cr Hrs	40			2.54495
Spr Cr Hrs	40			7.01572
Cum Cr Hrs	40			7.47046
Housing	40			
On-Campus		7	17.50	
Off-Campus		33	82.50	
CmpEmply	40			
Wrk on-Cmp		6	15.00	
Did Not		34	85.00	

Combined Public System Model 1

Combined Public System Model 1 (CPS M1), includes all students in both public statewide four-year university systems where data were available for all 11 independent variables and one dependent variable. There were a total of 454 students in this model. The variables "Financial Sponsorship" and "Appointments" were not included because 359 (79.1%) records out of 454 did not have complete information on "Financial Sponsorship" and "Appointments."

Table 15 contains the descriptive statistics for international students in CPS M1. There were 228 (50.2%) freshmen and 226 (49.8%) transfer international undergraduate students in this model. The students in this model were represented from Africa (N = 68, 15.0%), Asia (N = 280, 61.7%), Europe (N = 34, 7.5%), Latin America (N = 14, 3.1%), Middle East (N = 19, 4.19%), North America (N = 33, 7.3%), and Oceania (N = 6, 1.3%). Out of the 454 international students, 269 (59.3%) were males and 185 (40.8%) were females. Of the 454 students in both public systems, 146 (32.2%) lived on campus, and 308 (67.8%) lived off campus. Of the 454 international students, 113 (24.9%) in this model held an on-campus part-time job.

Table 15

Descriptive Statistics of Combined Public System Model 1 of New International Students for Academic Year 2006/2007

		N	Mean	%	Std. Dev.
Persist	454			84.00	
TOEFL	454		578.05		31.8720
Class	454				
Freshmen		228		50.22	
Transfer		226		49.78	
Country/Region	454				
Africa		68		14.98	
Asia		280		61.67	
Europe		34		7.49	
Latin America		14		3.08	
Middle East		19		4.19	
North America		33		7.27	
Oceania		6		1.32	
Gender	454				
Male		269		59.25	
Female		185		40.75	
Fall GPA	454		3.02		0.7972
Spring GPA	454		2.79		1.0556
Cum GPA	454		3.02		0.7151
Fall Cr Hrs	454		14.58		2.0450
Spr Cr Hrs	454		14.13		4.4570
Cum Cr Hrs	454		31.72		6.4250
Housing	454				
On-Campus		146		32.16	
Off-Campus		308		67.84	
CmpEmply	454				
Wrk on-Cmp		113		24.89	
Did Not		341		75.11	

Descriptive statistics in Table 16 summarizes the characteristics of persisting students in both public systems. There were 382 students persisted from academic year 2006/2007 to 2007/2008, of where 193 (50.5%) were freshmen and 189 (49.5%) were transfer students. Out of the 382 persisting students, 53 (13.9%) were from Africa, 239 (62.6%) from Asia, 29 (7.6%) from Europe, 12 (3.1%) from Latin America, 16 (4.2%) from the Middle East, 28 (7.3%) from North America, and six (1.6%) students from Oceania. There was no information on the financial sources of students in this model. There were 226 (59.2%) male and 156 (40.8%) female students who persisted. Of the 382 persisting students, 101 (26.4%) worked on campus, and 130 (34.0%) lived on campus.

Table 16

Descriptive Statistics of Combined Public System Model 1 of Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Persist	382			
TOEFL	382	575.00		32.5123
Class	382			
Freshmen		193	50.52	
Transfer		189	49.48	
Country/Region	382			
Africa		53	13.87	
Asia		239	62.57	
Europe		29	7.59	
Latin America		12	3.14	
Middle East		16	4.19	
North America		28	7.33	
Oceania		6	1.57	
Gender	382			
Male		226	59.16	
Female		156	40.84	
Fall GPA	382	3.16		0.7148
Spring GPA	382	3.09		0.7613
Cum GPA	382	3.13		0.5925
Fall Cr Hrs	382	15.00		1.9608
Spr Cr Hrs	382	15.00		2.7961
Cum Cr Hrs	382	33.00		4.9443
Housing	382			
On-Campus		130	34.03	
Off-Campus		252	65.97	
CmpEmply	382			
Wrk on-Cmp		101	26.44	
Did Not		281	73.56	

Table 17

Descriptive Statistics of Combined Public System Model 1 of Non-Persisting International Students from Academic Year 2006/2007 to 2007/2008

	N	Mean	%	Std. Dev.
Did Not Persist	72			
TOEFL	72	585.00		28.4356
Class	72			
Freshmen		35	48.61	
Transfer		37	51.39	
Country/Region	72			
Africa		15	20.83	
Asia		41	56.94	
Europe		5	6.94	
Latin America		2	2.78	
Middle East		3	4.17	
North America		5	6.94	
Oceania				
Gender	72			
Male		43	59.72	
Female		29	40.28	
Fall GPA	72	3.00		1.0950
Spring GPA	72	1.67		1.5345
Cum GPA	72	2.82		1.1028
Fall Cr Hrs	72	14.00		2.3586
Spr Cr Hrs	72	12.00		7.1700
Cum Cr Hrs	72	26.00		8.0898
Housing	72			
On-Campus		16	22.22	
Off-Campus		56	77.78	
CmpEmply	72			
Wrk on-Cmp		12	16.67	
Did Not		60	83.33	

Table 17 presents the descriptive statistics for international students who did

not persist in model CPS M1. There were 72 students who did not continue their

enrollment from academic year 2006/2007 to 2007/2008, of which 35 (48.6%) were

freshmen and 37 (51.4%) were transfer international students. The students were

represented from Africa (N = 15, 20.8%), Asia (N = 41, 57.0%), Europe (N = 5, 7.0%),

Latin America (N = 2, 2.8%), the Middle East (N = 3, 4.2%), and North America (N = 5,

7.0%). There was no data on the students' financial sources. There were 43 (59.7%)

male and 29 (40.3%) female students who did not persist. Out of the 72 students, 16

(22.2%) lived on campus, and 12 (16.7%) worked on campus.

Statistical Analyses Relative to Research Questions

An objective of this study is to develop a predictive persistence model for

undergraduate international students enrolled in public four-year universities. To

accomplish this objective, the variables in this study were categorized into three blocks

according to their categories. The first block, or Pre-entry category, consists of

independent variables TOEFL, class or status (freshmen or transfer), country of

citizenship, financial sponsorship, and gender (male or female). The second block

consisted of the independent variables first-semester credit hours attempted (Fall 2006),

second-semester credit hours attempted (Spring 2007), cumulative semester credit hours

attempted, first-semester grade point average (GPA), second-semester GPA, and

cumulative GPA. The third block consisted of independent variables of on-campus

employment, housing (on or off campus), and appointments with International Student

Office.

This study posed nine research questions pertaining to factors affecting the retention of international undergraduates from their first to second year. Results of the statistical analyses will be presented in the following order. First, for the three categories of factors (pre-entry, institutional experience, and on campus interaction) hypothesized to relate to retention, the results of univariate analyses will be presented to determine the simple correlation between the factor and retention into the second year. Second, results of two multivariate analyses will be reported to determine the contribution of the factor in the context of the set of other factors that might influence retention. In this section, results of two multivariate analyses, multiple regression and stepwise binomial logistic regression, will be presented to identify the best set of predictor variables. Finally, statistics relative to the predictive ability of each of the equations in accurately predicting retention will be presented.

Public System 1 Model 1

Appendix A contains five statistically significant bivariate relationships within the data structure and multicollinearity problems in the data set based on the data analysis using Pearson Correlation. The bivariate and multicollinearity relationships between the institutional experience variables such as fall semester GPA and cumulative GPA ($r = .913$), spring semester GPA and cumulative GPA ($r = .709$), spring semester GPA with cumulative credit hours attempted ($r = .601$), spring semester GPA with spring semester attempted credit hours ($r = .650$), and spring semester attempted credit hours with cumulative attempted credit hours ($r = .919$). These relationships were expected because of their close relationship and interdependent nature among each other. For example, if a

student had a high fall and spring GPA, naturally the cumulative GPA will be high. If a student attempted a higher number of credit hours in spring semester than fall, it will increase the attempted cumulative credit hours. The relationship between spring GPA and attempted cumulative credit hours could result from better understanding of college learning, interactions, teaching methodology and other in and out of classroom stimuli. The possible causal relationships between these variables are not discussed in this study because the current study does not address causal issues.

This multivariate regression, referred to as PS1 M1, included international students in Public System 1 for which the R^2 for Public System 1 Model 1, first block, noted in Table 18 is .056, which means that pre-entry characteristics account for 5.6% of the variation in Persist. For the second block, this value is .205 which means that pre-entry variables and institutional academic experiences account for 20.5% of variation in Persist, while the addition of the third block means that the full model accounts for 24.1% of the variation in Persist. The adjusted R^2 provides some idea of how well the model generalizes, and ideally we would like its value to be the same, or very close to, the value of R^2. This shrinkage means that if the model were derived from the population rather than a sample it would account for approximately 3.6% less variance in the outcome. The Durbin-Watson statistic informs us about whether the assumption of independent errors is tenable. The closer the value of Durbin-Watson is to two the better, and for these data the value is 1.851, which is close enough to satisfy the assumption of independent errors is tenable.

Table 18

Statistical Models Summary for Public System 1 Model 1

Block/Model	R Square	Adjusted R Square	R Square Change	Durbin-Watson
1	0.056	0.003	0.056	
2	0.205	0.110	0.149	
3	0.241	0.119	0.036	1.851

The next part of the analysis for Public System 1 Model 1, summarized in Table 19, reports an analysis of variance (ANOVA) that tests whether the model is significantly better at predicting the outcome than using the mean as a "best guess." Specifically, the F-ratio represents the ratio of the improvement in prediction that results from fitting the model (labeled "Regression" in Table 19), relative to the inaccuracy that still exists in the model (labeled "Residual" in Table 19).

If the improvement due to fitting the regression model is much greater than the inaccuracy within the category, then the value of F will be greater than one, and SPSS calculates the exact probability of obtaining the value of F by chance. For the first block the F-ratio is 1.061, which is greater than one, however since it is very close to one, there is a likelihood of inaccuracy in this model ($p = .387$). For the addition of the second block the value of F is 2.167, which is highly significant ($p = 0.028$). For the addition of the third block the value of F is 1.976, which is significant ($p = 0.033$). From the results in Table 19, we can infer that when variables from on-campus interaction were

introduced into the model (model 3), it reduced the ability to predict the outcome

variable of persistence from F = 2.167 to F = 1.976. We can interpret these results as

meaning that the second and third models improve our ability to predict the outcome

variable of persistence.

Table 19

ANOVA of the significant of Models of Public System 1 Model 1

Model/Block		SS	df	Mean Squares	F	Sig.
1	Regression	0.785	5	0.1570	1.0610	0.3870
	Residual	13.173	89	0.1480		
	Total	13.958	94			
2	Regression	2.862	10	0.2860	2.1670	0.0280
	Residual	11.096	84	0.1320		
	Total	13.958	94			
3	Regression	3.360	13	0.2580	1.9760	0.0330
	Residual	10.598	81	0.1310		
	Total	13.958	94			

The next set of results, summarized in Table 20, provides estimates for the *b* value

which indicate the individual contribution of each predictor to the model for predicting

persistence. The *b* values tell us about the relationship between "Persist" and each

predictor. If the value is positive, we can tell that there is a positive relationship between

the predictor and the outcome, whereas a negative coefficient represents a negative

relationship.

Each of these beta values has an associated standard error indicating to what

extent these values would vary across different samples, and these standard errors are

used to determine whether or not the *b* value differs significantly from zero. Therefore, if

the *t*-test associated with a *b* value is significant (if the value in the column labeled Sig. is

less than 0.05), then that predictor is making a significant contribution to the model. The

smaller the value of "Sig" and the larger the value of *t*, the greater the contribution of that

predictor.

The *b* values are important statistics to examine; however, the standardized

versions of the *b* values are in many ways easier to interpret (because they are not

dependent on the units of measurement of the variables). The standardized beta values

indicate the number of standard deviations that the outcome will change as a result of one

standard deviation change in the predictor. The standardized beta values are all measured

in standard deviation units and so are directly comparable and therefore, they provide a

better insight into the importance of a predictor in the model. For example (Table 20),

the standardized beta value in the third grouping for second semester credit hours

attempted (SCrHrs) is .387, and for gender (Gender) is .252. This tells us that SCrHrs

has a slightly greater effect on retention than Gender.

Table 20

Model Parameters of Public System 1 Model 1

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
1	TOEFL	0.812	0.001	-0.033	-0.317	0.752
	Class	0.000	0.083	0.016	0.150	0.881
	Country					
	Africa	-0.057	0.101	-0.059	-0.563	0.575
	Asia	-0.005	0.084	-0.007	-0.063	0.950
	Europe	0.200	0.167	0.127	1.202	0.233
	Latin America	0.194	0.278	0.073	0.697	0.488
	Middle East	0.003	0.188	0.002	0.016	0.987
	North America	-0.080	0.154	-0.055	-0.521	0.604
	Financial					
	Family	0.076	0.117	0.068	0.655	0.514
	Company	-0.140	0.128	-0.112	-1.092	0.278
	Government	0.158	0.237	0.072	0.666	0.507
	Gender	-0.023	0.080	0.240	2.290	0.024
2	TOEFL	0.000	0.001	-0.020	-0.197	0.884
	Class	-0.016	0.080	-0.020	-0.202	0.840
	Country					
	Africa	0.090	0.104	0.094	0.867	0.388
	Asia	-0.067	0.086	-0.085	-0.773	0.442
	Europe	0.264	0.158	0.168	1.668	0.099
	Latin America	-0.013	0.279	-0.005	-0.047	0.962
	Middle East	-0.147	0.184	-0.086	-0.802	0.425
	North America	-0.118	0.152	-0.080	-0.775	0.441
	Financial					
	Family	0.089	0.117	0.080	0.761	0.449

(table continues)

Table 20 (continued)

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
	Company	-0.112	0.129	-0.090	-0.872	0.386
	Government	0.017	0.245	0.008	0.068	0.946
	Gender	0.146	0.085	0.191	1.725	0.088
	FGPA	-0.224	0.142	-0.435	-1.583	0.117
	SGPA	-0.057	0.089	-0.154	-0.643	0.522
	CGPA	0.324	0.196	0.598	1.657	0.101
	FCrHrs	-0.040	0.021	-0.230	-1.896	0.061
	SCrHrs	0.037	0.015	0.432	2.492	0.015
3	TOEFL	0.000	0.001	-0.022	-0.223	0.824
	Class	-0.032	0.090	-0.040	-0.350	0.727
	Country					
	Africa	0.043	0.110	0.045	0.392	0.696
	Asia	-0.430	0.088	-0.055	-0.493	0.623
	Europe	0.230	0.159	0.146	1.446	0.152
	Latin America	0.016	0.284	0.006	0.058	0.954
	Middle East	-0.132	0.191	-0.077	-0.690	0.492
	North America	-0.094	0.166	-0.064	-0.565	0.573
	Financial					
	Family	0.108	0.117	0.097	0.923	0.359
	Company	-0.132	0.130	-0.106	-1.021	0.310
	Government	0.000	0.256	0.000	-0.001	0.999
	Gender	0.193	0.088	0.252	2.186	0.032
	FGPA	-0.195	0.143	-0.379	-1.365	0.176
	SGPA	-0.034	0.093	-0.092	-0.366	0.715
	CGPA	0.277	0.201	0.511	1.377	0.172
	FCrHrs	-0.045	0.021	-0.257	-2.118	0.037
	SCrHrs	0.033	0.015	0.387	2.161	0.034
	On-Campus Hse	-0.001	0.095	-0.001	-0.010	0.992
	Campus Emply	0.114	0.089	0.148	1.284	0.203
	Appointments	0.091	0.102	0.108	0.890	0.376

From Table 20, only three variables out of 14 were statistically significant as a predictor of persistence in Public System 1 Model 1 (PS1 M1). The statistically significant variables were Gender ($p = .032$), attempted fall semester credit hours ($p = .037$), and attempted spring semester credit hours ($p = .034$). The statistical analysis of gender, where female students were coded as "1" and male students as "0," revealed that female students were statistically significant as a predictors of persistence in PS1 M1. The results in Table 20 also imply that students who attempted more credit hours in fall and spring semester are better predictor of persistence. This could be the consequence of students who are more motivated to graduate from college attempting to complete or challenge themselves by enrolling in more credit hours per semester. There is no discussion on the causal effect in this study because this study does not address causal issues.

The final analyses was a forward stepwise binomial logistic regression process which examined the set of independent variables as they contributed to the prediction of persistence into fall 2007 (two semesters after initial enrollment). The independent variables were the dichotomous variables class, gender, housing (living on or off campus), on-campus employment, and appointments with the International Student Office, while the continuous variables were TOEFL score, country of citizenship, financial sponsorship, fall semester GPA, spring semester GPA, cumulative GPA, attempted credits hours for fall semester, spring semester, and cumulative (fall and spring).

Stepwise binomial logistic regression, resulting in generating the Chi-square was used because it adds variables in the forward direction and tests at each stage to see whether a variable that has previously been entered should now be removed. Logistic regression is useful for this situation because this study's intent was to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is similar to a linear regression model but is suited to models where the dependent variable is dichotomous.

Table 21 shows the stepwise binomial logistic regression to predict the retention of new international students from fall 2006 to fall 2007 in Public System 1 Model 1 (PS1 M1). The model was completed after one step and included only spring GPA. The addition of SGPA to the model added 2.1% to the predicted retention rate.

There was only one variable out of 14 that was statistically significant as a predictor of persistence in PS1 M1. The statistically significant variable was spring semester GPA ($p = .006$). The result implies that students with higher spring GPA were better predictor of persistence. This could be the consequence of students with higher GPA being more motivated to graduate from college There is no discussion on the causal effect in this study because this study does not address causal issues.

Table 21

Stepwise Binomial Logistic Regression Model to Predict Retention for PS1 M1

	Variables	*b*	S.E.	Sig.	Predicted %
Step 0					82.1
Step 1					84.2
	SGPA	0.647	0.234	0.006	
	Constant	-0.261	0.668	0.696	

Public System 1 Model 2 (PS1 M2)

Appendix B contains four statistically significant bivariate relationships within the data structure and multicollinearity problems in the data set based on the data analysis using Pearson Correlation. The bivariate and multicollinearity relationships between the institutional experience variables, such as fall semester GPA and cumulative GPA (r = .860), spring semester GPA and cumulative GPA (r = .670), spring semester GPA with spring semester attempted credit hours (r = .633), and spring semester attempted credit hours with cumulative attempted credit hours (r = .691). These relationships were expected because of their close relationship and interdependent nature among each other. For example, if a student had a high fall and spring GPA, naturally the cumulative GPA will be high. If a student attempted a higher number of credit hours in spring semester than fall, it will increase the attempted cumulative credit hours. The possible causal

relationships between these variables are not discussed in this study because the current study does not address causal issues.

This multivariate regression, referred to as PS1 M2, included international students in Public System 1 for which the R^2 for Public System 1 Model 2, first block/model, noted in Table 22 is .011, which means that pre-entry characteristics account for 1.1% of the variation in Persist. For the second model, this value is .249 which means that pre-entry variables and institutional academic experiences account for 24.9% of variation in Persist, while the addition of the third block means that the full model accounts for 25.7% of the variation in Persist. The adjusted R^2 provides some idea of how well the model generalizes, and ideally we would like its value to be the same, or very close to, the value of R^2. This shrinkage means that if the model were derived from the population rather than a sample it would account for approximately .9% less variance in the outcome. The Durbin-Watson statistic informs us about whether the assumption of independent errors is tenable. The closer the value of Durbin-Watson is to two the better, and for these data the value is 1.867, which is close enough to satisfy the assumption of independent errors is tenable.

Table 22

Statistical Models Summary for Public System 1 Model 2

Model	R Square	Adjusted R Square	R Square Change	Durbin-Watson
1	0.011	-0.005	0.011	
2	0.249	0.217	0.237	
3	0.257	0.219	0.009	1.867

Table 23 contains an analysis of variance (ANOVA) where in the first model the F-ratio is .703, which is less than one, meaning there is a likelihood of inaccuracy in this model ($p = .590$). For the second model, the value of F is 7.812, which is highly significant ($p = .000$). For the third model the value of F is 6.760, which is highly significant ($p = .000$). From the results in Table 23, we can infer that when variables from on-campus interaction were introduced into the model (model 3), the variables reduced the ability to predict the outcome variable of persistence from $F = 7.812$ to $F = 6.760$. We can interpret these results as meaning that the second and third models improve our ability to predict the outcome variable of persistence.

Table 23

ANOVA of the significant of Models of Public System 1 Model 2

Model		SS	df	Mean Squares	F	Sig.
1	Regression	0.320	4	0.080	0.703	0.590
	Residual	27.534	242	0.114		
	Total	27.854	246			
2	Regression	6.927	10	0.693	7.812	0.000
	Residual	20.927	236	0.089		
	Total	27.854	246			
3	Regression	7.170	12	0.598	6.760	0.000
	Residual	20.684	234	0.088		
	Total	27.854	246			

From Table 24, the standardized beta value in the third block/model for second

semester credit hours attempted (SCrHrs) is .216, and for gender (Gender) is .002. This

tells us that SCrHrs has more impact in the third block than Gender. Only three variables

out of 12 were statistically significant as a predictor of persistence in Public System 1

Model 2 (PS1 M2). The statistically significant variables were attempted fall semester

credit hours ($p = .003$), attempted spring semester credit hours ($p = .042$), and attempted

cumulative credit hours ($p = .009$). The results imply that students who attempted more

credit hours in fall and spring semester, which leads to an increase in attempted

cumulative credit hours are better predictor of persistence. This could be the

Table 24

Model Parameters of Public System 1 Model 2

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
1	TOEFL	-0.001	0.001	-0.039	-0.059	0.551
	Class	0.044	0.043	0.066	1.023	0.307
	Country					
	Africa	-0.057	0.101	-0.059	-0.563	0.575
	Asia	-0.005	0.084	-0.007	-0.063	0.950
	Europe	0.200	0.167	0.127	1.202	0.233
	Latin America	0.194	0.278	0.073	0.697	0.488
	Middle East	0.003	0.188	0.002	0.016	0.987
	North America	-0.080	0.154	-0.055	-0.521	0.604
	Oceania	0.134	0.241	0.036	0.558	0.577
	Gender	0.018	0.045	0.025	0.392	0.695
2	TOEFL	0.001	0.001	0.040	0.656	0.513
	Class	0.025	0.039	0.037	0.625	0.532
	Country					
	Africa	0.090	0.104	0.094	0.867	0.388
	Asia	-0.067	0.086	-0.085	-0.773	0.442
	Europe	0.264	0.158	0.168	1.668	0.099
	Latin America	-0.013	0.279	-0.005	-0.047	0.962
	Middle East	-0.147	0.184	-0.086	-0.802	0.425
	North America	-0.118	0.152	-0.080	-0.775	0.441
	Oceania	0.090	0.212	0.024	0.424	0.672

Table 24 (continued)

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
	Gender	-0.004	0.042	-0.005	-0.086	0.932
	FGPA	-0.041	0.056	-0.097	-0.737	0.462
	SGPA	0.037	0.042	0.114	0.874	0.383
	CGPA	0.041	0.085	0.083	0.480	0.632
	FCrHrs	-0.029	0.011	-0.167	-2.713	0.007
	SCrHrs	0.019	0.008	0.237	2.261	0.025
	CCrHrs	0.012	0.005	0.231	2.612	0.010
3	TOEFL	0.000	0.001	0.037	0.603	0.547
	Class	0.033	0.040	0.049	0.821	0.412
	Country					
	Africa	0.031	0.109	0.032	0.284	0.777
	Asia	-0.045	0.087	-0.057	-0.511	0.610
	Europe	0.233	0.159	0.148	1.464	0.147
	Latin America	0.037	0.282	0.014	0.133	0.895
	Middle East	-0.113	0.190	-0.066	-0.594	0.554
	North America	-0.084	0.165	-0.058	-0.512	0.610
	Oceania	0.070	0.212	0.019	0.332	0.740
	Gender	0.001	0.043	0.002	0.030	0.976
	FGPA	-0.036	0.057	-0.083	-0.629	0.530
	SGPA	0.039	0.043	0.119	0.894	0.372
	CGPA	0.027	0.086	0.055	0.315	0.753
	FCrHrs	-0.033	0.011	-0.192	-3.029	0.003
	SCrHrs	0.017	0.008	0.216	2.043	0.042
	CCrHrs	0.013	0.005	0.243	2.622	0.009
	On-Campus Hse	-0.026	0.044	-0.037	-0.586	0.559
	Campus Emply	0.066	0.045	0.091	1.479	0.141

consequence of students who are more motivated to graduate from college attempting

to complete or challenge themselves with more credit hours per semester. The possible

causal relationships between these variables are not discussed in this study because the

current study does not address causal issues.

Table 25 shows the stepwise binomial logistic regression to predict the retention

of new international students from fall 2006 to fall 2007 Public System 1 Model 2 (PS1

M2). The model required five steps to complete. SCrHrs was eliminated after step two,

while FCrHrs and campus employment was added at step five. The subtraction of

SCrHrs and addition of FCrHrs and campus employment to the model added 2.1% to the

predicted retention rate.

There were three variables out of 12 that were statistically significant as

predictors of persistence in PS1 M2. The statistically significant variables were

attempted fall semester credit hours ($p = .005$), attempted cumulative credit hours ($p = .000$), and on campus employment ($p = .042$). The results imply that students who

attempted more fall semester and cumulative credit hours are better predictor of

persistence. This could be the consequence of students who are more motivated to

graduate from college attempting to complete or challenge themselves with more credit

hours per semester. On-campus employment could be influenced by institutional

interaction among peers and motivation of students to continue to pursue a college

degree. There is no discussion on the causal effect in this study because this study does

not address causal issues.

Table 25

Stepwise Binomial Logistic Regression Model to Predict Retention for PS1 M2

	Variables	*b*	S.E.	Sig.	Predicted %
Step 0					87.0
Step 1					89.9
	SCrHrs	0.204	0.038	0.000	
	Constant	-0.658	0.492	0.180	
Step 2					89.9
	SCrHrs	0.087	0.062	0.162	
	CCrHrs	0.107	0.049	0.028	
	Constant	-2.591	1.026	0.012	
Step 3					89.1
	CCrHrs	0.162	0.030	0.000	
	Constant	-3.221	0.922	0.000	
Step 4					87.9
	FCrHrs	-0.276	0.118	0.020	
	CCrHrs	0.189	0.034	0.000	
	Constant				
Step 5	FCrHrs	-0.358	0.129	0.005	89.1
	CCrHrs	0.194	0.034	0.000	
	CmpEmply	1.123	0.553	0.042	
	Constant	0.672	1.711	0.694	

Public System 2 Model 1 (PS2 M1)

Appendix C contains seven statistically significant bivariate relationships within

the data structure and multicollinearity problems in the data set based on the data analysis

using Pearson Correlation. The bivariate and multicollinearity relationships between

the institutional experience variables such as fall semester GPA and cumulative GPA (r =

.870), spring semester GPA and cumulative GPA (r = .669), spring semester GPA with

cumulative credit hours attempted (r = .650), spring semester GPA with spring semester

attempted credit hours (r = .680), and spring semester attempted credit hours with

cumulative attempted credit hours (r = .936). These relationships were expected because

of their close relationship and interdependent nature among each other. For example, if a

student had a high fall and spring GPA, naturally the cumulative GPA will be high. If a

student attempted a higher number of credit hours in spring semester than fall, it will

increase the attempted cumulative credit hours. The relationship between spring GPA

and attempted cumulative credit hours could resulted from better understanding of

college learning, interactions, teaching methodology and other in and out of classroom

stimuli. The possible causal relationships between these variables are not discussed in

this study because the current study does not address causal issues.

 The final two relationships were persistence with attempted spring credit hours (r

= .617) and cumulative credit hours (r = .623). The results demonstrated that attempted

spring semester credit hours and attempted cumulative credit hours have a positive

relationship and could lead to an effect on persistence.

 This multivariate regression, referred to as PS2 M1, included international

students in Public System 2 for which the R^2 for Public System 2 Model 1, first

block/model, noted in Table 26 is .019, which means that pre-entry characteristics

account for 1.9% of the variation in Persist. For the second model, this value is .453

which means that pre-entry variables and institutional academic experiences account

for 45.3% of variation in Persist, while the addition of the third block means that the full

model accounts for 46.4% of the variation in Persist. The adjusted R^2 provides some idea

of how well the model generalizes, and ideally we would like its value to be the same, or

very close to, the value of R^2. This shrinkage means that if the model were derived from

the population rather than a sample it would account for approximately 1.1% less

variance in the outcome. The Durbin-Watson statistic informs us about whether the

assumption of independent errors is tenable. The closer the value of Durbin-Watson is to

two the better, and for these data the value is 1.777, which is close enough to satisfy the

assumption of independent errors is tenable.

Table 26

Statistical Models Summary for Public System 2 Model 1

Model	R Square	Adjusted R Square	R Square Change	Durbin-Watson
1	0.019	-0.001	0.019	
2	0.453	0.428	0.434	
3	0.454	0.434	0.011	1.777

Table 27 contains an analysis of variance (ANOVA), where in the first model the

F-ratio is .953, which is less than one, meaning there is a likelihood of inaccuracy in this

model ($p = .435$). For the second model, the value of F is 18.092, which is highly

significant (p = .000). For the third model, the value of F is 15.345, which is highly

significant (p = .000). From the results in Table 27, we can infer that when variables

from on-campus interaction were introduced into the model (model 3), it reduced the

ability to predict the outcome variable of persistence from F = 18.092 to F = 15.345. We

can interpret these results as meaning that the second and third models improve our

ability to predict the outcome variable of persistence.

Table 27

ANOVA of the significant of Models of Public System 2 Model 1

Model		SS	Df	Mean Squares	F	Sig.
1	Regression	0.598	4	0.149	0.953	0.435
	Residual	31.673	202	0.157		
	Total	32.271	206			
2	Regression	14.603	9	1.623	18.092	0.000
	Residual	17.667	197	0.090		
	Total	32.271	206			
3	Regression	14.973	11	1.361	15.345	0.000
	Residual	17.298	195	0.089		
	Total	32.271	206			

From Table 28, the standardized beta value in the third block/model for second-semester credit hours attempted (SCrHrs) is .334, and for gender (Gender) is .007. This tells us that SCrHrs has more impact in the third block than Gender. There were only three variables out of 12 were statistically significant as a predictor of persistence in Public System 2 Model 1 (PS2 M1). The statistically significant variables were spring semester GPA (p = .000), attempted fall semester credit hours (p = .028), and attempted spring credit hours (p = .000). The results imply that students who attempted more credit hours in fall and spring semester are better predictor of persistence. This could be the consequence of students who are more motivated to graduate from college attempting to complete or challenge themselves with more credit hours per semester. The GPA of spring semester may also contribute towards the motivation of students to continue to pursue a college degree. The possible causal relationships between these variables are not discussed in this study because the current study does not address causal issues.

Table 28

Model Parameters of Public System 2 Model 1

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
1	TOEFL	0.001	0.001	0.091	1.306	0.193
	Class	-0.082	0.056	-0.104	-1.474	0.142
	Country					
	Africa	0.001	0.095	0.001	0.008	0.993
	Asia	0.033	0.058	0.040	0.567	0.571
	Europe	-0.111	0.098	-0.081	-1.135	0.258
	Latin America	-0.112	0.165	-0.048	-0.678	0.499
	Middle East	0.088	0.147	0.043	0.596	0.552
	North America	0.027	0.096	0.020	0.283	0.777
	Oceania	-0.053	0.200	-0.018	-0.264	0.792
	Gender	0.014	0.056	0.018	0.255	0.799
2	TOEFL	0.000	0.001	0.000	0.008	0.994
	Class	-0.080	0.043	-0.101	-1.861	0.064
	Country					
	Africa	0.117	0.072	0.088	1.619	0.107
	Asia	-0.066	0.045	-0.081	-1.467	0.144
	Europe	-0.012	0.077	-0.009	-0.154	0.878
	Latin America	-0.001	0.127	-0.001	-0.009	0.992
	Middle East	0.027	0.113	0.013	0.236	0.814
	North America	0.063	0.074	0.046	0.848	0.398
	Oceania	-0.032	0.152	-0.011	-0.213	0.832

(table continues)

Table 28 (continued)

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
	Gender	-0.002	0.045	-0.002	-0.043	0.966
	FGPA	-0.009	0.057	-0.019	-0.165	0.869
	SGPA	0.135	0.040	0.369	3.352	0.001
	CGPA	-0.041	0.079	-0.078	-0.520	0.604
	FCrHrs	0.025	0.011	0.135	2.275	0.024
	SCrHrs	0.029	0.007	0.347	4.107	0.000
3	TOEFL	0.000	0.001	-0.022	-0.401	0.689
	Class	-0.067	0.044	-0.085	-1.517	0.131
	Country					
	Africa	0.096	0.073	0.072	1.303	0.194
	Asia	-0.060	0.045	-0.074	-1.334	0.184
	Europe	-0.008	0.076	-0.006	-0.099	0.921
	Latin America	-0.009	0.127	-0.004	-0.075	0.940
	Middle East	0.051	0.113	0.025	0.454	0.650
	North America	0.069	0.074	0.050	0.932	0.353
	Oceania	-0.071	0.154	-0.025	-0.459	0.646
	Gender	0.006	0.045	0.007	0.124	0.901
	FGPA	0.003	0.059	0.007	0.058	0.954
	SGPA	0.147	0.041	0.401	3.613	0.000
	CGPA	-0.061	0.080	-0.115	-0.754	0.452
	FCrHrs	0.024	0.011	0.131	2.212	0.028
	SCrHrs	0.028	0.007	0.334	3.945	0.000
	On-Campus Hse	-0.057	0.051	-0.063	-1.110	0.268
	Campus Emply	0.103	0.056	0.101	1.844	0.067

Table 29 shows the stepwise binomial logistic regression to predict the retention of new international students from fall 2006 to fall 2007 for Public System 2 Model 1 (PS2 M1). SGPA was added at step two. The model required only two steps to complete and included SGPA and CCrHrs to the model. The addition of SGPA and CCrHrs added 8.2% to the predicted retention rate.

Two variables out of 12 were statistically significant as predictors of persistence in PS2 M1. The statistically significant variables were spring semester GPA ($p = .012$), and attempted cumulative credit hours ($p = .000$). The results imply that students with more cumulative credit hours predicts for persistence. This could be the consequence of students who are more motivated to graduate from college attempting to complete or challenge themselves with more credit hours per semester. The GPA of spring semester may contribute towards the motivation of students to continue to pursue a college degree. There is no discussion on the causal effect in this study because this study does not address causal issues.

Table 29

Stepwise Binomial Logistic Regression Model to Predict Retention for PS2 M1

Variables	*b*	S.E.	Sig.	Predicted %
Step 0				80.7
Step 1				88.4
CCrHrs	0.393	0.072	0.000	
Constant	-9.507	2.017	0.000	
Step 2				88.9
SGPA	0.676	0.270	0.012	
CCrHrs	0.341	0.081	0.000	
Constant	-9.896	2.297	0.000	

Combined Public System Model 1 (CPS M1)

Appendix D contains seven statistically significant bivariate relationships within

the data structure and multicollinearity problems in the data set based on the data analysis

using Pearson Correlation. The bivariate and multicollinearity relationships between the

institutional experience variables, such as fall semester GPA and cumulative GPA ($r =$

.865), spring semester GPA and cumulative GPA ($r = .670$), spring semester GPA with

cumulative credit hours attempted ($r = .577$), spring semester GPA with spring semester

attempted credit hours ($r = .651$), and spring semester attempted credit hours with

cumulative attempted credit hours ($r = .726$). These relationships were expected

because of their close relationship and interdependent nature among each other. For

example, if a student had a high fall and spring GPA, naturally the cumulative GPA will

be high. If a student attempted a higher number of credit hours in spring semester than

fall, it will increase the attempted cumulative credit hours. The relationship between

spring GPA and attempted cumulative credit hours could resulted from better

understanding of college learning, interactions, teaching methodology and other in and

out of classroom stimuli. The possible causal relationships between these variables are

not discussed in this study because the current study does not address causal issues.

The final two relationships were persistence with attempted spring credit hours (r

$= .513$) and cumulative credit hours ($r = .503$). The results demonstrated that attempted

spring semester credit hours and attempted cumulative credit hours have a positive

relationship and could lead to an effect on persistence.

This multivariate regression, referred to as CPS M1, included international

students in Public System 1 and 2, for which the R^2 for Combined Public System Model

1, first block/model, noted in Table 30 is .001, which means that pre-entry characteristics

account for .1% of the variation in Persist. For the second model, this value is .331

which means that pre-entry variables and institutional academic experiences account for

33.1% of variation in Persist, while the addition of the third block means that the full

model accounts for 33.5% of the variation in Persist. The adjusted R^2 provides some idea

of how well the model generalizes, and ideally we would like its value to be the same, or

very close to, the value of R^2. This shrinkage means that if the model were derived from

the population rather than a sample it would account for approximately .4% less

variance in the outcome. The Durbin-Watson statistic informs us about whether the

assumption of independent errors is tenable. The closer the value of Durbin-Watson is to

two the better, and for these data the value is 1.823, which is close enough to satisfy the

assumption of independent errors is tenable.

Table 30

Statistical Models Summary for Combined Public System Model 1

Model	R Square	Adjusted R Square	R Square Change	Durbin- Watson
1	0.001	-0.008	0.001	
2	0.331	0.316	0.330	
3	0.335	0.317	0.004	1.823

Table 31 contains an analysis of variance (ANOVA) where in the first model the

F-ratio is .094, which is less than one, meaning there is a likelihood of inaccuracy in this

model ($p = .984$). For the second model the value of F is 21.933, which is highly

significant ($p = .000$). For the third model the value of F is 18.512, which is highly

significant ($p = .000$). From the results in Table 28, we can infer that when variables

from on-campus interaction were introduced into the model (model 3), it reduced the

ability to predict the outcome variable of persistence from F = 21.933 to F = 18.512. We

can interpret these results as meaning that the second and third models improve our

ability to predict the outcome variable of persistence.

Table 31

ANOVA of the significant of Models of Combined Public System Model 1

Model		SS	df	Mean Squares	F	Sig.
1	Regression	0.051	4	0.013	0.094	0.984
	Residual	60.531	449	0.135		
	Total	60.581	453			
2	Regression	20.062	10	2.006	21.933	0.000
	Residual	40.520	443	0.091		
	Total	60.581	453			
3	Regression	20.294	12	1.691	18.512	0.000
	Residual	40.288	441	0.091		
	Total	60.581	453			

From Table 32, the standardized beta value in the third block/model for second-

semester credit hours attempted (SCrHrs) is .185, and for gender (Gender) is -.016. This

tells us that SCrHrs has more impact in the third block than Gender. Only three variables

out of 12 were statistically significant as predictors of persistence in Combined Public

System Model 1 (CPS M1). The statistically significant variables were spring semester

GPA ($p = .004$), attempted spring semester credit hours ($p = .010$), and attempted

cumulative credit hours ($p = .000$). The results imply that students who attempted more

credit hours in spring semester and cumulative credit hours are better predictor of

persistence. This could be the consequence of students who are more motivated to

graduate from college attempting to complete or challenge themselves with more credit

hours per semester. The GPA of spring semester may also contribute towards the

motivation of students to continue to pursue a college degree. The possible causal

relationships between these variables are not discussed in this study because the current

study does not address causal issues.

Table 32

Model Parameters of Combined Public System Model 1

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
1	TOEFL	0.000	0.001	0.009	0.193	0.847
	Class	-0.008	0.035	-0.011	-0.233	0.816
	Country					
	Africa	-0.074	0.048	-0.072	-1.522	0.129
	Asia	0.033	0.036	0.044	0.932	0.352
	Europe	0.011	0.066	0.008	0.160	0.873
	Latin America	0.020	0.100	0.009	0.197	0.844
	Middle East	0.002	0.087	0.001	0.019	0.985
	North America	0.005	0.067	0.003	0.068	0.946
	Oceania	-0.007	0.151	-0.002	-0.049	0.961

(table continues)

Table 32 (continued)

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
	Gender	0.003	0.035	0.004	0.093	0.926
2	TOEFL	0.000	0.000	0.028	0.676	0.500
	Class	-0.025	0.029	-0.035	-0.866	0.387
	Country					
	Africa	0.015	0.041	0.014	0.355	0.723
	Asia	-0.036	0.030	-0.048	-1.180	0.239
	Europe	0.076	0.055	0.055	1.386	0.166
	Latin America	0.039	0.083	0.018	0.466	0.641
	Middle East	-0.050	0.072	-0.027	-0.694	0.488
	North America	0.028	0.056	0.020	0.498	0.619
	Oceania	0.002	0.125	0.001	0.019	0.985
	Gender	-0.014	0.031	-0.019	-0.465	0.642
	FGPA	-0.026	0.040	-0.057	-0.649	0.517
	SGPA	0.082	0.029	0.238	2.839	0.005
	CGPA	0.005	0.058	0.009	0.081	0.935
	FCrHrs	-0.009	0.008	-0.049	-1.119	0.264
	SCrHrs	0.015	0.006	0.187	2.608	0.009
	CCrHrs	0.015	0.004	0.266	4.164	0.000

(table continues)

Table 32 (continued)

Model	Variables	Beta (b)	Std. Error	Standardized b	t	Sig.
3	TOEFL	0.000	0.000	0.023	0.551	0.582
	Class	-0.018	0.030	-0.024	-0.587	0.558
	Country					
	Africa	0.004	0.042	0.004	0.094	0.925
	Asia	-0.030	0.031	-0.040	-0.974	0.331
	Europe	0.071	0.055	0.051	1.295	0.196
	Latin America	0.040	0.083	0.019	0.476	0.634
	Middle East	-0.039	0.072	-0.021	-0.541	0.589
	North America	0.028	0.057	0.020	0.491	0.624
	Oceania	-0.013	0.125	-0.004	-0.103	0.918
	Gender	-0.012	0.031	-0.016	-0.382	0.703
	FGPA	-0.020	0.041	-0.044	-0.498	0.619
	SGPA	0.086	0.029	0.248	2.921	0.004
	CGPA	-0.005	0.059	-0.010	-0.089	0.929
	FCrHrs	-0.010	0.008	-0.055	-1.256	0.210
	SCrHrs	0.015	0.006	0.185	2.587	0.010
	CCrHrs	0.015	0.004	0.257	3.910	0.000
	On-Campus Hse	-0.027	0.033	-0.035	-0.820	0.413
	Campus Emply	0.046	0.034	0.054	1.348	0.178

Table 33 shows the stepwise binomial logistic regression to predict the retention of new international students from fall 2006 to fall 2007 Combined Public System Model 1 (CPS M1). The model required four steps to complete. CCrHrs was added in step two, while SGPA was added in Step three and SCrHrs was eliminated in step five. The subtraction of SCrHrs and addition of CCrHrs and SGPA to the model added 5.3% to the predicted retention rate.

Two variables out of 12 were statistically significant predictors of persistence in CPS M1. The statistically significant variables were spring semester GPA ($p = .001$), and attempted cumulative credit hours ($p = .000$). The results imply that students with more cumulative credit hours are better predictor of persistence. This could be the consequence of students who are more motivated to graduate from college attempting to complete or challenge themselves with more credit hours per semester. The GPA of spring semester may contribute towards the motivation of students to continue to pursue a college degree. There is no discussion on the causal effect in this study because this study does not address causal issues.

Table 33

Stepwise Binomial Logistic Regression Model to Predict Retention for CPS M1

	Variables	*b*	S.E.	Sig.	Predicted %
Step 0					84.1
Step 1					89.0
	SCrHrs	0.254	0.032	0.000	
	Constant	-1.620	0.433	0.000	
Step 2					89.0
	SCrHrs	0.095	0.050	0.060	
	CCrHrs	0.158	0.041	0.000	
	Constant	-4.257	0.835	0.000	
Step 3					89.6
	SGPA	0.499	0.175	0.004	
	SCrHrs	0.030	0.057	0.598	
	CCrHrs	0.145	0.043	0.001	
	Constant	-4.292	0.862	0.000	
Step 4					89.4
	SGPA	0.534	0.161	0.001	
	CCrHrs	0.160	0.032	0.000	
	Constant	-4.429	0.822	0.000	

Research Questions

Research Question 1

The first research question was: Does proficiency in English influence persistence rate of international students? For this analysis, TOEFL scores were used to measure the English proficiency of international undergraduate students.

TOEFL is not statistically significant as a predictor of persistence as included in the analyses summarized in Tables 21, 25, 29, and 33. The respective p values of TOEFL from the models summarized in Table 34 were $p = .824$ from PS1 M1, $p = .547$ from PS1 M2, $p = .689$ from PS2 M1, and $p = .582$ from CPS M1. TOEFL was not considered as a significant predictor of persistence in the final equation.

Table 34

TOEFL: t-test Analysis of Variables

Model	t	Std. Error	Sig.
PS1 M1	-0.223	0.001	0.824
PS1 M2	0.603	0.001	0.547
PS2 M1	-0.401	0.001	0.689
CPS M1	0.551	0.000	0.582

Research Question 2

The second research question was: Does country of citizenship have any effect on retention rate of international students?

Table 35

Country: Chi-Square Analysis of Variables

Model	Region	X^2	d.f.	Sig.
PS1 M1	Africa	0.431	1	0.512
	Asia	0.000	1	0.991
	Europe	1.396	1	0.237
	Latin America	0.445	1	0.505
	Middle East	0.016	1	0.900
	North America	0.586	1	0.444
	Oceania	-	-	-
PS1 M2	Africa	0.472	1	0.708
	Asia	0.796	1	0.372
	Europe	2.377	1	0.123
	Latin America	1.231	1	0.267
	Middle East	0.279	1	0.597
	North America	0.023	1	0.879
	Oceania	0.300	1	0.584
PS2 M1	Africa	0.006	1	0.936
	Asia	0.230	1	0.631
	Europe	0.656	1	0.418
	Latin America	0.778	1	0.378
	Middle East	0.249	1	0.618
	North America	0.168	1	0.682
	Oceania	0.084	1	0.772

Table 35 (continued)

Model	Region	X^2	d.f.	Sig.
CPS M1	Africa	2.304	1	0.129
	Asia	0.810	1	0.368
	Europe	0.037	1	0.848
	Latin America	0.027	1	0.870
	Middle East	0.000	1	0.993
	North America	0.013	1	0.908
	Oceania	0.003	1	0.957

Table 35 summarizes the results for the variable, country of citizenship chi-square for PS1 M1, where Africa $X^2 = .431$ ($p = .512$), Asia $X^2 = .000$ ($p = .991$), Europe $X^2 = 1.396$ ($p = .237$), Latin America $X^2 = .445$ ($p = .505$), Middle East $X^2 = .016$ ($p = .900$), and North America $X^2 = .586$ ($p = .444$). In model PS1 M2, Africa $X^2 = .472$ ($p = .708$), Asia $X^2 = .796$ ($p = .372$), Europe $X^2 = 2.377$ ($p = .123$), Latin America $X^2 = 1.231$ ($p = .267$), Middle East $X^2 = .279$ ($p = .597$), North America $X^2 = .023$ ($p = .879$), and Oceania $X^2 = .300$ ($p = .584$). In model PS2 M1, Africa $X^2 = .006$ ($p = .936$), Asia $X^2 = .230$ ($p = .631$), Europe $X^2 = .656$ ($p = .418$), Latin America $X^2 = .778$ ($p = .378$), Middle East $X^2 = .249$ ($p = .618$), North America $X^2 = .168$ ($p = .682$), and Oceania $X^2 = .084$ ($p = .772$). The variable country of citizenship was not included in the final prediction equation.

Research Question 3

The third research question was: Does the source of financial sponsorship have any effect on international students' persistence? Only PS1 M1 was used to address this research question because the other models did not have official reported financial sponsorship information. CPS M1 was not included in addressing this research question because data on financial sponsorship was not available.

Table 36

Finance: Chi-Square Analysis of Variables

Model	X^2	d.f.	Sig.
PS1 M1			
Family	0.275	1	0.600
Company	1.115	1	0.291
Government	0.675	1	0.411

As the results in Table 36 indicate, Finance was not statistically significant as a predictor of persistence, $X^2 = 0.275$, and $p = .600$ for family sponsored, $X^2 = 1.115$, and $p = .291$ for religious organizations or company sponsored, and $X^2 = 0.675$, and $p = .411$ for government sponsored. Financial Sponsorship was not included in the final equation.

Research Question 4

The fourth research question addressed the possibility of gender in influencing retention or persistence from year one to year two of international undergraduate students

at four-year public higher education institutions. The question was: Is gender related

to retention of international undergraduate students?

Table 37

Gender: Chi-Square Analysis of Variables

Model	X^2	d.f.	Sig.
PS1 M1	3.525	1	0.060
PS1 M2	1.125	1	0.289
PS2 M1	0.026	1	0.871
CPS M1	0.018	1	0.893

To more directly address the research question, the relationship between gender

and retention was examine in each of the four data sets. Gender was not statistically

significant in relation to retention as found in Table 21, 25, 29 and 33. Table 37

demonstrated that Gender in PS1 M1 had a chi-Square (X^2) of 3.525, which was very

close to being statistically significant ($p = .060$). To validate the findings, CPS M1 was

constructed by merging PS1 M2 and PS2 M1 while eliminating two variables from PS1

M1, "financial sponsorship" and "appointments with the International Student Office,"

since data from those variables was not available at those institutions. The X^2 for gender

in Table 37 for the other models were PS1 M2 1.125 ($p = .289$), PS2 M1 .026 ($p = .871$)

and CPS M1 .018 ($p = .893$).   Based on the results, gender was not included in the final

retention equation.

Research Question 5

The fifth research question was, "Do the first and or second semester grade point average (GPA) and/or cumulative grade point average (CGPA) have an effect on the retention of international students?"

The results from Table 38 showed that fall semester GPA was not a significant predictor of retention. The t - test and p values were recorded as $t = -1.365$, $p = .176$ in PS1 M1, $t = -.629$, $p = .530$ in PS1 M2, $t = .058$, $p = .954$ in PS2 M1, and $t = -.498$, $p = .619$ in CPS M1. Fall semester GPA was not included in the final equation.

Table 38

Grade Point Average: t-test Analysis of Variables

Model	*Variables*	*T*	Sig.
PS1 M1	FGPA	-1.365	0.176
	SGPA	-0.366	0.715
	CGPA	1.377	0.172
PS1 M2	FGPA	-0.629	0.530
	SGPA	0.894	0.372
	CGPA	0.315	0.753
PS2 M1	FGPA	0.058	0.954
	SGPA	3.613	0.000
	CGPA	-0.754	0.452
CPS M1	FGPA	-0.498	0.619
	SGPA	2.921	0.004
	CGPA	-0.089	0.929

Cumulative GPA was also not statistically significant with values of $t = 1.377$, $p = .172$ in PS1 M1, $t = .315$, $p = .753$ in PS1 M2, $t = -.754$, $p = .452$ in PS2 M1, and $t = -.089$, $p = .929$ in CPS M1. Cumulative GPA was not included in the final equation.

The statistically significant variable in this category proved to be second (or spring) semester GPA. The t - test and p values were recorded as $t = -.366$, $p = .715$ in PS1 M1, $t = .894$, $p = .372$ in PS1 M2, $t = 3.613$, $p = .000$ in PS2 M1, and $t = 2.921$, $p = .004$ in CPS M1. The variable spring semester GPA was included in the final equation of public system 2.

Research Question 6

The sixth research question in the study was: Does the number of credit hours attempted in the first and second semester have any effect on retention rate of international students? This question also involved another variable, the total credit hours attempted during the first academic year in college.

As the results in Table 39 indicated, first-semester attempted credit hours was shown to be a statistically significant predictor of retention in all models except for CPS M1, where $t = -2.118$, $p = .037$ in PS1 M1, $t = -3.029$, $p = .003$ in PS1 M2, $t = 2.212$, $p = .028$ in PS2 M1, $t = -1.256$, $p = .210$ in CPS M1.

Spring semester and cumulative credit hours attempted, were statistically significant in all models as shown in Table 39. Spring semester credit hours attempted in PS1 M1 where $t = 2.161$, $p = .034$, in PS1 M2 $t = 2.043$, $p = .042$, in PS2 M1 $t = 3.945$, $p = .000$, and in CPS M1 $t = 2.587$, $p = .010$. Cumulative credits hours attempted was statistically significant only in PS1 M2 $t = 2.622$, $p = .0009$, and in CPS M1 $t = 3.910$, p

= .000. This variable was excluded in the equation for model PS1 M1 and PS2 M1 in

the t – test analysis in its final model.

Table 39

Attempted Credit Hours: t-test Analysis of Variables

Model	Variables	t	Sig.
PS1 M1	FCrHrs	-2.118	0.037
	SCrHrs	2.161	0.034
	CCrHrs	excluded	excluded
PS1 M2	FCrHrs	-3.029	0.003
	SCrHrs	2.043	0.042
	CCrHrs	2.622	0.009
PS2 M1	FCrHrs	2.212	0.028
	SCrHrs	3.945	0.000
	CCrHrs	excluded	excluded
CPS M1	FCrHrs	-1.256	0.210
	SCrHrs	2.587	0.010
	CCrHrs	3.910	0.000

The variable first-semester, second-semester, and cumulative semester credit

hours attempted were included in the final equation of public system 1 and 2.

Research Question 7

The seventh research question was: Does living on campus affect the retention

rate of international students?

The variable on-campus housing (living on or off campus) was not statistically significant when tested in each of the models as reported in Tables 21, 25, 29, and 33. Table 40 summarizes the findings and shows that X^2 and p values were $X^2 = 0.297$, $p = .586$ in PS1 M1, $X^2 = 1.044$, $p = .307$ in PS1 M2, $X^2 = 1.068$, $p = .301$ in PS2 M1, and $X^2 = 2.538$, $p = .111$ in CPS M1. Since the p values were not statistically significant, the variable on-campus housing was not considered in the final retention equation.

Table 40

On-Campus Housing: Chi-Square Analysis of Variables

Model	X^2	d.f.	Sig.
PS1 M1	0.297	1	0.586
PS1 M2	1.044	1	0.307
PS2 M1	1.068	1	0.301
CPS M1	2.538	1	0.111

Research Question 8

The eighth research question was: Does working on campus impact the retention rate of international students? This question is the second in the study, along with question 7 and 9, to address the impact of on-campus interaction on retention rate of international undergraduate students.

All analysis of data showed that this variable was not statistically significant

in all models except for PS1 M2. As indicated in Table 41, the X^2 and p values of this

variable across the models were recorded as $X^2 = 1.066$, $p = .302$ in PS1 M1, $X^2 = 4.127$,

$p = .042$ in PS1 M2, $X^2 = 2.005$, $p = .157$ in PS2 M1, and $X^2 = 2.103$, $p = .147$ in CPS

M1. This variable was included in the final equation for public system 1 but not for

public system 2.

Table 41

On-Campus Employment: Chi-Square Analysis of Variables

Model	X^2	d.f.	Sig.
PS1 M1	1.066	1	0.302
PS1 M2	4.127	1	0.042
PS2 M1	2.005	1	0.157
CPS M1	2.103	1	0.147

Research Question 9

The final and ninth research question was: Do appointments with International

Student Office affect the retention rate of international students? This question was also

used to address the impact of on-campus interaction on retention of international

undergraduate students. Only PS1 M1 was used because no other models contained

information on appointments at the International Student Office.

The results in Table 42 showed that this variable was not statistically significant with a value of $X^2 = 1.085$ and p value of .297 in PS1 M1. This variable was not included in the final equation.

Table 42

Appointments: Chi-Square Analysis of Variables

Model	X^2	d.f.	Sig.
PS1 M1	1.085	1	0.297

Final Retention Equation

To prepare the final equation of factors affecting retention of international undergraduate students in public system 1 and 2, the variable "class or status" had to be taken into account. This variable was defined earlier in the study as the entering status of international undergraduate students to both statewide public four-year universities. They were classified as freshmen (11) and transfer (12). This variable was used to determine if there should be a single equation for each public system or two separate equations based on the entering status of international undergraduate students.

Table 43 indicated that the variable class was not statistically significant in all the models tested.   Therefore, there will only be one final equation for each public system.

Table 43

Class (Freshman or Transfer): Chi-Square Analysis of Variables

Model	X^2	d.f.	Sig.
PS1 M1	0.001	1	0.971
PS1 M2	0.025	1	0.874
PS2 M1	2.880	1	0.090
CPS M1	0.938	1	0.333

The final equation of the factors affecting retention of international undergraduate students in the form of $Y = b_0 + b_1X_1 + b_2X_2 + \ldots + b_{14}X_{14}$ where b_0 represents the intercept and $b_1, b_2, \ldots b_{14}$ are the regression coefficients for the predictors $X_1, X_2, \ldots X_{14}$ respectively. The final retention model of factors affecting retention of international undergraduate students in the statewide public four-year university system 1 was represented by PS1 M1 and PS1 M2. The equation for PS1 M1 includes the variables fall, and spring semester credit hours attempted and PS1 M2 includes the variables fall, spring, and cumulative semester credit hours attempted.

The equation for the Model of International Student Persistence: Factors Influencing Retention of International Undergraduate Students at the statewide public system 1 four-year university system models PS1 M1: Predicted Retention Rate =

Constant + Constant of fall semester credit hours attempted (FCrHrs) + Constant of spring semester credit hours attempted (SCrHrs); $Y_1 = C_0 + C_9X_9 + C_{10}X_{10}$ and PS1 M2: Predicted Retention Rate = Constant + Constant of fall semester credit hours attempted (FCrHrs) + Constant of spring semester credit hours attempted (SCrHrs) + Constant of cumulative credit hours attempted (CCrHrs); $Y_1 = C_0 + C_9X_9 + C_{10}X_{10} + C_{11}X_{11.}$

Public System 1 Model 1 (PS1 M1)

Predicted Retention Rate = 1.274 – 0.045 (FCrHrs) + 0.033 (SCrHrs).

Table 44

Predicted Retention Rate Equation for PS1 M1

Constant	Constant of Fall Credit Hours	FCrHrs	Constant of Spring Credit Hours	SCrHrs	Predicted Retention Rate
1.274	-0.045	12	0.033	12	1.13
1.274	-0.045	13	0.033	12	1.09
1.274	-0.045	12	0.033	13	1.16
1.274	-0.045	15	0.033	12	1.00
1.274	-0.045	12	0.033	15	1.23

From Table 44, if the student attempted the required minimum of 12 credit hours in fall and spring semester, the student had an 11.3 percent to persist for the next academic year. If the student increases one credit hour in fall, the student would have a 10.9 percent chance to persist to the next academic year. However, by increasing one or two credit hours in the spring, the student had an 11.6 percent and 12.3 percent to persist.

In contrast, when a student increases credit hours in the fall semester the rate of retention decreased from 11.3 percent to 10.9 percent. By increasing one credit hours in spring semester, the student increased 11.6 – 11.3 = 0.3 percent to persist onto the next academic year.

Public System 1 Model 2 (PS1 M2)

The equation for the Model of International Student Persistence: Factors Influencing Retention of International Undergraduate Students at the statewide public system 1 four-year university system model PS1 M2: $Y_1 = C_0 + C_9X_9 + C_{10}X_{10} + C_{11}X_{11} + C_{12}X_{12}$

Predicted Retention Rate = -0.081 - 0.033 (FCrHrs) + 0.017 (SCrHrs) + .013 (CCrHrs) + .066 (CmpEmply).

Table 45

Predicted Retention Rate Equation for PS1 M2

Constant (Const.)	Const. of Fall CrHrs	FCrHrs	Const. of Spring CrHrs	SCrHrs
-0.081	-0.033	12	0.017	12
-0.081	-0.033	13	0.017	12
-0.081	-0.033	12	0.017	13
-0.081	-0.033	12	0.017	12
-0.081	-0.033	13	0.017	12
-0.081	-0.033	12	0.017	13

Table 45 (continue)

Constant (Const.)	Const. of Cum CrHrs	CCrHrs	Const. of Emply	Emply	Predicted Retention Rate
-0.081	0.013	24	0.066	1	0.105
-0.081	0.013	25	0.066	1	0.019
-0.081	0.013	25	0.066	1	0.069
-0.081	0.013	24	0.066	0	0.039
-0.081	0.013	25	0.066	0	0.019
-0.081	0.013	25	0.066	0	0.069

From Table 45, if the student attempted the required minimum of 12 credit hours in fall and spring semester, while held an on-campus part-time job, the student had a 1.1 percent to persist for the next academic year. If the student increases one credit hour in fall, the student would have a .19 percent chance to persist to the next academic year. However, by increasing one credit hour in the spring, the student had a .69 percent to persist. In contrast, when a student increases credit hours in the fall semester the rate of retention decreased from .39 percent to .19 percent. By increasing one credit hours in spring semester, the student increased .39 – .69 = .3 percent to persist onto the next academic year. This effect is similar if the student is not working on campus.

If a student attempted 12 credit hours in fall and spring, the student had a higher retention rate if held an on-campus job as compared to not working on campus. The difference is 1.1 - .4 = .7 percent.

Public System 2 Model 1 (PS2 M1)

The equation for the Model of International Student Persistence: Factors Influencing Retention of International Undergraduate Students at the statewide public system 2 four-year university system models PS2 M1: Predicted Retention Rate = Constant + Constant of spring GPA (SGPA) + Constant of fall semester credit hours attempted (FCrHrs) + Constant of spring semester credit hours attempted (SCrHrs); $Y_1 = C_0 + C_7X_7 + C_9X_9 + C_{10}X_{10.}$

Table 46 indicated that if a student attempted 12 credit hours in fall and spring, obtained a 2.00 GPA in spring semester, the student had a 16.4 percent to persist on to the second year. By increasing the spring GPA to 2.50, the same student will increase 17.2 – 16.4 = .8 percent to persist on to the second year.

There were changes in terms of increasing attempted credit hours in fall or spring semesters.

Table 46

Predicted Retention Rate Equation for PS2 M1

Constant	Constant of Spr GPA	SGPA	Constant of Fall Credits Hours	FCrHrs	Constant of Spr Credits Hours	SCrHrs	Predicted Retention Rate
0.725	0.147	2.00	0.024	12	0.028	12	1.64
0.725	0.147	2.00	0.024	13	0.028	12	1.67
0.725	0.147	2.00	0.024	12	0.028	13	1.67
0.725	0.147	2.50	0.024	12	0.028	12	1.72
0.725	0.147	2.50	0.024	13	0.028	12	1.74
0.725	0.147	2.50	0.024	12	0.028	13	1.74

Combined Public System Model 1 (CPS M1)

When all the data from PS1 M1, PS1 M2, and PS2 M1 were combined into CPS

M1, excluding two variables "financial sponsor" and "appointments with the

International Student Office," the final equation final equation of CPS M1 is Predicted

Retention Rate = 0.196 + 0.086 (Spring GPA) + 0.015 (Spring Attempted Credit Hours)

+ 0.015 (Cumulative Attempted Credit Hours).

Table 47

Predicted Retention Rate Equation for CPS M1

Constant	Constant of Spring GPA	SGPA	Constant of Spring Credit Hours	SCrHrs	Constant of Cum Credit Hours	SCrHrs	Predicted Retention Rate
0.196	0.086	2.00	0.015	12	0.015	12	0.728
0.196	0.086	2.00	0.015	13	0.015	12	0.743
0.196	0.086	2.50	0.015	12	0.015	12	0.771
0.196	0.086	2.50	0.015	13	0.015	12	0.786

Table 47 indicated that if a student maintained a 2.00 GPA in spring semester and attempted 12 credit hours in spring semester, the student had a 7.3 percent retention rate to persist into the second year. With an increase of one credit hour in spring semester, the student would increase the retention rate by 7.4 – 7.3 = 0.1 percent.

If the same student maintained a spring semester GPA of 2.50, while attempted 13 credit hours in spring semester, the retention rate would be 7.7 percent. If the student increase one credit hour in spring semester, the retention rate will increase by 7.9 – 7.7 = 0.2 percent.

Chapter 5

Discussion and Conclusions

This chapter discusses the results of the data analysis of the study in the context of

the literature on retention and persistence of higher education students in U.S. colleges

and universities. A summary of results follows the discussion of data analysis. This

chapter continues with the discussion of the limitations of the study. The conclusion of

this chapter includes recommendations for future research, the implications of the

findings for future research and recommendations for practice.

Literature on retention and persistence

According to Astin (1985), the essence of student learning is becoming involved

in campus activities both within and outside of the classroom. The involvement of

students is the guiding principle in undergraduate education in the United States. Tinto

(1975) explored the concept of involvement in more detail by categorizing involvement

into pre-college conditions such as, gender, socio economic status, etc. and academic

communities' interaction such as student-faculty, on campus housing, etc. Braxton,

Sullivan, and Johnson (1997) proposed that academic performance reflects a student's

degree of structural integration into the academic system of a college or university.

Braxton, Sullivan, and Johnson (1997) further stated that student success is assessed by

the ability of the student in meeting an institution's values and objectives. This, they

proposed, is measured by a student's grades, and the hypothesis that academic

performance is highly correlated with persistence. Although many studies have

examined individual and institutional variables related to retention, the literature on factors contributing to the retention of international undergraduate students is almost non-existent.

<div align="center">Discussion of results</div>

The discussion of the findings of the research questions of this study is divided into three groupings of variables: *Pre-entry Attributes*, *Institutional Experiences* and *On-campus Interaction*. The first grouping, pre-entry, consists of research questions one to four. The second grouping, institutional experience, includes research questions six and seven. Research questions five, eight, and nine concluded the last grouping, on-campus interaction.

Research Question 1: The impact of English proficiency (TOEFL) on retention.

TOEFL was used to determine if higher proficiency in the English language prior to beginning college had any effect on persistence. TOEFL score was used in lieu of high school GPA typically used in developing retention models for domestic students because different high school grading systems around the world are often not comparable to the U.S. high school GPA system of grading.

The independent sample *t* tests included in Tables 20, 23, and 26 indicated the following results in PS1 M1 (N = 95, $t = -.223$, $p = .824$), PS1 M2 (N = 247, $t = .603$ $p = .547$), and PS2 M1 (N = 207, $t = -.401$, $p = .689$). The impact of TOEFL on retention is not statistically significant in PS1 M1, PS1 M2, and PS2 M1. TOEFL was not statistically significant as an impact on retention is all three models.

Although results indicated that TOEFL had no direct effect on retention, it is possible that there are indirect effects as a result of the correlation between TOEFL scores and academic performance as measured by grade point average.

Research Question 2: The impact of country of citizenship on retention.

This was used to determine retention rate based on country of citizenship, and to determine if citizenship has any influence on retention. As many countries do not use English as a medium of instruction in schools, this will be another way to measure the effect of language (besides TOEFL) on retention. The codes developed for this variable were Africa (1), Asia (2), Europe (3), Latin America (4), Middle East (5), North America (6), and Oceania (7). Each region were analyzed separately in PS1 M1, PS1 M2, PS2 M1, and CPS M1 using both analyses, multiple regression and stepwise binary logistic regression.

The independent sample *t* tests included in Tables 20, 23, and 26 indicated the follow results in PS1 M1 (N = 95, t = -.631, p = .530), PS1 M2 (N = 247, t = .190, p = .849), and PS2 M1 (N = 207, t = .392, p = .695). The impact of country of citizenship on retention is not statistically significant in PS1 M1, PS1 M2, and PS2 M1. When the same models were analyzed using stepwise logistic regression, the results summarized in Table 36 were as follows: PS1 M1 (N = 95, X^2 = .065, p = .798), PS1 M2 (N = 247, X^2 = .231, p = .631), and PS2 M1 (N = 207, X^2 = .013, p = .910). All three models indicated that country of citizenship to not be statistically significant as an impact on retention.

Research Question 3: The impact of financial sponsorship (or financial sources) on retention.

Financial sponsorship reflects the socio-economic status of each student's family and is used in this study to replace the socio-economic status variable used in many retention studies on domestic students. The types of sponsorship in this study were classified into family or loans from home country (1), charitable or religious organizations or company (2) and government scholarship (3). The hypothesis is that sources of sponsorship have no effect on retention rate because federal immigration regulations required that, prior to being admitted, all international students in the U.S. must prove that their sponsor is capable of supporting them through college.

The independent sample t tests included in Table 20 indicated the following results in PS1 M1 (N = 95, t = -.726, p = .470). The impact of financial sponsorship on retention is not statistically significant in PS1 M1. There were no data available in PS1 M2 and PS2 M1 on financial sponsorship. When PS1 M1 was analyzed using stepwise logistic regression, from Table 37, PS1 M1 was also not significant (N = 95, X^2 = .031, p = .860). The chi-square test indicated the same result of the t test. PS1 M1 indicated that financial sponsorship not to be statistically significant as an impact on retention.

Financial sponsorship was used in place of financial aid which has been used in many studies of domestic (U.S.) students in U.S. colleges and universities. Since international students are required to provide proof of financial ability to pay for college expenses by the federal government, most international students are not eligible for financial aid. Also, common sense suggests that economic circumstances play an

important role not only in whether and where students go to college, but also in how long they remain. Pascarella and Terenzini (2005) stated that there were both positive and negative effects of financial aid on retention based on research done both prior and since 1990. They further indicated that students who received financial aid were as likely to persist in college as those who did not, even after adjusting for academic ability. According to Pascarella and Terenzini (2005), studies using the 1989-90 National Beginning Postsecondary Student Survey and the 1992 follow-up indicate that students who receive financial aid (compared with those who do not) are less likely to leave postsecondary education after two years and are more likely to earn a degree or certificate. The impact of financial aid was particularly evident among students enrolled in two or three-year programs and those from families with the lowest income. Among students at four-year institutions, the differences in persistence rates between aid recipients and non-recipients were small.

For students in PS1 M1, over 86 percent of international undergraduate students were sponsored by family. The non significant results of the variable "financial sponsorship" in persistence suggest that, financial aid does not increase the retention rate of international undergraduate students in Public System 1 Model 1.

Research Question 4: The impact of gender on retention.

The independent sample *t* tests included in Tables 20, 23, and 26 indicated the following results in PS1 M1 (N = 95, t = 2.186, p = .032), in PS1 M2 (N = 247, t = .030, p = .976), and in PS2 M1 (N = 207, t = .124, p = .901). The impact of gender on retention is not statistically significant in PS1 M2 and PS2 M1, but was statistically

significant in PS1 M1, which consists of those institutions in Public System 1 for

which data on all 14 variables were available. When the same models were analyzed

using stepwise logistic regression, the results, summarized in Table 34 were as follows,

PS1 M1 (N = 95, X^2 = 3.525, p = .060), PS1 M2 (N = 247, X^2 = 1.125, p = .289), and PS2

M1 (N = 207, X^2 = .026, p = .871). In this analysis, the gender is statistically not

significant in all models. Results from Tables 7, 10, 13, and 15 summarizes the

following in PS1 M1 46.2% male and 53.8% female persisted, in PS1 M2 62.8% males

and 37.2% female persisted, in PS2 M1 54.5% male and 45.5% female persisted and in

CPS M1 59.2% male and 40.8% female persisted.

These findings are in line with current research on the relationship between

gender and retention in analyses of both national and institutional samples. In general,

the evidence yielded by these investigations is inconsistent (Pascarella & Terenzini,

2005). Pascarella and Terenzini (2005) also stated that women at a women's college

appeared to gain in educational attainment beyond what might be the case at

predominantly white or coeducational institutions; however, these advantages are

indirect, being mediated largely through the positive effects these institutions have on

academic performance. Evidence also suggested that women at coeducational

institutions have different educational experiences and encounter more potential obstacles

to success than do their male peers or their counterparts at women's colleges (Smith,

Morrison, & Wolf, 1994). Some research indicated that women's colleges afford their

students some modest net advantages in terms of educational attainment. The nature of

the effect remained uncertain, apparently being more indirect than direct, operating

through the generally higher academic achievement of women in single-sex

institutions compared with their coeducational counterparts (Pascarella & Terenzini,

2005).

According to Wolf-Wendel, Baker, and Morphew (2000), studies focused on

women found that institution size to be a statistically significant and negative factor in

retaining women, but that is less influential when compared with race-ethnicity or the

average SAT verbal scores of entering students.

Although results indicated that gender had no direct effect on retention (with the

exception of PS1 M1), it is possible that there are indirect effects as a result of the

imbalance breakdown of male and female international students in the study.

Research Question 5: The impact of GPA on retention.

In most studies of factors related to retention, measure of academic performance

are included in the models. The first semester GPA (earned during the initial semester)

has typically served as one of the base retention predictors in many studies (Indiana

University-Bloomington, 2002). This study used first-semester, second-semester and

cumulative GPA as academic performance measurement predictors on retention.

The first variable in this section is fall (or first) semester GPA. The independent

sample *t* tests included in Tables 20, 23, and 26 indicated the following results: PS1 M1

($N = 95$, $t = -1.365$, $p = .176$), PS1 M2 ($N = 247$, $t = -.629$, $p = .530$), and PS2 M1 ($N =

207$, $t = .058$, $p = .954$). The impact of fall semester GPA on retention is not statistically

significant in PS1 M1, PS1 M2, and PS2 M1.

The second variable in this section is spring (or second) semester GPA. The

independent sample *t* tests included in Tables 20, 23, and 26 indicated the following

results: PS1 M1 (N = 95, *t* = -.369, *p* = .715), PS1 M2 (N = 247, *t* = .894, *p* = .372), PS2

M1 (N = 207, *t* = 3.613, *p* = .000), and CPS M1 (N = 454, *t* = 2.921, *p* = .004. The

impact of spring semester GPA on retention is only statistically significant in PS2 M1

and CPS M1.

The third variable in this section is cumulative GPA at the end of the first

academic year. The independent sample *t* tests included in Tables 20, 23, and 26

indicated the following results: PS1 M1 (N = 95, *t* = 1.377, *p* = .172), PS1 M2 (N = 247, *t*

= .315, *p* = .753), and PS2 M1 (N = 207, *t* = -.754, *p* = .452). The impact of cumulative

GPA on retention is not statistically significant in PS1 M1, PS1 M2, and PS2 M1.

The inconsistent results for grade point average in predicting retention rates for

new international undergraduate students contrasted sharply with the results for other

groups of undergraduates.

Grade-point averages (GPA) are the lingua franca of the academic instructional

world, the keys to students' standing and continued enrollment, to admission to majors

with enrollment caps, to program and degree completion, to admission to graduate and

professional schools, and to employment opportunities. It is not a surprise that the

attention GPA had commanded in the studies of retention and persistence (Pascarella &

Terenzini, 2005). Astin (1993) argued that grades are hardly a perfect measure of

learning and intellectual development in that they generally reflect a student's

performance relative to other students rather than how much has been learned.

According to Adelman (1999), first-year GPA and a measure of subsequent trends in grades have been found to be statistically significant and positive predictors of bachelor's degree completion, beyond the effects of an array of other variables, including students' precollege characteristics, the selectivity and mission of the first institution attended, financial aid, hours worked, and other selected college experience variables. Adelman (1999) further stated that having first-year grades in the top quintiles increased a student's likelihood of degree completion by two to three times over students with grades in the bottom quintiles.

In Pascarella and Terenzini's (2005) review of studies, they concluded that the positive and statistically significant net effect of grades on persistence and degree attainment are consistently apparent over varying periods of time. More importantly, from a practical and policy perspective, academic achievement during a student's first year of college may be a powerful influence on retention and degree completion. The positive and statistically significant effects of grades on persistence and degree completion are evident, whether the studies track persistence from the first to the second semester, to the second year, or over longer periods of time in a two-year institution or into the second year or over longer periods in four-year colleges and universities.

Generally, the combination of fall and spring semesters GPA (or cumulative GPA) is used to determine if a student would be eligible to persist into the following academic year by most higher education institutions in the United States. However, in many cases, if a student dropped out after fall semester regardless of GPA, the cumulative GPA at the end of the student's first academic year may only reflect the

actual GPA of the student at the end of fall semester. This situation may skew the results of cumulative GPA in determining its effect on retention rate.

In this study, only spring semester GPA showed to be statistically significant in predicting persistence of new international undergraduate students from academic year 2006/2007 onto 2007/2008. The reason fall semester GPA in this study failed to emerge as a good predictor could lie in the influenced of pre-entry traits inherent in individual students. Though there have been no specific studies conducted on international students, Braxton, Sullivan, and Johnson (1997) stated that student success is assessed by the ability of the student in meeting an institution's values and objectives. Students during their first semester (fall) may not have acquired the skills in meeting an institution's values and objectives.

Research Question 6: The impact of attempted credit hours on retention.

The hypothesis was that the more first and/or second semester credit hours attempted, the more likely students were to persist. This is also linked to motivation. The assumption was students who are motivated to graduate from college would attempt to complete more credit hours per semester than less motivated students. However, under federal immigration regulations, international undergraduate students must attempt a minimum of 12 credit hours per semester during the regular academic year. Some exceptions such as, medical, adjustment to new education system, and language deficiency are permitted.

The first variable in this section is attempted credit hours in fall (or first) semester. The independent *t* test from Tables 20, 23, and 26 indicated the following

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results: PS1 M1 (N = 95, t = -2.118, p = .037), PS1 M2 (N = 247, t = -3.029, p = .003), and PS2 M1 (N = 207, t = 2.212, p = .028).   The relationship between fall semester attempted credit hours and persistence was statistically significant in all models with the exception of the combined model CPS M1.

.   The second variable in this section is attempted credit hours in spring (or second) semester. The independent sample t tests included in Tables 20, 23, and 26 indicated the following results: PS1 M1 (N = 95, t = 2.161, p = .034), PS1 M2 (N = 247, t = 2.043, p = .042), and PS2 M1 (N = 207, t = 3.945, p = .000). The impact of spring semester attempted credit hours on retention is statistically significant in all three models. It is also significant in the final combined model CPS M1.

        The third variable in this section is cumulative attempted credit hours in the first academic year. The independent sample t tests included in Tables 20, 23, and 26 indicated the following results: PS1 M2 (N = 247, t = 2.622, p = .009), and CPS M1 (N = 454, t = 3.910, p = .000). The impact of cumulative credit hours attempted on retention is statistically significant in PS1 M2, and CPS M1 but was excluded in the t-test analysis for PS1 M1 and PS2 M1 in the final model of analysis.

        The literature on the impact of credit hours attempted to retention of new entering students is sparse. Most studies concentrated on the use of academic advising, which is related to attempted credit hours. Studies reviewed by Pascarella and Terenzini (2005) concluded that there was a positive effect of high-quality academic advising on retention, but that effect appeared to be more indirect than direct.

Research Question 7: The impact of housing (on or off-campus) on retention.

In the analysis of students in the two public systems, the housing situation

were as followings: PS1 M1 (N = 95, living on-campus 33.7%), PS1 M2 (N = 247, living

on-campus 36.8%), PS2 M1 (N = 207, living on-campus 26.6%), and CPS M1 (N = 454,

living on-campus 32.2%). This study used campus housing to better understand how on-

campus interactions relate to student retention. The hypothesis was that students living

on campus are more likely to persist than those living off campus.

The independent sample t tests included in Tables 20, 23, and 26 indicated the

following results: PS1 M1 (N = 95, t = -.010, p = .992), PS1 M2 (N = 247, t = -.586, p =

.559), and PS2 M1 (N = 207, t = -1.110, p = .268). The impact of housing on retention is

not statistically significant in PS1 M1, PS1 M2, and PS2 M1. When the same models

were analyzed using stepwise logistic regression, the results in Table 38 indicated the

following: PS1 M1 (N = 95, X^2 = .297, p = .586), PS1 M2 (N = 247, X^2 = 1.044, p =

.307), and PS2 M1 (N = 207, X^2 = 1.068, p = .301). The chi-square test also indicated the

same results as the t test. The housing variable in all three models shown by both the t-

test and chi-square analysis was not statistically significant as a variable affecting

retention into the second year.

By way of contrast with findings in this study, Pascarella and Terenzini's (2005)

review of studies of students living on campus (rather than commuting) found on-campus

residence an important positive factor for persistence. They attributed the finding to on-

campus residence offerings, which increased opportunities for peer interactions.

Pascarella and Terenzini (2005) further stated that there was consistent evidence that

students living on campus are more likely to persist and graduate than students who

commute. This relationship remains positive and statistically significant, even when

a wide array of precollege characteristics related to persistence and educational

attainment were taken into account, including precollege academic performance,

socioeconomic status, educational aspirations, age, and employment status.

Other researchers, such as Astin (1993), have found that living in an on-campus

residence hall increases the likelihood of persistence and degree completion whether

students' precollege characteristics are controlled or not. Blimling's (1993) review

indicated that residential students (versus commuters) participated in more extracurricular

activities, report more positive perceptions of the campus social climate, tend to be more

satisfied with their college experience, report more personal growth and development,

and engage in more frequent interactions with peers and faculty members. The evidence

from both Blimling (1993) and Pascarella and Terenzini (2005), indicates that this

involvement and changes have a positive influence on persistence.

By way of contrast, findings in the current study indicated no difference in

retention rates favoring students who live on campus. The importance of on-campus

housing has not been examined for international students, and the existing research was

based on domestic American students. Another possibility is the relatively small sample

size in this study, and that only 32.2 percent of the total subject (international

undergraduate students) lived on campus.

The majority of international students lived off campus, 67.8 percent in this study.

The reasons were mainly due to the unavailability of ethnic food in the cafeteria, which

international students are accustomed to, and facilities such as prayer room (or areas) for Muslim students.

Research Question 8: The impact of on-campus employment on retention.

According to Indiana University-Bloomington (2002), the more hours students expect to work per week during their freshman year (on or off-campus), the greater their chances of not being retained. The hypothesis in this study was working on campus have an adverse affect on retention. Off-campus employment was not included in this study because international students are only permitted to work on campus. A total of 24.9 percent of international students in both public systems worked on campus during the first year in college.

The independent sample t tests included in Tables 20, 23, and 26 indicated the following results: PS1 M1 (N = 95, t = 1.284, p = .203), PS1 M2 (N = 247, t = 1.479, p = .141), and PS2 M1 (N = 207, t = 1.844, p = .067). The impact of on-campus employment on retention is not statistically significant in PS1 M1, PS1 M2, or PS2 M1. When the same models were analyzed using stepwise logistic regression, the results, summarized in Table 41 indicated the followings: PS1 M1 (N = 95, X^2 =1.066, p = .302), PS1 M2 (N = 247, X^2 = 4.127, p = .042), and PS2 M1 (N = 207, X^2 = 2.005, p = .157). The chi-square test indicated results similar to the t test. PS1 M1 and PS2 M1 demonstrated to be not statistically significant as an impact on retention. Only in PS1 M2, was on-campus employment statistically significant contributor to retention.

According to Pascarella and Terenzini (2005), pre-1990s evidence indicated that, working off campus, whether full or part time, tended to reduce the likelihood of persistence, whereas part-time work on campus tended to promote persistence. On the other hand, Horn and Berktold (1998) and Nora, Cabrera, Hagedorn, and Pascarella (1996) stated that after adjusting for gender, race-ethnicity, age, income, full-time or part-time status, institutional type, receipt of financial aid, and the number of hours worked, persistence rates of students working on and off-campus to be virtually identical. They also found that, net of other factors, whether a student worked on or off-campus had no statistically significant effect on persistence into the second year. The relationship between hours worked and persistence or degree completion is not linear. Previous studies have indicated that working 20 or more hours per week reduces student persistence and degree completion, but other studies indicated that it enhanced persistence (Pascarella & Terenzini, 2005).

The results of this study verified the inconsistency of findings on the impact of on-campus employment on retention, and it is the first study to examine the contribution of employment on campus to the retention of international students.

Research Question 9: The impact of appointments with international student office on retention.

This analysis was only based on 95 subjects from PS1 M1. Data from other models in public system 1 and 2 were not available at the time of this study. Out of the 95 subjects, 70.5 percent made at least one appointment with the International Student Office. This variable was selected because it could have multiple contributions toward

retention of international students. It can be viewed from the perspective of interaction between student and advisor (Indiana University-Bloomington, 2002), a student's pre-existing initiative to reach out for help, and motivation to be successful.

The independent sample t tests included in Table 20 suggested that in PS1 M1 (N = 95, t = .890, p = .376) appointments kept with the international student office was not statistically significant in the predicting of retention. The impact of appointments with international student office on retention is not statistically significant. There were no data available in data sets two and three on appointments with the international student office. When the same model was analyzed using stepwise logistic regression, results in Table 42 (PS1 M1, N = 95, X^2 = 1.085, p = .297) indicated that the relationship between appointments with the international student office and retention rate was not statistically significant. The chi-square test indicated the same results as the t test.

The variable "appointment with international student office" was used as a parallel to studies, which have used advising and counseling as a contribution measure to persistence. The literature on interaction with international student offices is not currently available in scholarly studies of higher education in the U.S. The closest example are studies of the impact of advising and counseling on retention, such as the study by Peterson, Wagner, and Lamb (2001) that found that the direct or indirect effects of advising and counseling programs are unclear and inconclusive. In a similar study, Metzner (1989) found that a series of indirect effects on persistence through advising's positive influences on student grades, satisfaction, and intent to persist.

Another possible reason for the non-significant results for the variable

appointment could be due to the small sample size. Only PS1 M1 (N = 95) contained the

data on appointment. Within this model, over 70 percent of subjects made an

appointment with the international student office.

<center>Summary of Results</center>

In summary, this study indicated that there is no one single factor which

influences persistence or retention of international undergraduate students in the two

statewide public four-year higher education systems. Only two factors were shown to

influence international undergraduate students' persistence from year one to two, some

more directly than indirectly.

Based on the final equations of predicting the persistence of international

undergraduate students at statewide public systems 1 and 2 (CPS M1), the two factors

influencing persistence are spring semester's GPA, and cumulative credit hours

attempted.

By attempting one additional credit hour (either during fall or spring) there is a

potential to increase persistence by $18.95 - 16.14 = 2.81$ percent. By improving spring

semester's GPA by .50, persistence could be increased by $21.09 - 16.14 = 4.95$ percent.

According to Braxton, Sullivan, and Johnson (1997), students' institutional

commitments exert an important and positive effect in shaping their persistence

decisions, both planned and actual, even in the face of controls for the precollege

demographics and academic characteristics and the initial goal and institutional

commitments students bring with them to college. This finding is generalizable

across a variety of settings such as, urban or rural institutions and public or private

institutions.

Pascarella and Terenzini's (2005) findings are also consistent with those of

Braxton, Sullivan, and Johnson (1997) and Astin (1993) in suggesting that the level of

student involvement and integration in any of the components of an institution's

academic (such as spring semester's GPA and spring semester's attempted credit hours)

and social systems (such as on-campus employment in PS1 M2) can be critical factors in

students' persistence decisions. Braxton, Sullivan, and Johnson (1997) also found

moderate to strong evidence that students' academic and social engagement had positive,

indirect effects on persistence through their influence on students' goal and institutional

commitments. These effects remain even after statistical adjustments for a variety of

precollege characteristics, abilities, and motivation. However, Braxton, Sullivan, and

Johnson (1997) also found consistent evidence that academic and social integration are

interrelated and found in two studies that the two forms of engagement may reinforce one

another, although the specifics remain unclear. One study found each form of integration

positively and directly related to the other, but the other study found a positive academic-

to-social integration effect only among men and the reverse effect among women.

<center>Limitations of Study</center>

The main limitation of this study was that it was limited to two statewide public

higher education systems in the Midwest. The study did not include international

undergraduate students from private institutions in the state. It also excluded graduate

international students and non-degree seeking international students. While the study

captured the majority of data for international undergraduate students in the system, it is

not representative of national population, because the state's population of international

students ranked only fifth in the Midwest during the academic year 2006/2007 (Chin &

Bhandari, 2006). According to Pascarella and Terenzini (2005), comparisons of public

versus private institution persistence or degree completion rates unadjusted for students'

precollege characteristics consistently find higher rates at private institutions.

The second limitation was the size of the data pool. The entire study consisted of

only 454 international undergraduate students from both public systems, while the total

number of new international undergraduate students for fall 2006 reported by both

systems totaled 821. Only three of the seven institutions in Public System 1 participated

in the study. The central system office of Public System 1 was unable to assist in

obtaining all the data centrally. Data were obtained through individual institutions'

Institutional Research Offices. The research was only able to obtain 55.30 percent of the

data of total new international undergraduate students from both systems.

Another limitation of this study was that it was only done for a single academic

year, spanning from fall 2006 through spring 2007. If more than one academic year was

included, different results might emerge and a better overall persistence pattern might be

shown. Also, the findings and results would be different if the study was to include

retention into third, fourth, and fifth year of college.

Recommendations for Future Research

Although the present study examined persistence in a specific population (international undergraduate students) that has been neglected by many researchers, there are other variables which could be added to this study. More information on precollege characteristics of international students, such as social economic status, high school achievement, and parents' education level could be included. In terms of institutional effects, other information such as frequency and quality of academic advising and intramural activities could enhance the study of institutional factors affecting retention. In the category of on-campus interaction, international students and faculty interaction, international students and student affairs department interaction, and other peer interactions could be included. Unfortunately, very limited data are available on international students studying in the United States. The institutions included in this study were unable to provide data on all the variables common to retention studies on domestic (American) students.

A second suggestion for future study would be to develop a casual model of international student persistence. The current study is not a casual study, but rather a predictive model used to predict retention rate of international undergraduate students by pre-determined factors. Since there are very few empirical studies in this area, it would be beneficial to develop a causal model to understand the causal effects of persistence among international students in the United States. This model could also be extended to compare the effects of international students in the United States versus other countries such as Australia, Canada, and the United Kingdom.

Another recommendation for future research is to expand on the area of interaction. The current study only considered indirect peer interaction (working on campus, and living on campus) and interaction with non-faculty (student affairs staff) through appointments with an international student office. This study only takes into consideration whether an international student made an appointment with international student office and did not include information on the nature of the visit(s). A more comprehensive study could include the reasons for appointments with international student offices. In terms of peer interaction, the types of activities which students living on campus participated could be measured.

A fourth recommendation for future research is to include both private and public institutions. As this is one of the main limitations of this study, including private institutions would enable a more comprehensive study of persistence rates of international students in the United States. This inclusion could also address "between college effects" between private and public institutions on persistence rates of international students.

<center>Implications</center>

Four-year public institutions may be able to use the information of this study to evaluate current practices and policies on international student persistence. If there are no designated practices or policies, institutions may use the current study to develop policies and practices specifically to predict the retention or persistence rates of international undergraduate students on their campuses. We can conclude from this study that even though the prediction of international undergraduate students' persistence rate

is similar to the general population of domestic postsecondary students in the United States, they are not identical. Institutions that are interested in increasing retention rates of international students and indirectly increasing the retention rates of the total student population could use the study's predictive model to determine what and how they may increase the retention rates.

An implication of the study was in the form of academic achievement. When an international student attempted one more credit hour, in spring semester, it increased the persistence rate and when improving .50 grade point average in the spring semester for models PS2 M1 and CPS M1, it also increased the persistence rate. Improving the quality of academic advising and tutoring may influence the persistence rate of international undergraduate students on campuses. Also, reaching out to international students who are not using the tutoring or advising services may increase the persistence rate in general.

Conclusion

In conclusion, the study showed that attempted credit hours, spring semester's grade-point-averages, and in one model on-campus employment have positive and statistically significant net effects on the persistence of international undergraduate students in the statewide four-year higher education systems. The analysis of data of newly admitted degree-seeking international undergraduate students in Fall semester 2006 for one academic year showed that by attempting one additional credit hour, there is a potential to increase persistence by .1 percent. By improving spring semester's GPA by

.50 points, persistence could be increased by 4.3 percent. Having an on-campus job may increase an international student retention rate by .7 percent.

This study also showed that the results were consistent with other retention and educational attainment studies where there was no one magic formula or model to predict the persistence of postsecondary students in U.S. higher educational institutions. Results for most variables studied were either unclear or inconsistent. Only academic achievement was consistently shown to have a statistically significant and positive net effect on persistence and degree attainment over varying periods of time.

The difference in the results of this study, in comparison to studies of factors affecting the retention of domestic students, is intriguing. In a way, this study raises more questions than it answers. There are at least four possibilities. First, it could be that the nature of the on-campus versus off-campus experience of international undergraduates is different than that of domestic students. For example, it could be that international undergraduates who do not live on campus live with other international students and/or international families, which may provide some of the benefits of on-campus housing for domestic students. Second, it might be that the most salient variables affecting retention of international undergraduates were not included in the analysis. For example, Tinto's (1986) model of retention includes indicators of intentions to graduate. Third, related to Tinto's intention to graduate, could be motivation to earn a U.S. degree. This was illustrated in Fry's (1977,1984) findings of the achievement of social mobility of international students from Thailand after obtaining a U.S. degree. Not forgetting also, the countless stories about how Asian parents would sell their home to finance their

children's education abroad. Fourth, perhaps theories about the factors affecting

retention of domestic students do not apply to international undergraduates.

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Appendix A

Correlations Public System 1 Model 1

Pearson Correlations

	Persist	TOEFL	Class	Ctry	Fin	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	CmpEmply	Appt
Persist	1.000	-0.005	0.015	-0.018	-0.008	0.233	0.145	0.310	0.209	-0.094	0.284	0.199	-0.042	0.113	0.060
TOEFL	-0.005	1.000	-0.097	-0.130	0.010	0.133	0.095	-0.027	0.069	-0.024	-0.083	-0.079	-0.050	-0.034	0.001
Class	0.015	-0.097	1.000	0.040	0.150	0.002	0.059	0.022	-0.031	-0.171	-0.012	-0.079	0.313	-0.069	0.254
Ctry	-0.018	-0.130	0.040	1.000	0.175	-0.130	0.018	0.025	0.019	-0.306	0.122	-0.022	0.286	-0.294	0.152
Fin	-0.008	0.010	0.150	0.175	1.000	0.059	0.048	-0.084	0.048	-0.356	-0.087	-0.216	0.019	-0.074	0.139
Gender	0.233	0.133	0.002	-0.130	0.059	1.000	0.335	0.221	0.370	-0.113	-0.078	-0.110	-0.067	-0.202	-0.298
FGPA	0.145	0.095	0.059	0.018	0.048	0.335	1.000	0.579	0.913	0.169	0.242	0.270	0.172	0.006	-0.179
SGPA	0.310	-0.027	0.022	0.025	-0.084	0.221	0.579	1.000	0.709	0.147	0.650	0.601	0.017	0.015	-0.159
CGPA	0.209	0.069	-0.031	0.019	0.048	0.370	0.913	0.709	1.000	0.172	0.214	0.248	-0.158	0.012	-0.172
FCrHrs	-0.094	-0.024	-0.171	-0.306	-0.356	-0.113	0.169	0.147	0.172	1.000	0.212	0.581	-0.033	0.273	0.001
SCrHrs	0.284	-0.083	-0.012	0.122	-0.087	-0.078	0.242	0.650	0.214	0.212	1.000	0.919	-0.066	0.053	0.056
CCrHrs	0.199	-0.079	-0.079	-0.022	-0.216	-0.110	0.270	0.601	0.248	0.581	0.919	1.000	-0.068	0.154	0.047
Hse	-0.042	-0.050	0.313	0.286	0.019	-0.067	0.172	0.017	-0.158	-0.033	-0.066	-0.068	1.000	0.096	-0.119
CmpEmply	0.113	-0.034	-0.069	-0.294	-0.074	-0.202	0.006	0.015	0.012	0.273	0.053	0.154	0.096	1.000	0.290
Appt	0.060	0.001	0.254	0.152	0.139	-0.298	-0.179	-0.159	-0.172	0.001	0.056	0.047	-0.119	0.290	1.000

Appendix A (continued)

		Persist	TOEFL	Class	Ctry	Fin	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply	Appt
Sig.	Persist	.	0.480	0.443	0.430	0.468	0.012	0.081	0.001	0.021	0.183	0.003	0.027	0.342	0.138	0.283
(1-tailed)	TOEFL	0.480	.	0.174	0.104	0.461	0.100	0.180	0.399	0.252	0.408	0.212	0.223	0.315	0.372	0.496
	Class	0.443	0.174	.	0.349	0.073	0.491	0.283	0.416	0.381	0.049	0.455	0.224	0.001	0.253	0.006
	Ctry	0.430	0.104	0.349	.	0.045	0.104	0.431	0.406	0.428	0.001	0.120	0.416	0.003	0.002	0.070
	Fin	0.468	0.461	0.073	0.045	.	0.287	0.321	0.210	0.323	0.000	0.201	0.018	0.427	0.238	0.089
	Gender	0.012	0.100	0.491	0.104	0.287	.	0.000	0.016	0.000	0.137	0.228	0.143	0.259	0.025	0.002
	FGPA	0.081	0.180	0.283	0.431	0.321	0.000	.	0.000	0.000	0.051	0.009	0.004	0.048	0.479	0.041
	SGPA	0.001	0.399	0.416	0.406	0.210	0.016	0.000	.	0.000	0.077	0.000	0.000	0.434	0.443	0.062
	CGPA	0.021	0.252	0.381	0.428	0.323	0.000	0.000	0.000	.	0.047	0.019	0.008	0.063	0.456	0.048
	FCrHrs	0.183	0.408	0.049	0.001	0.000	0.137	0.051	0.077	0.047	.	0.020	0.000	0.374	0.004	0.495
	SCrHrs	0.003	0.212	0.455	0.120	0.201	0.228	0.009	0.000	0.019	0.020	.	0.000	0.263	0.305	0.295
	CCrHrs	0.027	0.223	0.224	0.416	0.018	0.143	0.004	0.000	0.008	0.000	0.000	.	0.255	0.068	0.325
	Hse	0.342	0.315	0.001	0.003	0.427	0.259	0.048	0.434	0.063	0.374	0.263	0.255	.	0.177	0.126
	CmpEmply	0.138	0.372	0.253	0.002	0.238	0.025	0.479	0.443	0.456	0.004	0.305	0.068	0.177	.	0.002
	Appt	0.283	0.496	0.006	0.070	0.089	0.002	0.041	0.062	0.048	0.495	0.295	0.325	0.126	0.002	.

(table continues)

		Persist	TOEFL	Class	Ctry	Fin	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply	Appt
N	Persist	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	TOEFL	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	Class	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	Ctry	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	Fin	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	Gender	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	FGPA	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	SGPA	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	CGPA	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	FCrHrs	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	SCrHrs	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	CCrHrs	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	Hse	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	CmpEmply	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	Appt	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95

Appendix B

Correlations Public System 1 Model 2

		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
Pearson	Persist	1.000	-0.047	0.062	0.069	0.020	0.108	0.389	0.163	-0.041	0.420	0.408	-0.070	0.097
Correlations	TOEFL	-0.047	1.000	-0.085	-0.078	0.135	0.078	-0.009	0.072	0.107	-0.038	-0.228	-0.019	0.095
	Class	0.062	-0.085	1.000	-0.106	0.031	-0.055	-0.001	-0.036	-0.053	-0.046	0.127	0.187	-0.103
	Ctry	0.069	-0.078	-0.106	1.000	-0.033	-0.035	0.016	-0.047	-0.074	0.171	0.072	-0.225	-0.151
	Gender	0.020	0.135	0.031	-0.033	1.000	0.229	0.219	0.293	0.050	0.020	-0.021	-0.095	-0.048
	FGPA	0.108	0.078	-0.055	-0.035	0.229	1.000	0.455	0.860	0.135	0.191	0.255	-0.050	0.113
	SGPA	0.389	-0.009	-0.001	0.016	0.219	0.455	1.000	0.670	0.087	0.633	0.561	-0.019	0.154
	CGPA	0.163	0.072	-0.036	-0.047	0.293	0.860	0.670	1.000	0.091	0.182	0.258	-0.080	0.130
	FCrHrs	-0.041	0.107	-0.053	-0.074	0.050	0.135	0.087	0.091	1.000	0.256	0.258	-0.172	0.242
	SCrHrs	0.420	-0.038	-0.046	0.171	0.020	0.191	0.633	0.182	0.256	1.000	0.691	-0.097	0.157
	CCrHrs	0.408	-0.228	0.127	0.072	-0.021	0.255	0.561	0.258	0.258	0.691	1.000	-0.168	0.014
	Hse	-0.070	-0.019	0.187	-0.225	-0.095	-0.050	-0.019	-0.080	-0.172	-0.097	-0.168	1.000	-0.080
	CmpEmply	0.097	0.095	-0.103	-0.151	-0.048	0.113	0.154	0.130	0.242	0.157	0.014	-0.080	1.000

Appendix B (continued)

		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
Sig.	Persist	.	0.233	0.165	0.141	0.379	0.046	0.000	0.005	0.260	0.000	0.000	0.138	0.063
(1-tailed)	TOEFL	0.233	.	0.093	0.112	0.017	0.112	0.445	0.131	0.047	0.278	0.000	0.380	0.069
	Class	0.165	0.093	.	0.048	0.314	0.195	0.497	0.289	0.205	0.238	0.023	0.002	0.053
	Ctry	0.141	0.112	0.048	.	0.304	0.292	0.404	0.229	0.124	0.004	0.129	0.000	0.009
	Gender	0.379	0.017	0.314	0.304	.	0.000	0.000	0.000	0.216	0.380	0.374	0.068	0.226
	FGPA	0.046	0.112	0.195	0.292	0.000	.	0.000	0.000	0.017	0.001	0.000	0.215	0.038
	SGPA	0.000	0.445	0.497	0.404	0.000	0.000	.	0.000	0.086	0.000	0.000	0.380	0.008
	CGPA	0.005	0.131	0.289	0.229	0.000	0.000	0.000	.	0.077	0.002	0.000	0.106	0.020
	FCrHrs	0.260	0.047	0.205	0.124	0.216	0.017	0.086	0.077	.	0.000	0.000	0.003	0.000
	SCrHrs	0.000	0.278	0.238	0.004	0.380	0.001	0.000	0.002	0.000	.	0.000	0.064	0.007
	CCrHrs	0.000	0.000	0.023	0.129	0.374	0.000	0.000	0.000	0.000	0.000	.	0.004	0.412
	Hse	0.138	0.380	0.002	0.000	0.068	0.215	0.380	0.106	0.003	0.064	0.004	.	0.106
	CmpEmply	0.063	0.069	0.053	0.009	0.226	0.038	0.008	0.020	0.000	0.007	0.412	0.106	.

(table continues)

Appendix B (continued)

		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
N	Persist	247	247	247	247	247	247	247	247	247	247	247	247	247
	TOEFL	247	247	247	247	247	247	247	247	247	247	247	247	247
	Class	247	247	247	247	247	247	247	247	247	247	247	247	247
	Ctry	247	247	247	247	247	247	247	247	247	247	247	247	247
	Gender	247	247	247	247	247	247	247	247	247	247	247	247	247
	FGPA	247	247	247	247	247	247	247	247	247	247	247	247	247
	SGPA	247	247	247	247	247	247	247	247	247	247	247	247	247
	CGPA	247	247	247	247	247	247	247	247	247	247	247	247	247
	FCrHrs	247	247	247	247	247	247	247	247	247	247	247	247	247
	SCrHrs	247	247	247	247	247	247	247	247	247	247	247	247	247
	CCrHrs	247	247	247	247	247	247	247	247	247	247	247	247	247
	Hse	247	247	247	247	247	247	247	247	247	247	247	247	247
	CmpEmply	247	247	247	247	247	247	247	247	247	247	247	247	247

Appendix C

Correlations Public System 2 Model 1

		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
Pearson	Persist	1.000	0.088	-0.100	0.003	0.004	0.223	0.570	0.274	0.323	0.617	0.623	-0.100	0.042
Correlations	TOEFL	0.088	1.000	0.025	-0.078	-0.030	0.153	0.141	0.161	0.124	0.111	0.137	-0.056	0.185
	Class	-0.100	0.025	1.000	-0.124	0.107	0.016	0.083	0.077	-0.105	-0.019	-0.055	0.264	0.000
	Ctry	0.003	-0.078	-0.124	1.000	0.003	0.000	0.010	-0.031	-0.075	-0.064	-0.080	-0.053	-0.110
	Gender	0.004	-0.030	0.107	0.003	1.000	0.256	0.152	0.312	-0.113	0.016	-0.029	0.021	-0.107
	FGPA	0.223	0.153	0.016	0.000	0.256	1.000	0.492	0.870	0.298	0.259	0.322	0.044	-0.014
	SGPA	0.570	0.141	0.083	0.010	0.152	0.492	1.000	0.669	0.254	0.680	0.650	-0.012	-0.102
	CGPA	0.274	0.161	0.077	-0.031	0.312	0.870	0.669	1.000	0.277	0.268	0.322	-0.043	-0.053
	FCrHrs	0.323	0.124	-0.105	-0.075	-0.113	0.298	0.254	0.277	1.000	0.321	0.634	-0.093	0.029
	SCrHrs	0.617	0.111	-0.019	-0.064	0.016	0.259	0.680	0.268	0.321	1.000	0.936	-0.045	-0.038
	CCrHrs	0.623	0.137	-0.055	-0.080	-0.029	0.322	0.650	0.322	0.634	0.936	1.000	-0.072	-0.020
	Hse	-0.100	-0.056	0.264	-0.053	0.021	0.044	-0.012	-0.043	-0.093	-0.045	-0.072	1.000	0.116
	CmpEmply	0.042	0.185	0.000	-0.110	-0.107	-0.014	-0.102	-0.053	0.029	-0.038	-0.020	0.116	1.000

(table continues)

Appendix C (continues)

		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
Sig.	Persist	.	0.102	0.077	0.485	0.477	0.001	0.000	0.000	0.000	0.000	0.000	0.075	0.272
(1-tailed)	TOEFL	0.102	.	0.360	0.131	0.335	0.014	0.022	0.010	0.037	0.056	0.025	0.211	0.004
	Class	0.077	0.360	.	0.038	0.063	0.411	0.116	0.135	0.066	0.392	0.217	0.000	0.499
	Ctry	0.485	0.131	0.038	.	0.481	0.499	0.440	0.327	0.140	0.182	0.126	0.224	0.058
	Gender	0.477	0.335	0.063	0.481	.	0.000	0.014	0.000	0.053	0.411	0.339	0.380	0.063
	FGPA	0.001	0.014	0.411	0.499	0.000	.	0.000	0.000	0.000	0.000	0.000	0.264	0.423
	SGPA	0.000	0.022	0.116	0.440	0.014	0.000	.	0.000	0.000	0.000	0.000	0.433	0.071
	CGPA	0.000	0.010	0.135	0.327	0.000	0.000	0.000	.	0.000	0.000	0.000	0.270	0.226
	FCrHrs	0.000	0.037	0.066	0.140	0.053	0.000	0.000	0.000	.	0.000	0.000	0.091	0.339
	SCrHrs	0.000	0.056	0.392	0.182	0.411	0.000	0.000	0.000	0.000	.	0.000	0.258	0.292
	CCrHrs	0.000	0.025	0.217	0.126	0.339	0.000	0.000	0.000	0.000	0.000	.	0.153	0.385
	Hse	0.075	0.211	0.000	0.224	0.380	0.264	0.433	0.270	0.091	0.258	0.153	.	0.048
	CmpEmply	0.272	0.004	0.499	0.058	0.063	0.423	0.071	0.226	0.339	0.292	0.385	0.048	.

(table continues)

		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
N	Persist	207	207	207	207	207	207	207	207	207	207	207	207	207
	TOEFL	207	207	207	207	207	207	207	207	207	207	207	207	207
	Class	207	207	207	207	207	207	207	207	207	207	207	207	207
	Ctry	207	207	207	207	207	207	207	207	207	207	207	207	207
	Gender	207	207	207	207	207	207	207	207	207	207	207	207	207
	FGPA	207	207	207	207	207	207	207	207	207	207	207	207	207
	SGPA	207	207	207	207	207	207	207	207	207	207	207	207	207
	CGPA	207	207	207	207	207	207	207	207	207	207	207	207	207
	FCrHrs	207	207	207	207	207	207	207	207	207	207	207	207	207
	SCrHrs	207	207	207	207	207	207	207	207	207	207	207	207	207
	CCrHrs	207	207	207	207	207	207	207	207	207	207	207	207	207
	Hse	207	207	207	207	207	207	207	207	207	207	207	207	207
	CmpEmply	207	207	207	207	207	207	207	207	207	207	207	207	207

Appendix D

Correlations Combined Public System Model 1

	Variables	Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
Pearson	Persist	1.000	0.009	-0.014	0.025	0.004	0.167	0.481	0.223	0.136	0.513	0.503	-0.092	0.083
Correlations	TOEFL	0.009	1.000	-0.035	-0.047	0.064	0.106	0.060	0.106	0.142	0.062	-0.122	-0.008	0.093
	Class	-0.014	-0.035	1.000	-0.119	0.062	-0.021	0.040	0.020	-0.082	-0.036	0.061	0.214	-0.054
	Ctry	0.025	-0.047	-0.119	1.000	-0.006	-0.021	0.008	-0.044	-0.061	0.059	-0.034	-0.132	-0.144
	Gender	0.004	0.064	0.062	-0.006	1.000	0.238	0.183	0.297	-0.019	0.023	-0.053	-0.034	-0.083
	FGPA	0.167	0.106	-0.021	-0.021	0.238	1.000	0.473	0.865	0.210	0.222	0.276	-0.012	0.063
	SGPA	0.481	0.060	0.040	0.008	0.183	0.473	1.000	0.670	0.162	0.651	0.577	-0.021	0.051
	CGPA	0.223	0.106	0.020	-0.044	0.297	0.865	0.670	1.000	0.178	0.222	0.284	-0.067	0.056
	FCrHrs	0.136	0.142	-0.082	-0.061	-0.019	0.210	0.162	0.178	1.000	0.294	0.359	-0.120	0.129
	SCrHrs	0.513	0.062	-0.036	0.059	0.023	0.222	0.651	0.222	0.294	1.000	0.726	-0.065	0.061
	CCrHrs	0.503	-0.122	0.061	-0.034	-0.053	0.276	0.577	0.284	0.359	0.726	1.000	-0.157	0.048
	Hse	-0.092	-0.008	0.214	-0.132	-0.034	-0.012	-0.021	-0.067	-0.120	-0.065	-0.157	1.000	-0.018
	CmpEmply	0.083	0.093	-0.054	-0.144	-0.083	0.063	0.051	0.056	0.129	0.061	0.048	-0.018	1.000

(table continues)

Appendix D (continues)

	Variables	Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
Sig.	Persist	.	0.427	0.383	0.300	0.465	0.000	0.000	0.000	0.002	0.000	0.000	0.025	0.039
(1-tailed)	TOEFL	0.427	.	0.228	0.159	0.086	0.012	0.101	0.012	0.001	0.092	0.005	0.433	0.023
	Class	0.383	0.228	.	0.006	0.094	0.329	0.196	0.333	0.040	0.224	0.099	0.000	0.128
	Ctry	0.300	0.159	0.006	.	0.452	0.330	0.429	0.176	0.097	0.106	0.232	0.002	0.001
	Gender	0.465	0.086	0.094	0.452	.	0.000	0.000	0.000	0.347	0.309	0.131	0.237	0.038
	FGPA	0.000	0.012	0.329	0.330	0.000	.	0.000	0.000	0.000	0.000	0.000	0.401	0.091
	SGPA	0.000	0.101	0.196	0.429	0.000	0.000	.	0.000	0.000	0.000	0.000	0.331	0.140
	CGPA	0.000	0.012	0.333	0.176	0.000	0.000	0.000	.	0.000	0.000	0.000	0.077	0.118
	FCrHrs	0.002	0.001	0.040	0.097	0.347	0.000	0.000	0.000	.	0.000	0.000	0.005	0.003
	SCrHrs	0.000	0.092	0.224	0.106	0.309	0.000	0.000	0.000	0.000	.	0.000	0.083	0.098
	CCrHrs	0.000	0.005	0.099	0.232	0.131	0.000	0.000	0.000	0.000	0.000	.	0.000	0.153
	Hse	0.025	0.433	0.000	0.002	0.237	0.401	0.331	0.077	0.005	0.083	0.000	.	0.350
	CmpEmply	0.039	0.023	0.128	0.001	0.038	0.091	0.140	0.118	0.003	0.098	0.153	0.350	.

(table continues)

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Appendix D (continues)

Variables		Persist	TOEFL	Class	Ctry	Gender	FGPA	SGPA	CGPA	FCrHrs	SCrHrs	CCrHrs	Hse	Cmp Emply
N	Persist	454	454	454	454	454	454	454	454	454	454	454	454	454
	TOEFL	454	454	454	454	454	454	454	454	454	454	454	454	454
	Class	454	454	454	454	454	454	454	454	454	454	454	454	454
	Ctry	454	454	454	454	454	454	454	454	454	454	454	454	454
	Gender	454	454	454	454	454	454	454	454	454	454	454	454	454
	FGPA	454	454	454	454	454	454	454	454	454	454	454	454	454
	SGPA	454	454	454	454	454	454	454	454	454	454	454	454	454
	CGPA	454	454	454	454	454	454	454	454	454	454	454	454	454
	FCrHrs	454	454	454	454	454	454	454	454	454	454	454	454	454
	SCrHrs	454	454	454	454	454	454	454	454	454	454	454	454	454
	CCrHrs	454	454	454	454	454	454	454	454	454	454	454	454	454
	Hse	454	454	454	454	454	454	454	454	454	454	454	454	454
	CmpEmply	454	454	454	454	454	454	454	454	454	454	454	454	454

Appendix E

From: irb@umn.edu
To: kwai0001@umn.edu
Subject: Change in Protocol Approval - Study Number: 0801E23961
Sent: Wed 10/8/2008 3:50 PM

The IRB has approved your change in protocol for the study listed below:

Study Number: 0801E23961
Principal Investigator: Chee Kwai
Title(s): Model of International Student Persistence: Factors Influencing Retention of
International Undergraduate Students at a State-Wide Four-Year University System

From: irb@umn.edu
To: kwai0001@umn.edu
Subject: 0801E23961 - PI Kwai - IRB - Exempt Study Notification
Sent: Thu 3/27/2008 9:32 AM

The IRB: Human Subjects Committee determined that the referenced study is exempt from
review under federal guidelines 45 CFR Part 46.101(b) category #4 EXISTING DATA;
RECORDS REVIEW; PATHOLOGICAL SPECIMENS.

Study Number: 0801E23961

Principal Investigator: Chee Kwai

Title(s):
Model of International Student Persistence: Factors Influencing Retention of International
Undergraduate Students at a State-Wide Four-Year University System
_____

This e-mail confirmation is your official University of Minnesota RSPP notification of
exemption from full committee review. You will not receive a hard copy or letter.

This secure electronic notification between password protected authentications has been deemed by the University of Minnesota to constitute a legal signature.

The study number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

If you requested a waiver of HIPAA Authorization and received this e-mail, the waiver was granted. Please note that under a waiver of the HIPAA Authorization, the HIPAA regulation [164.528] states that the subject has the right to request and receive an accounting of Disclosures of PHI made by the covered entity in the six years prior to the date on which the accounting is requested.

If you are accessing a limited Data Set and received this email, receipt of the Data Use Agreement is acknowledged.

This exemption is valid for five years from the date of this correspondence and will be filed inactive at that time. You will receive a notification prior to inactivation. If this research will extend beyond five years, you must submit a new application to the IRB before the study's expiration date.

Upon receipt of this email, you may begin your research. If you have questions, please call the IRB office at (612) 626-5654.

You may go to the View Completed section of eResearch Central at http://eresearch.umn.edu/ to view further details on your study.

The IRB wishes you success with this research.