

INTERNATIONAL GRADUATE STUDENTS:
CHOICE OF ACADEMIC MAJORS AND ACADEMIC PERFORMANCE

By

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To those I love(d) and those who love(d) me

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Abstract of Dissertation Presented to the Graduate School
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INTERNATIONAL GRADUATE STUDENTS:
CHOICE OF ACADEMIC MAJORS AND ACADEMIC PERFORMANCE

By

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The increasing number of international graduate students has been a sizeable segment of the student body in the U.S. higher educational system. However, this is an understudied population in the educational literature. The majority of the research either focused solely on international undergraduate students or did not distinguish between international undergraduate students and international graduate students. Research has been limited on international graduate students as an isolated population. Therefore, this student population has not completely been understood by higher education administrators and faculty, and their diverse needs have not been met by existing services on campuses.

International graduate students were studied as an isolated population in this study, which was conducted at a large southeastern four-year public university. This study examined reasons for international graduate students' choice of academic majors, factors associated with their academic performance, differences in teaching and learning methods in their home countries and in the United States, and learning and study strategies they used in the United States. Used in this study was the researcher's model of international graduate students' choice of academic majors and academic performance. The findings of the study may assist higher education administrators and faculty to better understand this population, and to provide appropriate and supportive

services for them. This study also suggests policies, services, and programs to meet this population's unique needs and to assist their academic success in the United States.

CHAPTER 1 INTRODUCTION

Background

The United States has become a major host country to international students. According to the Open Doors report (2006), 564,766 international students studied in American higher educational institutions in the 2005–2006 academic year (approximately 3.9% of the total post-secondary enrollment), including 259,717 students in graduate programs (approximately 46% of the total international students). Although the number of international students decreased 3.7% since September 11, 2001, the United States remains one of the major host countries. The total number of international students in the 2005–2006 academic year was 24.5% higher than the number in 1995–1996 and 65.1% higher than the number in 1984–1985. The number of international graduate students increased 36.6% in 1995–1996 and 112.1% in 1984–1985 (Open Doors, 2006).

The presence of international students increases diversity on American campuses. Selvadurai (1998) believed that “education is not only a means of permitting students to pursue academic and personal goals, but also an instrument in the economic, social and political development of emerging countries” (p. 153). Wood and Kia (2000) pointed out that international students bring a multi-cultural environment to the American campus “on a daily basis” (p. 55). As a significant proportion of the student population on campuses, international students increase awareness and understanding of diverse cultures, values, beliefs, religions, customs, festivals, and political issues among American students. In the long term, it is generally believed that universal understanding of diversity benefits international business, culture exchange, international relations, and world peace.

International students also constitute a source of revenue for American higher educational institutions. Since international students at public institutions pay full unsubsidized tuition rates and have few opportunities to receive financial aid from federal or state governments, the total economic contribution of international students in the United States was more than \$13 billion in 2005–2006 (Open Doors, 2006). Thus, the success of international students may be a predictive source for these institutions' continuing revenue. Moreover, successful international students may encourage others from their home countries to become economic contributors.

In addition to institutional revenue, international students' success also ensures American institutional investment and students' personal investment. Although the primary funding sources at the undergraduate level were personal and family funds (81.5%), 11.4% of these funds were from U.S. colleges or universities (Open Doors, 2006). At the graduate level, the primary funding source of international graduate students was U.S. colleges or universities (46.5%), which was even higher than personal and family funds (46.1%) in 2005–2006 (Open Doors, 2006). Therefore, the academic success of international students, especially at the graduate level, directly affects the investment of the students as well as U.S. institutions.

International graduate students play important roles in teaching assistance and research assistance in American higher education. When the class size is large, professors frequently cannot meet students' academic demands in limited class meeting time and office hours. As teaching assistants, international graduate students provide more office hours to assist students in labs and after class. Some international graduate students are selected as instructors to ensure that courses and assistance are available to students. In addition, international research assistants work in experimental labs, libraries, and offices to support professors in research projects, patent applications, and development of publications. Chellaraj, Maskus, and Mattoo (2005) stated that

“a ten-percent increase in the number of foreign graduate students would raise patent applications by 4.7 percent, university patent grants by 5.3 percent and non-university patent grants by 6.7 percent” (p. 1). International graduate students’ contributions therefore not only maintain or improve university research prestige, but may also help the United States maintain its position as the world’s leading research country.

The increasing number of international graduate students has been a sizeable segment of the student body in the U.S. higher educational system. They make significant contributions to institutions’ diversity, revenue, investment, research, and teaching. Research, however, has showed that the existing campus services are designed primarily for domestic students, and many of the needs of international students are not met by these services (Davis, 1999). It is not clear how universities can best assist international graduate students to achieve academic success, and only a little support has been provided to assist them. As a result, Shen and Herr (2004) suggested that educators and administrators face this challenge and provide effective services for international student population in response to the students’ geographic and cultural diversity needs.

Stoynoff (1997) indicated that “determinants of international students’ academic achievement are complex and not completely understood” (p. 9). Although his study proved that language proficiency and learning and study strategies were associated with international students’ academic achievement, he also pointed out that these were not the only influential aspects. He recommended additional research to explore other factors associated with international students’ academic performance.

Previous research addressed only the choice of majors among American students (e.g., Galotti, 1999; Malgwi, Howe, & Burnaby, 2005). However, existing research has not explored

international graduate students' reasons for selecting their academic majors. Hence, a better understanding is needed in how international graduate students select their academic majors in the United States.

By investigating international graduate students' reasons for selecting academic majors and factors associated with academic performance, practitioners in higher educational institutions can better understand this population's particular academic needs. Having a better understanding enables administrators to provide appropriate support services for international students to ensure their success in graduate study. Administrators can also help faculty members to assist these students in overcoming academic difficulties and achieving academic success.

Purpose of the Study

This study had four purposes: (a) to investigate the reasons for the choice of academic majors among international graduate students; (b) to identify the factors associated with international graduate students' academic performance; (c) to examine whether or not the teaching and learning methods differ in the home country and the United States; and (d) to explore the learning and study strategies that international graduate students utilize in the United States. In addition, the study may assist practitioners in higher education to better understand international graduate students. The study also provides suggestions and implications for policymakers, administrators, faculty, and staff to help this population of students be academically successful in the United States.

To achieve these purposes, the six research questions of this study are:

1. What factors are associated with the choice of academic majors among international graduate students?
2. What reasons for choosing academic majors are reported by international graduate students?
3. What factors are associated with international graduate students' academic performance?

4. Do learning and teaching methods differ between the United States and international students' home countries?
5. What learning and teaching methods in the United States and the home country are reported by international graduate students?
6. What learning and study strategies are reported by international graduate students?

Significance of the Study

This study contributes to educational literature, knowledge, and practice. First, the study adds to the limited research on international graduate students. Due to the unique admissions requirements of U.S. universities for international students, the specialized nature of graduate level study, and the critical contributions they make to the U.S. institutions, international graduate students need to be studied in isolation (Poyrazli, Arbona, Nora, McPherson, & Pisecco, 2002). International graduate students have been understudied as a component of the graduate student population on American campuses.

The population of international graduate students is a relatively new targeted population for the study on the choice of academic majors and academic performance. Previous research on choice of majors focused mainly on American undergraduate students (e.g., Galotti, 1999; Malgwi et al., 2005), but research on international graduate students' choice of academic majors was not found. International students' learning and study strategies have been studied (e.g., Stoyhoff, 1996, 1997); however, the focus of study was on international undergraduate students. The majority of the research on international students' academic performance has either focused solely on undergraduate students or did not distinguish between undergraduate and graduate students (e.g., Abel, 2002; Light, Xu, & Mossop, 1987; Selvadurai, 1998). Only a few researchers studied international graduate students as a separate group (e.g., Nelson, Nelson, & Malone, 2004; Poyrazli et al., 2002). Therefore, this present study adds to the literature and addresses a gap in research concerning international graduate students' choice of majors. The

study also extends the existing research on international graduate students' academic performance and learning and study strategies.

This study extended the existing research on factors associated with international graduate students' academic performance. Previous studies have examined such factors as English language proficiency, learning and study strategies, and cross-cultural adjustment. However, researchers also indicated that international graduate students' academic performance is multi-dimensional (Kuncel, Hezlett, & Ones, 2001). The study investigated other factors of academic performance of international graduate students. In addition, researchers have indicated that demographic variables also influence international students' educational experience (e.g., Fletcher & Stren, 1989; Shih & Brown, 2000). The study added the demographic factors of gender, age, graduate level, native region, and length of time in the United States.

Findings of the study may be of interest to practitioners in higher educational institutions with large international graduate student populations, as well as to those institutions that wish to attract a larger number of international graduate students. The study provides quantitative and qualitative data regarding international graduate students' motivation for their choice of academic majors, the factors associated with international graduate students' academic performance, differences in learning and teaching methods in the home country and the United States, and the learning and study strategies used in graduate study in the United States. The study informs institutional faculty and administrators how to better understand this particular population and their academic needs. The study leads to new policies, services, programs, and resources that particularly support international graduate students in American institutions of higher education.

Definition of Terms

Various terms were used in this study. These terms are defined in the alphabetical order.

Academic major: The academic field that a student chooses to study. This study applied the Biglan classification which is “the best known classification of university academic fields” (Hativa & Marincovich, 1995, p. 19). Biglan used multi-dimensional scaling to classify academic disciplines based on faculty’s ratings of differences and similarities among various disciplines: (1) time use (research, teaching, consulting time); (2) scholarly output (monographs); (3) funding source (private, state, federal); and (4) attitudes (conservative view, attitude toward scholarship and application). The dimension of “hard versus soft” is based on the disciplines’ level of paradigm development—a single knowledge paradigm is categorized as “hard” (i.e., engineering and physical sciences), and the “soft” category includes multi-paradigm disciplines (i.e., humanities and education). The “pure versus applied” dimension categorizes disciplines based on the extent to which they emphasized application of knowledge. The “pure” category consists of theoretical disciplines (i.e., physical sciences and humanities). Practical disciplines (i.e., education and engineering) are categorized as “applied” disciplines. In this study, academic majors are classified into four categories of two dimensions: hard/pure, hard/applied, soft/pure, and soft/applied (Biglan, 1973a, 1973b). The hard/pure category includes disciplines in natural sciences; the hard/applied category includes disciplines in agriculture and forestry, engineering, and health sciences; the soft/pure category includes disciplines in the humanities and arts, and the social sciences; the soft/applied category includes disciplines in architecture and design, business, communications and journalism, education, law, and public affairs.

Academic performance: A student’s learning accomplishment in the selected study area. It is typically measured by grade point average (GPA).

English language proficiency: A non-English speaker’s competency level of English language skills. Typically American university admissions offices require a score of 550 (paper-

based) or 213 (computer-based) or 80 (Internet-based) on TOEFL (Test of English as a Foreign Language) as a satisfactory score for English language proficiency in academic study.

Expectation of success: An individual's beliefs about how well he will do on upcoming tasks either in the immediate or long-term future (Eccles-Parsons, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983).

Family influence: The impact of family members' opinions or values on a student's decision.

International student: A student who is not a U.S. citizen or a permanent resident and who holds a non-immigrant student visa for the purpose of seeking a degree at a U.S. higher educational institution.

Welcome of international students: the quality and state of acceptance and welcome that an international student experiences and feels.

English language ability belief: An individual's perception of his current competence of the English language.

Learning and study strategies: A variety of approaches that a student uses to facilitate learning, to acquire new knowledge, and to perform well on course assignments and exams, for example, learning method, study style, and length of study time.

Native region: The geographical categories of international students' home countries, such as Africa, Central and South America, Central and South Asia, East and Southeast Asia, Europe, Middle East, North America, and Oceania.

Subjective values: The attainment value (the importance of doing well on a given task), intrinsic value (the enjoyment one gains from doing the task), and utility value (how a task fits into an individual's future plans) (Eccles-Parsons et al., 1983).

Limitations

One of the limitations of this study was the relatively low response rate of the online survey. The online survey was sent to 2,112 registered international graduate students at the selected university in Spring 2006 using an email list provided by the university's Office of Institutional Research, and 607 online survey emails were bounced back. However, 505 responses were collected after the original survey email and two follow-up emails. The response rate was 33.5%. Several reasons for this relatively low response rate occurred. First, Sheehan and McMillan (1999) indicated that "to date, the response rates for email surveys appear to be somewhat lower than those of traditional mail surveys" (p. 48). The expectation of an email survey response rate is between 25% and 30% (Kittleson, 1997). Second, confidentiality and Internet security was a concern for many participants. Some respondents were hesitant to reply to a request for participation over the Web (Sills & Song, 2002), although the informed consent emphasized that the answers were confidential and anonymous. Third, the online survey link was emailed to students' official university email accounts. Some students did not check this university email account often, and they may have missed the response deadline or they did not read these emails. Fourth, due to the increasing amount of junk emails, students might have deleted the survey emails directly as junk emails or may never have had the chance to read the emails categorized in the junk email file.

Another limitation was the inability to check the accuracy of the participants' answers. Since the online questionnaire and the focus group interview were completely confidential and anonymous, the researcher had no way to confirm the accuracy of the answers. Therefore, the study assumed that all the answers were accurate. However, if some participants answered the questionnaire and/or interview questions inaccurately for various reasons, the validity of the results might be impacted.

The results of the study may not be generalizable to other institutions. The study was conducted in a southeastern public university with an enrollment of approximately 50,000 students. The number includes more than 3,000 international students, 2,100 of whom are in graduate programs. Since the participants were from one institution, the study results may be applicable only to public universities with a large number of international graduate students who are demographically alike.

CHAPTER 2 REVIEW OF THE LITERATURE

Introduction

In this chapter, a review of relevant literature is presented. An overview of the following topics are presented: (a) international students in the United States; (b) American graduate students' challenges and problems; (c) international students' problems and barriers; (d) factors associated with academic performance; (e) factors associated with choice of academic majors; and (f) expectancy-value theory. This chapter concludes with a summary.

International Students in the United States

The number of international students in the United States has consistently increased since the 1950s (Open Doors, 2006). Although the number of international students has decreased during the past several years due to the September 11, 2001 event, the United States is still one of the top countries attracting international students. According to the Open Doors report (2006), 564,766 international students studied in American higher educational institutions in 2005–2006 (approximately 3.9% of the total post-secondary enrollment), including 259,717 students in graduate programs (approximately 46% of the total international students). Business and management, engineering, physical and life sciences, social sciences, and math and computer science were the top five academic fields in which international students studied. Approximately 55% international students came from Asia. India, China, Korea, Japan, and Taiwan were the top five regions that international students came from (Open Doors, 2006).

Enrollment of international students has enriched U.S. higher education spiritually, economically, and culturally diversity (Davis, 1999). “International students express a belief in the universal value of education and seek to further international understanding and good will through the dissemination of knowledge” (Selvadurai, 1998, p. 154). Furthermore, U.S. higher

educational institutions have increasingly depended on the enrollment of international graduate students, especially in doctoral programs. The steady decline of U.S. doctoral students in certain disciplines resulted in the increasing number of international students (Davis, 1999). According to the Open Doors report (2006), international graduate students represented approximately 10% of graduate enrollment in U.S. higher educational institutions.

According to Shen and Herr (2004), international students' long-term goals varied. Some students planned to return to their homes immediately after finishing their studies in the United States because they had commitments, a sense of security, family ties, and/or a promise of a career promotion in their home countries. Others planned to stay in the United States indefinitely due to family expectations, professional growth, a satisfying salary, living and working environment, a sense of job dignity, and lack of job opportunities in their home countries. The location of a satisfying job tended to be the main reason that some students had uncertain plans about leaving or staying in the United States upon graduation. Leppel, Williams, and Waldauer (2001) suggested that educational choices and career choices were essentially linked, and educational decisions were a step toward career decisions. Hence, the long-term goals may affect international students' academic choice and performance.

American Graduate Students' Challenges and Problems

Patrycia Gajdzik (2005) indicated that research on postsecondary students has focused primarily on American undergraduate students' attrition and retention. Few studies have been conducted on American graduate students' academic experience (Pruit-Logan & Issac, 1995). It is estimated that 25% of college graduates go to graduate schools either immediately after receiving a bachelor's degree or after several years of work experience. However, on average, only half of enrolled doctoral students actually graduate (Bowen & Rudenstein, 1992). Golde (1998) summarized five reasons that contributed to doctoral students' drop-out. The first reason

was dissatisfaction with doctoral lifestyle which was the most common reason. The second reason was a lack of overall balance between personal life and academic life. The third reason was a perceived mismatch between personal and departmental/advisor's interests. The fourth reason was a lack of desirable job prospects. The fifth reason was feeling that individual expectations cannot be met.

Many graduate students face what may be termed a “double load.” On the one hand, they may deal with academic adjustment—getting familiar with departmental and graduate norms, exploring areas of emphasis, and understanding degree requirements (Weidman, Twale, & Stein, 2001). On the other hand, they may experience life-changing events, such as a change in a job or job status, a change in financial status, and a change in social relationships (Gajdzik, 2005). Many graduate students, especially first-year students, experienced stress due to dealing with these loads. Problems and challenges faced by American graduate students included “taking time off between attending undergraduate and graduate school, task overload, taxing family and community obligations, full-time employment and lack of opportunities to interact with other students in similar situations” (Gajdzik, 2005, p. 22).

In addition, Polson (2003) pointed out that graduate students played multiple roles unlike traditional undergraduate students. They pursued satisfactory academic grades, prepared for comprehensive examinations, and completed a thesis or dissertation project. In addition, some graduate students were also expected to be research assistants or co-researchers in research projects, or teaching assistants or instructors for undergraduate courses. Some of the graduate students had family obligations, or they were part-time or full-time employees. Multiple roles crucially impacted graduate students' academic experiences. Polson (2003) indicated that

establishing priorities, time management, family and university supports, and the wise use of internal and external resources affected graduate students' academic performance.

International graduate students encounter many of the same common problems that American graduate students confront (Gajdzik, 2005). Pedersen (1991) stated that international graduate students faced more problems and challenges than their American peers when they enrolled in American higher education, and these obstacles may lower their academic achievements.

International Students' Barriers and Problems

The United States has been a major host nation to international students. However, studies indicated that international students face various challenges and problems when they study in the United States (e.g., Angelova & Riatzantseva, 1999). Moreover, researchers have pointed out that the difficulties faced by international students in the United States remain unchanged despite the fact that the population of international students has grown dramatically (Selvadurai, 1998). These problems include language barriers, insufficient academic advisement, incomplete knowledge of a different educational system and different teaching methods, a foreign collegial atmosphere, and cultural shock.

Language Barrier

Studies have indicated that the first barrier encountered by international students is language proficiency (Mori, 2000). A substantial proportion of these students do not speak English as their home language. Although most international students were able to pass standardized English proficiency examinations (e.g., TOEFL), they still have difficulties in understanding lectures, expressing ideas, writing reports, taking notes, reading academic literature, and understanding informal language (Angelova & Riatzantseva, 1999).

International students had difficulties in listening and speaking areas (Kim, 2005). In Brooks and Adams' study (2002), a survey was conducted by using a simple measure of students' familiarity with spoken English, which is called Frequency of Speaking English (FSE). The results showed that local students scored significantly higher than international students, and similarly, in their academic results, local students achieved significantly higher scores than international students.

Academic Advisement

Charles and Stewart (1991) pointed out that the objectives of academic advisement included "help [international students] adjust to the demands of their respective academic programs and achieve academic success" (p. 173). Advising international students is an important but difficult job. Inadequate academic advisement for international students contributed to poor academic performance and failure to graduate on schedule (Charles & Stewart, 1991).

Although not all academic advisement was poor, Charles and Stewart (1991) pointed out that many international students faced multiple issues. First, academic advisors may not have cultural sensitivity to understand different world views, so their advisement may not help international students understand and adjust to American academic demands. Second, academic advisors may not assess international students' academic language abilities or provide appropriate advisement on language support courses to help them overcome the language barrier. Charles and Stewart (1991) also indicated that international students' academic advisors may not be aware of adjustment issues that these students confront, so they may misguide them to unsuitable programs or to take overloaded credits. Last, but not least, international students' advisors may not know academic restrictions made by the U.S. immigration laws and/or their home governments. International students must take minimum academic credits each semester to

keep their student visas in the United States, and/or pursue a certain academic major in a limited time to continue their financial sponsorship provided by the home government. International students may have problems if these requirements are not met.

Educational System

Many international students have been faced with difficulties in adjusting to the American educational system and educational environment (Ward, Bochner, & Furnham, 2001). Most of these students have received their early education in other educational systems that differ in practice, content, and context from the educational system of the United States (Dunphy, 1999).

Moreover, Wan, Chapman, and Biggs (1992) found that “students from countries in which the educational system was perceived as more distant from the U.S. perceived their academic experiences as more stressful than did students from countries having more similar educational systems” (p. 615). Ward and colleagues (2001) indicated that little assistance was provided by the universities to help international students’ adaptation to the new educational environment. Rosenblatt and Christensen (1993) found that the adaptation was even harder for international graduate students. The universities assumed that graduate students knew what they should do, so the graduate school, the departments, or academic programs seldom provided orientation programs to address graduate programs’ requirements. They reported that an appropriate orientation program contributed to international graduate students’ adjustment since they experienced the same confusion as new undergraduates with no previous experience in American higher education.

Collegial Atmosphere

The difficulties of adjustment to American classroom atmosphere and faculty-student rapport have also been reported. Gulgoz (2001) found that the relationships with other students and professors and the size and atmosphere of the classroom were usually different from

international students' previous academic culture. International students may not know the American classroom principles, values, and practices, and be unfamiliar with classroom discourse patterns and expectations (Kim, 2005). In some cultures, classroom interaction was not expected, unless students were asked to speak (Marin, 1996). However, American students and teachers unconsciously share these assumptions and expectations about classroom conduct and practices to international students, such as classroom participation, discussion contribution, and critical questions (Robinson, 1992). The informal student-faculty interactions often confused international students who experienced a greater distance between faculty and students in their home countries (Edwards & Tonkin, 1990). In addition, international students who were used to cooperative learning styles may feel uncomfortable in a competitive environment in American classrooms (Edwards & Tonkin, 1990).

Teaching and Learning Methods

American classrooms emphasized interaction between the student and the teacher. Therefore, coaching and problem-solving teaching methods were used often in the United States (McKeachie, 1994). Lectures with individual student participation and lectures with group discussion were the preferred teaching styles (Beishline & Holmes, 1997). However, these teaching methods were different than those in other countries where students were note-takers or memorizers, and the teacher was seen as the sole authority (Bilal, 1990). Liu (1995) also indicated that students from other cultures expected students to be quiet in the class and not to critique the teachers' lectures. The lecture therefore was used as the principal teaching method outside the United States (Ladd & Ruby, 1999). These changes affected international students' study in the United States. Ladd and Ruby (1999) discovered that most international students changed their learning method from memorizing to problem-solving in order to adjust to the change in the teaching method, that is, from lecture to an active learning environment.

Beets and Lobingier (2001) found that the relationship between the teaching style and the learning style preference of the individual student influenced the student's academic performance. They also indicated that student attitudes were better if the teaching and learning style matched. Onwuegbuzie, Bailey, and Daley (2000) noted that when the learning style matched the teaching style, student achievement scores were higher than those when the learning style did not match the teaching style. They suggested that the instructors pay attention to all students, especially those with different learning styles.

Culture Differences

Cultural shock is another common challenge that international students face. International students may not understand American culture, religion, values, and political attitudes when they first arrive in the country. Homesickness, loneliness, and confusion were experienced by most international students who were from different cultures (Pedersen, 1991). Sandhu and Asrabadi (1994) reported that Americans lacked multi-cultural sensitivity and awareness. Therefore, international students often felt it was difficult to communicate or socialize with Americans. Selvadurai (1998) concurred that international students may have a positive academic and personal experience when they have satisfactory contacts with the host community.

The difference between a student's home culture and the predominant culture of the United States affected international students' adjustment (Selvadurai, 1998). When a student's culture was similar to the American culture, he had less difficulty adapting. In contrast, those having a different culture had more problems in adapting (Gareis, 1995). Most international students who were from cultures with close family ties, collectivism, distinct patterns of etiquette, and strong religious beliefs less common in the United States felt uncomfortable with America's free and liberal culture with emphasis on independence and individualism (Selvadurai, 1998).

Factors Associated with Academic Performance

Research indicates that multiple factors are associated with students' academic performance. For international graduate students, these factors included, but were not limited to, English language proficiency, learning and study strategies, interaction with faculty and peers, social influences, social interaction, self-efficacy beliefs, academic climate, and demographic information. Other factors were also discussed in previous studies.

English Language Proficiency

Researchers found a positive relationship between language proficiency and academic achievement among international students. Dodge (1990) reported that in the first semester, international students from non-English speaking countries struggled more than those who speak English as their first language. Stoyhoff (1997) stated that one predictor of the academic success of international students focused on English language proficiency measured widely by the TOEFL (Test of English as a Foreign Language). Many studies (e.g., Abadzi, 1984; Burgess & Greis, 1984; Riggs, 1982) reported that TOEFL scores were positively correlated with GPAs (grade point averages). However, Roemer (2002) stated that TOEFL scores may not be an accurate measure of English language proficiency. Nelson and colleagues (2004) found that TOEFL scores were not a predictor of program completion.

Researchers found that TOEFL and GRE (Graduate Record Examination) scores were reliable measures for predicting international student success in American graduate schools. Ayres and Quattlebaum (1992) and Nelson and colleagues (2004) found that the TOEFL score had predictive power in determining graduate grade point average (GGPA). Light and colleagues (1987) found that the overall TOEFL scores were significantly correlated with international graduate students' GPA ($r = .14, p < .05$); moreover, the higher the international student's TOEFL scores, the more graduate credit hours that student was able to earn in the first semester

($r = .19$, $p < .01$). However, some researchers have asserted that their studies did not find clear evidence regarding the relationship between international graduate students' TOEFL scores and their academic success as measured by GGPA (e.g., Neal, 1998; Yan, 1995; Yule & Hoffman, 1990).

Others have found that GRE scores were a significant indicator of international graduate student success in terms of program completion. Malone, Nelson, and Nelson (2001) found that the verbal portion of the GRE (GRE-V) was a reasonable predictor of success, as defined by program completion. Nelson and colleagues (2004) discovered that GRE scores are generalizably valid predictors of first-year GGPA and final GGPA. However, Neal (1998) showed that only GRE quantitative and analytical scores and GGPA were positively correlated.

Language skills also play a prominent role in graduate study. Cummins (1980) distinguished between basic interpersonal communication skills and cognitive academic language proficiency. He noted that mastery of appropriate communication skills for academic success was a complex and formidable task for international students. The language skills requirement may vary by academic disciplines and different colleges and universities in which international students study (Light et al., 1987). Academic performance in the natural sciences, which requires more quantitative competencies, was less affected by English-language proficiency than academic achievement in the humanities and social sciences (Light et al., 1987). They showed a stronger relationship between academic performance and language skills for humanities/fine arts/social sciences students than for natural sciences/math/business students (Light et al., 1987).

Learning and Study Strategies

The determinants of international students' academic achievement are complex because “the vast majority of international students, even those with lower language proficiency, appear

to succeed in university” (Stoynoff, 1997, p. 63). Studies reported that some factors—those that have important effects on the academic achievement of international students—were different from the abilities measured by TOEFL scores (Boyer & Sedlacek, 1988; Light et al., 1987). Cognitive psychologists have developed a conceptualization of learners as active and engaged participants in the learning process (Wittrock, 1986). Weinstein and Mayer (1986) emphasized the importance of active learners developing their own learning strategies and then actively organizing and adjusting their study behaviors. They revealed that active students were capable of controlling the ways in which they learn, and they use a variety of strategies to organize, implement, monitor, and adjust their learning behavior. Abel (2002) also found that “academic success seems to correlate modestly with attitudes toward learning and study strategies” (p. 13).

Stoynoff (1997) discovered that LASSI (Learning and Study Strategy Inventory) scale scores were correlated with international students’ academic performance measured by their GPA. The highest correlations for each scale were obtained during the first academic semester, and the correlations were significant for the motivation, self-testing techniques, and test-taking strategies scales. Stoynoff (1997) also stated:

More academically successful students better manage their study time, were better able to prepare for and take tests, were better at identifying the main ideas in spoken and written discourse, made better use of social support systems, and spent more time studying than less academically successful students. (p. 64)

Interaction with Faculty and Peers

Pascarella (1985) indicated that student interactions with faculty and peers influenced students’ academic achievement. Studies showed that the student peer culture was a potentially significant influence on individual academic behavior (Pascarella & Terenzini, 1982). Peer interactions including activities in and out of classrooms had a strong positive effect on college students’ cognitive outcomes (Whitt, Edison, Pascarella, Nora, & Terenzini, 1999). However, it

was not the only agent of socialization on campus with implications for student achievement. Students also had an extended series of interactions with faculty in both formal classroom and informal, non-classroom settings.

An institution's faculty and their interaction with students constituted different subcultures. Classroom instructional experiences and their influence on specific course content learning constituted a large body of research and inquiry (Pascarella, 1985). Nevertheless, students' interactions with faculty in less formalized, non-classroom situations appeared to influence a wide range of outcomes (Pascarella, 1980). Kuh and Hu (2001) indicated that faculty generally attached substantial value to student behaviors which increase academic achievement and learning. They also showed that faculty influence on student values and behaviors was usually enhanced through informal contact beyond the classroom. Thus, student-faculty interaction—both in and out of classrooms—is a potentially important influence on student achievement.

Social Influences

Research discovered that social support had significant influence on international students' well-being (Sandhu, 1995). Ward and colleagues (2001) indicated that international students' social influences were from family, peers, and mentors. These influences were significant to international students, that is, positive social support helped international students' adjustment as well as their academic performance (Gulgoz, 2001). Wan and colleagues' study (1992) found that international students who had a stronger social support network in their new academic environment tended to feel less stressful than those who did not have a strong social support network.

Stoyhoff (1997) indicated that the role of social assistance in international students' academic success is an essential factor, but social assistance is worth additional exploration. He also pointed out that a related issue was the extent to which seeking social assistance leads to a

formal mentoring process that permitted international students to successfully cope with the academic demands of their courses and helped them to negotiate the educational system despite limitations in language ability and differences in cultural background (Stoynoff, 1997).

Social Interaction

Many international students experienced anxiety, loneliness, or feelings of isolation in the new environment (Pedersen, 1991). Studies found that social interaction with local people was essential to international students' overall satisfaction and academic experience in the United States (Chen, 1999). Boyer and Sedlacek (1988) indicated that international students who socialize frequently with host people often experience easy adjustment and attain academic success.

However, Gajdzik (2005) also showed that graduate status and the language barrier limited international students' social interaction with Americans. Graduate study load and challenging academic demands required a large amount of time but left international graduate students little time for socializing (Chapdelaine & Alexitch, 2004). In addition, an inadequate language skill is another obstacle for social interaction with Americans. Crawford (2000) indicated that Americans often appeared to be impatient with foreign students who speak with a strong accent and limited communication vocabularies. Hence, little or no social interaction may affect international students' satisfaction of social and academic life in the United States.

Self-Efficacy Beliefs

Self-efficacy was defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Coffman and Gilligan (2003) have found that self-efficacy was positively correlated with college student adjustment and satisfaction with life. Leund and Berry (2001) studied self-efficacy beliefs of international and host students at a Canadian university. They discovered that

international students reported lower self-efficacy compared to host students. They also found that higher self-efficacy beliefs were correlated with better adjustment among international students.

Maddux and Meier (1995) noted that self-efficacy beliefs influenced students' goal setting. They pointed out that international students who have strong beliefs about their academic ability and competency tended to set higher academic goals and strive for a better adaptation to reach the goals. Poyrazli and colleagues (2002) found the same results: "High self-efficacy likely helps international students feel that they have the ability and competence to deal with academic situations and problems" (p. 640). Xu (1991) reported that international graduate students "who believed that their English was adequate encountered less academic difficulties than those who believed it to be inadequate" (p. 567).

Academic Climate

Tinto (1997) indicated that the academic climate in higher educational institutions had influences on students' learning, persistence, and completion. He found the academic climate was correlated to student academic outcomes. Academic climate includes critical mass and academic sub-environment.

Critical mass

Hagedorn, Chi, Cepeda, and McLain's study (2007) used the term "critical mass" to describe "a level of representation that brings comfort or familiarity within the educational environment" (p. 74). Johnson-Newman and Exum (1998) and Laden and Hagedorn (2000) indicated that the lack of a critical mass caused feelings of loneliness, isolation and discrimination among under-represented student groups. In contrast, minority students felt supported and comfortable in the environment with a critical mass (Etzkowitz, Kemelgor, Neuschatz, Uzzi, & Alonzo, 1994).

Although Hagedorn and her colleagues (2007) studied Hispanic students at community colleges, and Fleming's study (1984) was about African Americans, the findings of these studies pointed out the importance of critical mass. Those studies suggested that the critical mass may increase minority students' academic performance and influence their ability and desire to persist in higher education.

Nevarez (2001) suggested that increasing the numbers of minority students and minority faculty members was one of the best ways to help minority students' academic success. Hagedorn and her colleagues' study (2007) concurred. The authors found that critical mass at both the level of minority students and the level of minority faculty had a positive relationship with minority students' success. They concluded that the numbers of minority students and faculty on campus increased a critical mass and academic success (Hagedorn et al., 2007). The crisis mass may have the similar influences on international students.

Academic sub-environment

Pike and Killian (2001) stated that the academic sub-environment was related to student learning. Astin (1993) analyzed longitudinal data from the *Cooperative Institutional Research Program*. He found that majoring in the sciences was positively related to gains in critical thinking and problem-solving, but majoring in the arts was negatively related to gains in critical thinking. In addition, doctoral student research cultures between non-science and science fields were compared. In laboratory-based science subjects, doctoral students were often attached to research teams that included post-doctoral researchers and members of the research staff. The dissertation topic and often its funding were normally derived from a team-based project (Delamont, Parry, & Atkinson, 1997). However, in social science fields, students usually chose their own topics and were rarely attached to a research team. Funding for full-time students was not usually tied to the research grants held by supervisors (Collinson & Hockey, 1997). "The

majority of academics . . . were more likely to see the process of achieving a doctorate in terms of the doctor and becoming a member of a disciplinary culture, one of whose distinguishing characteristics was its individualism” (Becher, Henkel, & Kogan, 1994, p. 55). Hence, students in different academic fields, even in the same institution, experience different sub-environments which may affect their academic achievement.

Demographics

The relationship between academic performance and gender has been studied. Scanlon (1990) found a positive correlation between international students’ academic performance measured by GPA and gender—female students achieved better grades than males. Other studies, however, found that female students had greater problems than male students (Gordon & Wyant, 1994; Phongsuwan, 1996). But the authors pointed out that women may be more likely to express their feelings about problems and concerns than men do. However, Park, Hayes, and Foster (1994) reported that they did not find a significant difference between female students and male students’ academic performance.

Ganz and Ganz (1988) found that age was a significant predictor of international students’ academic success—the older the student, the better the grades. Naidoo (1990) also discovered that students below 30 years of age had more academic problems than those more than 30 years old. On the contrary, Roongrattanakool (1998) reported that older students faced more problems than younger students. Saisuphaluck (1997) indicated that age was not related to international students’ academic success.

Length of time stay in the United States was another demographic factor studied. Ali (1991) and Phongsuwan (1996) revealed that international students who spent less time in the United States experienced more academic problems than those who had stayed longer.

Multi-Dimensional Factors

Kuncel, Hezlett, and Ones (2001) pointed out that graduate school performance was multidimensional. Although the TOEFL and GRE were critical elements of international graduate students' academic success, additional variables, such as motivation and attitudes, previous knowledge of a field of study, previous academic performance, faculty's evaluations, and students' perceptions of their own success, were also important contributors to international students' academic success (Light et al., 1987; Nelson et al., 2004). In addition, Abel (2002) indicated that time management, classroom dynamics, and social and educational assistance were additional factors of academic success.

House's study (2000) indicated that students' self-beliefs, achievement expectancies, and academic background were significantly correlated with students' academic performance measured by their GPA. He found that the combination of academic background, self-belief and achievement expectancies explained a significant proportion of the variance in their first-year GPA in college.

Factors Associated with Choice of Academic Majors

Porter and Umbach (2006) showed that studies on the choice of academic majors have emphasized academic preparation, academic climate, value systems, social and cultural influences, and demographic attributes of students and how they affect choice of college majors. Studies also discussed the impact of combination of factors.

Academic Preparation

Students entered specific academic majors in post-secondary education because they had the necessary academic preparation (Simpson, 2001). Gamoran (1987) suggested that a student's coursework track and academic achievement, as measured by standardized test scores, can be

used to reflect academic preparation. In other words, the higher the coursework track and the standardized test scores, the better a student's academic preparation.

Research also indicated that academic preparation impacted students' choice of academic majors. Simpson (2001) noted that the more math preparation a student receives in high school, the more likely this student chooses a technical-related major. Lackland and De Lisi (2001) also pointed out that student selection of courses and majors was based on their previous academic performance and expectancies.

Social and Cultural Influences

Singaravelu's research (1999) revealed that influences of family, school counselors, and friends were related to career/major choice. Turner and Bowen's study (1999) concurred that parental and social expectations was one of the factors that influence students' preferences of choices.

Zea, Jarama and Bianchi (1995) found the social support that a student receives from his family affects the student's academic choice and performance. Parental aspirations for children's education significantly impacted their educational attitude and college plans. Simpson (2001) indicated that parental ties and involvement not only affected children's educational attainment and achievement, but also affected their selection of academic majors. Chao (1996) stated that Asian American parents place considerable value on education, and closely monitor their children's study.

In addition, Shih, Pittinsky, and Ambady (1999) indicated that the influence of socio-cultural stereotypes on individual performance was powerful. Song and Glick (2004) pointed out that Asian students' academic choices were influenced by their family, cultures, and traditions. Therefore, these students were more likely to choose typical Asian college majors, such as science-related and technology-related majors (Tang, Fouad, & Smith, 1999). Song and Glick

(2004) also found that Asian women were more likely to choose nontraditional female majors and careers than their female counterparts.

Gender Stereotype

Several studies (e.g., Turner & Bowen, 1999) noted that gender role identification stereotypes influence students' choice of college majors. Snyder and Hoffman (2000) pointed out that education and nursing majors were dominated by female students, while engineering and science majors were over-represented by males. In addition, Turner and Bowen (1999) found that academic ability measured by SAT (Standard Aptitude Test) scores did not explain the different choice of majors among male and female students. Lackland and De Lisi (2001) explained that English, education, and nursing majors were dominated by women because of their traditional female roles; and they showed that traditional male roles promoted men's choice of majors in mathematics, engineering, and natural sciences.

Previous studies have shown that gender-role socialization (e.g., nurturing and involvement with people) and family responsibility (e.g., pregnancies and child rearing) were the main reasons for women's educational and career choices in the social sciences and humanities (Jacobs, 1995). Hackett, Esposito, and O'Halloran (1989) indicated that the mother's role model was positively related to the nontraditional major choice of their daughters, that is, female students whose mothers work in nontraditional fields were more likely to choose nontraditional majors than those whose mothers are in traditional fields.

Academic Climate

Kanter (1993) found that women tended to study in the fields that enroll a large number of females rather than studying in fields with few women. Sandler and Hall (1986) explained that a "chilly climate" resulted from an under-representation of women in natural sciences and engineering majors. The small proportion of female students in the classes caused discomfort and

a feeling of lack of support in the learning environment. Thus, Porter and Umbach (2006) concluded that the “chilly climate” affects students’ choices of academic fields.

Etzkowitz and colleagues (1994) studied academic culture for women in the fields of sciences. They defined “critical mass” as “the discrete point at which the presence of a sufficient number bring about qualitative improvement in conditions and accelerates the dynamics of change” (p. 51). They indicated that academic culture change was “a threshold effect of critical mass” (p. 51). They found that the modest increases of female faculty members change departmental culture, and this change influences the academic performance and choices of female graduate students who usually see female faculty as their role models.

Value Systems

Lackland and De Lisi (2001) used the expectancy-value model (Wigfield & Eccles, 2000) to predict college students’ choice of academic majors. They found that student’s value systems were significant predictors of choice of academic majors. For example, they found that selection of a helping profession major was associated with a humanitarian concern, but selection of a science major was not associated with that kind of concern. However, the utility value was highly ranked among science majors, especially in male students. The study also indicated that students selected courses of study based on their value systems, and in turn the experience in the selected courses tended to affect their value systems.

Multi-Dimensional Factors

Lackland and De Lisi (2001) indicated that institutional factors and academic ability play a role in the selection of academic majors, but other factors also impact students’ choice of majors. Turner and Bowen (1999) found that difference in the academic preparation—especially pre-college level mathematics performance—was one of the main factors that influence academic choices among women and men. They asserted that men tend to take more advanced math

courses in high school than their female counterparts, and then they may exceed women in math skills at colleges. College students' choice of majors was found strongly influenced by their interest in the subject, the availability of jobs, and the potential earnings related to the major (Kim, Markham, & Cangelosi, 2002; Malgwi et al., 2005). However, studies found some differences among genders. Malgwi and colleagues (2005) also indicated that women were strongly influenced by their beliefs, while men were more influenced by expectations.

Eccles, Adler, and Meece (1984) also found that females tend to have lower estimates of their abilities, performance, and expectations for future success than males in specific tasks. Women expected to do less well than men on "male-typed" academic tasks (e.g., mathematics and sciences), but do better on "female-typed" tasks (e.g., English) (Eccles, Adler, & Meece, 1984). The authors also pointed out that individual differences on subjective task values were influenced by social stereotypes, parents, teachers, and peers. Due to the different socialization experiences, Eccles and her colleagues (1984) explained that gender differences in academic choice and achievement are from gender differences in the subjective value attached to various achievement activities.

Expectancy-Value Theory

Wigfield and Eccles's (2000) expectancy-value theory of achievement motivation was developed on Eccles-Parsons and her colleagues' (1983) expectancy-value model of achievement performance and choice. This theory was originally developed to understand elementary and secondary school students' performance and choice of academic activities.

In the expectancy-value model (Figure 2–1), student's academic-related choices are influenced by subjective task values and expectation of success. Wigfield and Eccles (2000) proposed three major components of subjective values: attainment value, intrinsic value, and utility value. Eccles-Parsons and her colleagues (1983) defined these values individually: (1)

attainment value was the importance of doing well on a given task; (2) intrinsic value was the enjoyment one gains from doing the task; and (3) utility value or usefulness referred to how a task fits into an individual's future plans.

Expectation of success was defined by Eccles-Parsons and her colleagues (1983) as people's beliefs about how well they will do on upcoming tasks, either in the immediate or longer term future. Both values and expectations are directly influenced by individual's goals and beliefs according to the model.

Achievement goals were defined as the broad purposes people have for learning or doing different activities (Eccles-Parsons et al., 1983). It includes short-term and long-term goals. Short-term goals may be a choice of a certain course or gain a higher grade in the course. Long-term goals include career plans and goals.

Ability beliefs were defined as the individual's perception of his current competence at a given activity (Wigfield & Eccles, 2000). A conceptual distinguish between expectation of success and ability beliefs was made by Wigfield and Eccles (2000): expectation of success focuses on the future, but ability beliefs focuses on present ability. They also pointed out that this distinguish was also discussed by Bandura (1997) who used terms "self-efficacy" and "outcome expectancies" for "ability beliefs" and "expectation of success", respectively. Self-efficacy was defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Bandura (1997) defined outcome expectancies as the belief that a given action will lead to a given outcomes.

Although the construct of goals and beliefs influence subjective values and expectation of success, it is also influenced by individual's interpretations of experience and perception of socializer's beliefs, expectations, and attitudes. The construct of individual's interpretations of

experience is influenced by the construct of individual's perception, previous achievement-related experience, differential aptitudes, socializer's beliefs and behaviors, and cultural milieu. The construct of cultural milieu which includes gender role and cultural stereotypes influences the constructs of individual's perception of socialization influences, individual's interpretations of experience, and socializer's beliefs and behaviors. The constructs of socializer's beliefs and behaviors and previous achievement-related experiences are influenced by the concepts of differential aptitudes.

Summary

International graduate students have comprised a substantial component of student population in American graduate schools. However, factors associated with international graduate students' choice of academic majors and academic performance are complex. Due to their dual status as graduate students who come from other countries, international graduate students may face common problems that both American graduate students and international undergraduate students confront. The literature showed that the dropout rate of American graduate students was high because these students were not satisfied with graduate life, they played multiple roles, and they experienced double loads from academic study and personal life. International students encountered a language barrier, inappropriate academic advisement, a different educational system, an unfamiliar collegial atmosphere, different teaching and learning methods, and culture adaptation problems. Previous studies found that language proficiency, learning and study strategies, academic climate, and social influences were the major factors influencing international student academic performance. Social and cultural influences, academic preparation, academic climate, value systems, and gender stereotype were the important factors associated with American student academic performance and choices. No research has been found on factors associated with academic performance and choice of academic majors,

specifically among international graduate students. The present study bridges the gap. The expectancy-value theory of achievement motivation (Wigfield & Eccles, 2000) is also reviewed in this chapter.

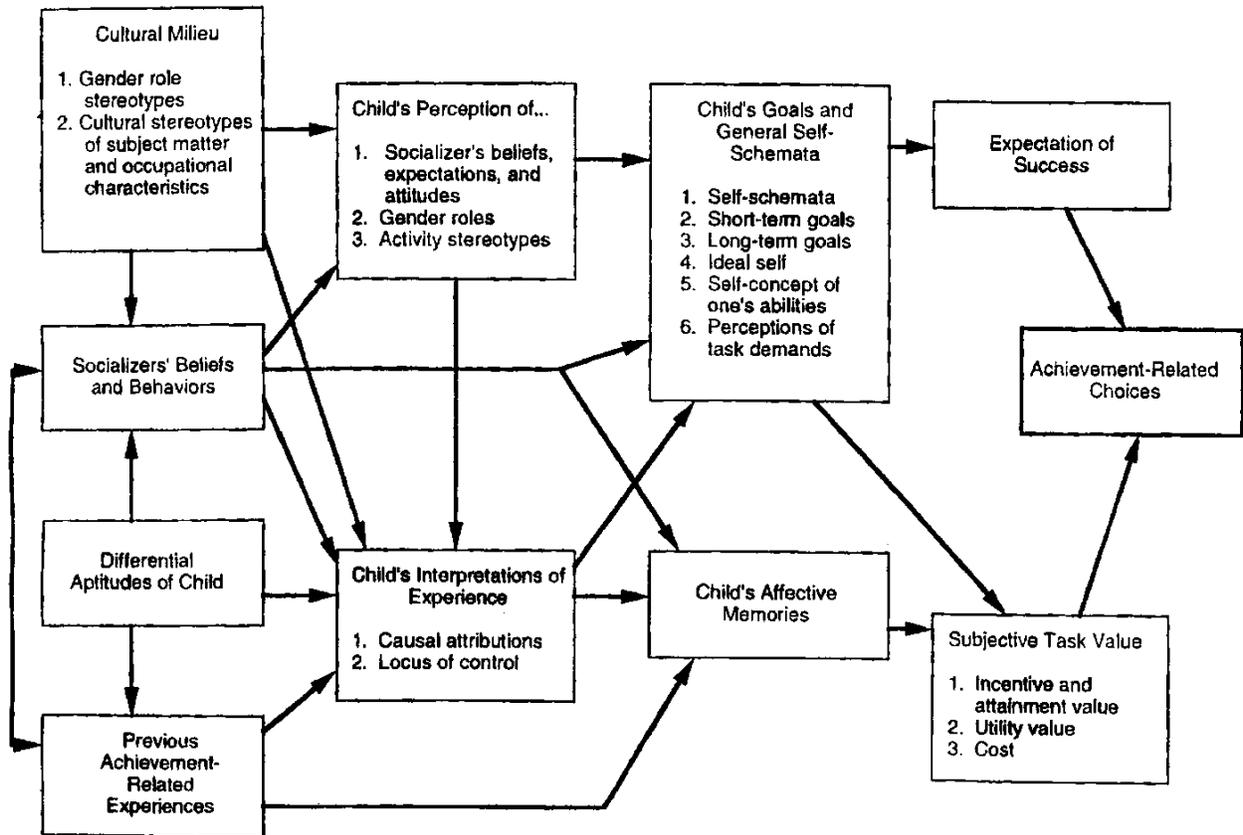


Figure 2–1. Wigfield and Eccles’s expectancy-value model of achievement motivation¹.

¹ Reprinted from *Contemporary Educational Psychology*, 25, Wigfield, A., & Eccles, J. S., Expectancy-value theory of achievement motivation, 68-81, 2000, with permission from Elsevier.

CHAPTER 3 RESEARCH METHODOLOGY

Introduction

This chapter includes research questions, research design, and a description of the research methodology. The research methodology includes the research setting, sampling procedure and participants, conceptual framework, description of relevant variables, instrumentation, and procedures for data collection and analysis. This chapter concludes with a summary.

Research Questions

The six research questions of this study are:

1. What factors are associated with the choice of academic majors among international graduate students?
2. What reasons for choosing academic majors are reported by international graduate students?
3. What factors are associated with international graduate students' academic performance?
4. Do learning and teaching methods differ between the United States and international students' home countries?
5. What learning and teaching methods in the United States and the home country are reported by international graduate students?
6. What learning and study strategies are reported by international graduate students?

Research Design

The study included a questionnaire plus follow-up focus group interviews. This questionnaire collected the primary data to investigate factors associated with international graduate students' choice of academic majors and academic performance, differences in teaching and learning methods in the home country and the United States, and learning and study strategies used in the United States. The follow-up focus group interviews were used to support and enhance knowledge in the areas covered by the questionnaire.

The Setting

This study was conducted at a public, comprehensive, land-grant, research university in southeastern United States. The university consists of 16 colleges, more than 100 undergraduate majors, almost 200 graduate programs, and more than 4,000 faculty members.

The university enrolls approximately 50,000 students annually, including approximately 3,000 international students from more than 100 countries/areas. The graduate student is about 18% of the total enrollment at the university; approximately 2,100 international students are in graduate programs.

Participants

Questionnaire Survey

The targeted population is international students who enrolled in graduate programs at a southeastern four-year public university in Spring 2006. The Web-based survey was sent to an email list of 2,112 international graduate students in Spring 2006. An email list of Spring 2005 enrolled international graduate students was received from the university's Office of Institutional Research. Approximately 600 emails were not in service. Finally, 505 responses were received after the original survey email and two follow-up emails were sent. The response rate was 33.5%.

One hundred and thirty-six (27%) participants were master's students and 369 (73%) were in doctoral programs. Three hundred and six (60%) participants were male. The age of the participants ranged from 21 to 46 ($M = 27.9$). Four hundred and sixty-nine (93%) participants self-reported that English was not their first language. The length of time that participants have been in the United States varied. The majority of the participants (57.9%) have stayed in the United States between 1 and 5 years.

The participants reported being from 72 countries/areas. Students who resided in most frequently cited countries/areas included India, China, South Korea, Taiwan, and Turkey. The countries/areas were subsequently divided into eight regions: Africa, Central and South America, North America, Central and South Asia, East and Southeast Asia, Middle East, Europe, and Oceania. The majority of the participants were from East and Southeast Asia, followed by Central and South Asia. This distribution represents the total distribution of international graduate student population on campus.

The majority of the participants were majoring in the natural sciences, social sciences, engineering, health sciences, education, agriculture, business, and humanities and arts. The academic majors were divided into four categories: hard/pure, hard/applied, soft/pure, and soft/applied (Biglan, 1973a, 1973b). The hard/pure category includes disciplines in the natural sciences; the hard/applied category includes disciplines in agriculture and forestry, engineering, and health sciences; the soft/pure category includes disciplines in the humanities and arts and social sciences; the soft/applied category includes disciplines in architecture and design, business, communications and journalism, education, law, and public affairs. Table 3–1 demonstrates academic majors' distribution by participants' native regions. Most of the participants majored in the hard/applied category, and they were from East and Southeast Asia.

Focus Group Interview

The convenience sampling method was used in focus group interviews. Participants were self-selected volunteers who responded to the focus group interview invitation email. This email was sent to the email list that the questionnaire survey email was sent to.

Sixteen participants (5 males and 11 females) were interviewed in three focus groups. Four were in master's programs and 12 were studying in doctoral programs. The participants were between 25 and 37 years old ($M = 29.75$). All 16 participants reported that English was not their

first language. The length of time the participants stayed in the United States varied. The majority of the participants (68.75%) have stayed in the United States between 1 and 5 years.

The participants of focus group interviews were from 10 countries/areas, 5 regions. The majority of the participants were from East and Southeast Asia, and no participant came from regions of Africa, North America, and Oceania.

The participants reported 14 majors. According to Biglan's classification of academic disciplines (Biglan, 1973a, 1973b), Table 3–2 demonstrates the participants' academic majors' distribution by participants' native regions. The focus group participants represented the questionnaire participants. Most of the focus group participants were also majored in the hard/applied category and they were from East and Southeast Asia.

Conceptual Framework

The conceptual framework of this study was adapted from Wigfield and Eccles's (2000) Expectancy-Value model of achievement motivation (Figure 2–1) based on the nature of international students. The conceptual framework includes eleven constructs: demographics, English language proficiency, family influence, welcome of international students, educational and work experiences, English language ability belief, learning and study strategies, expectation of success, subjective values, choice of academic majors, and academic performance. Figure 3–1 is the conceptual model which demonstrates the relationship among the 11 constructs.

Two constructs on the right of the model—academic performance and choice of academic majors—are influenced by international graduate students' expectation of success and their subjective values. The definitions of expectation of success and subjective values were adopted for this study. Expectation of success was defined by Eccles-Parsons and her colleagues (1983) as an individual's beliefs about how well he will do on upcoming tasks, either in the immediate or long-term future. Wigfield and Eccles (2000) proposed three major components of subjective

values: attainment value, intrinsic value, and utility value. Attainment value refers to the importance of doing well on a given task. Intrinsic value refers to the enjoyment one gains from doing the task. Utility value or usefulness refers to how a task fits into an individual's future plans (Eccles-Parsons et al., 1983).

English language ability belief impacts expectation of success and learning and study strategies, and learning and study strategies impact subjective values of international graduate students. A conceptual distinction between expectation of success and ability belief was made by Wigfield and Eccles (2000)—expectation of success focuses on the future, but ability belief focuses on present ability. That is to say, ability belief is an individual's judgment of his current capabilities, but expectation of success is about a person's expectation of outcomes in the future.

The left side of this model demonstrates that English language ability belief and learning and study strategies are influenced by five constructs: demographics, English language proficiency, family influence, welcome of international students, and educational and work experiences. These terms were defined in Chapter 1.

Operational Definition of Variables

This study has two dependent variables: choice of academic majors and academic performance. Gender, age, native region, graduate level, length of time in U.S., English language proficiency, continuity of academic majors, undergraduate GPA, relevance of academic background, relevance of previous work experience, welcome of international students, family influence, English language ability belief, expectation of success, academic interest, major's academic rank, professor's prestige, job opportunities, major learning method, length of weekly study time, studying alone, studying with home country students, and studying with other country students were independent variables. Tables 3–3 and 3–4 demonstrate dependent and independent variables, description, measures, and question numbers.

Dependent Variables

Choice of academic majors means a student's concentration in a selected academic area. It was measured by self-reported current academic majors in Survey Question 15.

Academic performance is the student's self-report of learning accomplishment in the selected study area. This variable was measured by a continuous ordinal scale of self-reported current GPA in the Survey Question 7.

Independent Variables

The construct of demographics includes gender, age, native region, graduate level, and length of time in the United States. Gender and graduate level were measured by nominal scales in Survey Question 9 (male or female) and Survey Question 13 (master or doctoral), respectively. Age and native country/area were self-reported in Survey Questions 10 and 11, respectively. Length of time stay in the United States was measured by a continuous ordinal scale in Survey Question 16.

English language proficiency is a non-English speaker's competency level of English language skills. Since a minimum TOEFL (Test of English as a Foreign Language) score was required by the university's Office of Admissions as acceptable English language proficiency in academic study, this variable was not measured by TOEFL scores. It was measured by a continuous ordinal scale (0%, 1%–20%, 21%–50%, and 51%–100%) in Survey Question 5—students' self-reported proportion of time they use their native language in academic-related activities.

The construct of educational and work experiences includes a student's undergraduate GPA, continuity of academic majors, relevance of academic background and relevance of work experience. Undergraduate GPA was measured by a continuous ordinal scale (Survey Question 7). Undergraduate and graduate majors were self-reported in Survey Questions 14 and 15. If a

student's undergraduate and current graduate majors were in the same category, according to the Biglan classification scheme—hard/pure, hard/applied, soft/pure, and soft/applied, the student continued his academic major. Three-level scales (“no,” “not sure,” or “yes”) were used to measure the relevance of students' previous academic background and work experiences in Survey Question 8.

Family influence means the impact of family members' opinion or values on a student's decision. Welcome of international students means the quality and state of welcome and acceptance that an international student experiences and feels. English language ability belief is a student's perception of his current competence in English language skills. Expectation of success is a student's beliefs about how well he will do on academic performance. These were measured by three-level scales (“no,” “not sure,” or “yes”) in Survey Question 8.

The construct of learning and study strategies includes the major learning method, the length of weekly study time, and study styles that a student uses to facilitate learning process. The major learning method was measured by a nominal scale (reading, listening, or discussion) in Survey Question 2. The length of weekly study time was measured by a continuous ordinal scale (from less than 10 hours to more than 71 hours) in Survey Question 4. The proportion of time using three study styles (studying alone, studying with students from the home country, and studying with students from other countries) was measured by continuous ordinal scales (0%, 1%–20%, 21%–50%, and 51%–100%) in Survey Question 6.

The construct of subjective values includes a student's academic interest, major's academic rank, professor's prestige, and job opportunities. These were measured by three-level scales (“no,” “not sure,” or “yes”) in Survey Question 8.

Instrumentation

This study used a researcher-developed questionnaire that was based on the literature and findings of numerous previous studies. This instrument was used to collect the primary data in the study. A follow-up focus group interview protocol was then developed based on the responses of the questionnaire to confirm and support the survey findings.

Questionnaire Survey

The questionnaire survey was conducted online. It included four pages (Appendix A). The first page was the informed consent approved by the university's Institutional Review Board (IRB). It briefly described the purpose of the survey, the time needed for answering the survey, confidential and voluntary policy, and contact information. At the bottom of the page, the participants had an opportunity to decide whether or not to participate in the survey. If they did not agree to participate, they jumped directly to the last page ("thank you" page) and then left the survey Web page. If they chose to participate, the survey started on the second page. Pages 2 and 3 were the survey questions. Nominal, ordinal, and interval scales were used in the questionnaire. The last page was the "thank you" page which showed participation was appreciated.

Expert panel review

An expert panel was used to ensure that the content of this instrument sufficiently addressed international graduate students' choice of academic majors, factors associated with their academic performance, and teaching and learning methods. Five experts, including three faculty members and two graduate students, were invited to review the survey protocol. These experts had research experiences and relevant knowledge in the fields of educational research methodology, student development, or higher education administration. They reviewed and commented on the survey construction, operationalization, wording, format, and question flow, and they provided revision suggestions. Based on the expert panel's comments, the researcher

added and deleted questions to make sure that all constructs were covered, and changed some scales to ensure that the items were measured appropriately.

Pilot test

The purpose of the pilot test was to determine that the participant was able to complete the survey and understand the questions (Creswell, 2005). The pilot test was conducted one semester prior to the delivery of the survey so the researcher had enough time to revise the survey. The researcher used the convenience sampling method (using friends and peers who meet the criteria) and the snowball sampling method (asking participants to refer the researcher to other potentially willing and available participants) to select 23 international graduate students at the institution.

The researcher sent the survey as a Microsoft Word document attachment via emails. The cover letter and informed consent were in the content of the email. The purpose of this pilot test and confidentiality were stated in the cover letter. The informed consent indicated that only those who agreed to participate in the pilot test should open and answer the questionnaire. The participants in the pilot test were asked to complete the survey and make comments on the questionnaire's content, design, clarity, wording, and format at the end of the survey. Then the completed surveys were emailed back to the researcher.

This pretest served to identify any incorrect or misleading survey items and additional problems for research that were not present in the literature (Borg & Gall, 1989). After collecting the participants' comments and feedback, the researcher revised some item scales from nominal scales to interval scales, reorganized some question flows, and clarified question wording.

Focus Group Interview

The focus group interview was “a research technique that collects data through group interaction on a topic determined by the researcher” (Morgan, 1996, p. 130). The instrument of the focus group interview included an informed consent and a protocol approved by the

university's IRB (Appendix B). The informed consent briefly described the purpose of the study, time length of the interview, confidentiality, and contact information. The protocol included demographic status questions and seven open-ended questions about participants' educational experience, academic motivation, and learning and study strategies.

Expert panel review

An expert panel was used to ensure that the content of this instrument sufficiently investigated international graduate students' educational experience, reasons for the choice of academic majors, and learning and study strategies based on the questionnaire responses. Four experts, including two faculty members and two doctoral students, reviewed the focus group interview survey questions, wording, format, and question flow. These faculty members and graduate students had research interests, experience, and relevant knowledge in the fields of educational research methodology, internationalizing education, student affairs, or higher education administration. The expert panel reviewed content of the survey, and helped the researcher revise the focus group interview protocol before the pilot test was conducted.

Pilot test

The focus group interview pilot test was conducted one semester after the questionnaire data were collected. The interview protocol was developed based on the responses of the Web survey. The purpose of the pilot test was to determine that the participant is able to understand and answer the questions in the focus group interview (Creswell, 2005).

One focus group interview was conducted as a pilot test. The researcher used the convenience sampling method to select six international graduate students to participate in the pilot test. The participants received an email including the purpose of the pilot study, the focus group interview meeting place and time, and a brief introduction of the procedure. After the six

international graduate students gathered, they had a socialization time to get to know each other, signed the informed consent forms, agreed to be audio-taped, and then answered the questions.

Comments and feedback on the question content, clarity, wording, and organization were then discussed. This pretest served to identify any confusing or unclear questions, potential problems with the data collection procedure, plus other additional areas of concern (Borg & Gall, 1989). Based on the participants' feedback, the protocol added some demographic questions for further data analysis, and some questions were re-worded for the purpose of clarification.

Data Collection

The study's data were collected from an online questionnaire survey and three follow-up focus group interviews. All data consisted of the participants' self-reported responses.

Questionnaire Survey

The questionnaire survey was conducted online in Spring 2006. After the researcher designed the survey on an online survey provider—www.surveymonkey.com—a survey link was created by the online survey provider. The online survey was accessible through this link on any computer with Internet access.

Three emails were sent to the international graduate student email list received from the university's Office of Institutional Research. The initial email consisted of the introduction of the researcher, the purpose and instruction of the survey, confidential and anonymous policy, time consumption, the link to the questionnaire, and the response deadline. A follow-up email was sent one week after the initial email was sent. It included a short letter of encouragement, the survey link, the guaranteed level of confidentiality, and the last date for answering the survey. Another reminder email, which included a letter of encouragement and appreciation, the survey link, and the responding deadline, was sent three days before the last day for answering the survey. All three emails were sent to all participants because the survey was completely

anonymous, and the researcher could not track which participants did not answer the survey. After sending the three emails, 505 responses were collected resulting in a response rate of 33.5%, which was slightly higher than the expected 25% to 30% response rate for Web surveys (Kittleston, 1997).

Focus Group Interview

Three follow-up focus group interviews were conducted in Fall 2006, one semester after the questionnaire survey data were collected. The participants were self-selected by responding to the researcher's invitation email. The invitation email was sent to the email list that the questionnaire survey was sent to. The invitation email included the link to the summary of the questionnaire results, the purpose and the introduction of focus group interviews, confidentiality statement, and three interview time periods. The voluntary participants were asked to select one of the three time slots that fit their schedules. Each group consisted of five to six participants according to the participant's choice of time. A reminder email was sent two days ahead of each focus group interview. The interview time and location and a brief introduction of the focus group interview procedure were included in the reminder emails.

Before the focus group interview started, the researcher arranged a socialization time to allow the group members to get to know each other, to become relaxed in preparation for the focus group interview, and to feel comfortable sharing their actual experiences. The purpose of the focus group interview, length of interview time, confidentiality and volunteer policy, and audio-taping process were stated on the informed consent form approved by the university's IRB. After the participants agreed to participate in the focus group interview and they signed the informed consent, they received the interview protocol. The interview protocol included eight questions on demographic status and seven open-ended questions on educational experience, academic motivation, and learning and study strategies. Participants were asked to respond to

eight demographic questions in writing before the following seven questions were answered orally.

For the purpose of anonymity, each participant wrote a researcher-assigned number on the demographic answer sheet instead of his name, and then recorded his assigned number when answering the open-ended oral questions. Hence, the researcher was able to connect the demographic answers and the open-ended answers. During the interviews, participants were asked to respond to the seven open-ended questions in as much detail as possible. Their answers were audio-taped and transcribed afterwards by a transcriptionist. Each focus group interview lasted approximately one hour.

The three focus groups had the same protocol and procedure. Two moderators were present during the focus group interviews. The researcher's role was to "keep the discussion on the topic while encouraging the group to interact freely" (Morgan, 2002, p. 146). A co-researcher attended and co-facilitated all three focus group interviews, observing and assisting during the entire procedure. During the interviews, the co-researcher maintained balance between moderation and participation, assisted the researcher's language expression (because English was not the researcher's native language), asked prompt follow-up questions, clarified the research questions and statements for participants (because the co-researcher had experience working with multi-cultural people), and took notes. After each interview, the two researchers debriefed and summarized their notes.

Data Analysis

Statistical Analysis

After the data were collected through the online survey provider, the researcher exported the data into the Statistical Package for the Social Sciences (SPSS) software program, which was

used to analyze the data to answer Research Questions 1, 3, and 4. For all tests, the *a priori* alpha was .05.

Research Question 1 asked: “What factors are associated with choice of academic majors among international graduate students?” A multivariate analysis of variance (MANOVA) was performed to investigate international graduate students’ factors associated with the choice of academic majors. The dependent variable was international graduate students’ current academic majors, which were quantified using the Biglan classification scheme: hard/pure, hard/applied, soft/pure, and soft/applied. The independent variables were gender, native regions, age, graduate level, English language proficiency, welcome of international students, family influence, continuity of academic majors, relevance of academic background, relevance of work experience, English language ability belief, expectation of success, academic interest, major’s academic rank, professor’s prestige, and job opportunities. The Tukey test was used as the post hoc test.

Research Question 3 asked: “What factors are associated with international graduate students’ academic performance?” A standard multiple regression analysis was performed to investigate the factors associated with international graduate students’ academic performance. The dependent variable was international graduate students’ academic performance measured by their self-reported current GPA. The independent variables were gender, age, native regions, length of time stay in the United States, English language proficiency, continuity of academic majors, undergraduate GPA, proportion of time of studying alone, proportion of time of studying with students from home country, proportion of time of studying with students from other countries, length of weekly study time, welcome of international students, family influence, English language ability belief, expectation of success, and academic interest. Graduate level

was first served as the interaction factor, so the researcher examined whether or not a difference of academic performance occurred when graduate level was interacted. A multiple regression model was reported to determine how many and which independent variables were associated with the dependent variable—international graduate students’ academic performance measured by their current GPA.

Research Question 4 asked: “Do learning and teaching methods differ between the United States and international students’ home countries?” Five non-parametric tests were performed to compare three learning methods (reading, listening, and discussion), and two teaching methods (lecture and seminar) in the United States and their home countries. McNemar’s Chi-square test was conducted based on the dichotomous nature of the variables. The researcher reported whether or not significant differences were found between the United States and the home country in three learning methods and two teaching methods. Means were compared as significant differences were found.

Domain Analysis

In this study, the follow-up focus group interview data were analyzed to answer Research Questions 2, 5, and 6. Domain analysis was used to analyze these data.

The focus group interviews were audio-taped and were transcribed into Microsoft Word documents. Each transcription consisted of an introduction and the main protocol content. The introduction listed the interview date and location, the research topic, and demographic information of participants in the focus group. The main protocol content included the detailed records of the interaction between the researchers and participants. Each line was numbered individually with two-inch margins on the left side for coding. Open coding was used after data were transcribed. Flick (2006) stated, “Open coding aims at expressing data and phenomena in the form of concepts” (p. 297). The concepts were known as “codes” (Flick, 2006).

After transcripts were coded, the researchers started to do domain analysis. A domain was defined as the “symbolic category that includes other categories” (Spradley, 1980, p. 100).

Spradley (1980) listed nine possible semantic relationships for domain analysis: strict inclusion (X is a kind of Y); spatial (X is a place in Y, X is a part of Y); cause-effect (X is a result of Y, X is a cause of Y); rationale (X is a reason for doing Y); location for action (X is a place for doing Y); function (X is used for Y); means-end (X is a way to do Y); sequence (X is a step or stage in Y); and attribution (X is an attribute, or characteristic, of Y).

The first step of domain analysis was the researcher selecting a semantic relationship. The second step was the researcher filling out a domain analysis worksheet by the selected semantic relationship, a statement of the form in which it is expressed, an example sentence that has a cover term (Y), an included terms (X) that fit the selected semantic relationship, and their locations on the transcripts. The third step was the researcher formulating questions about the relationship to check if the terms and the semantic relationship identified were correct. The repeat process was conducted for different semantic relationships. The fourth step was the researcher listing all domains discovered, the relationships in these domains, and the structural questions that followed the researcher’s analysis on Microsoft Excel sheets. The research findings were based on the information from the domain analysis worksheet.

Summary

This study was conducted in a large southeastern public university. Six research questions are stated in this chapter. The research design included a web-survey and follow-up focus group interviews. Five hundred and five international graduate students participated in the Web survey, and 16 participants were recruited in three focus group interviews. The distributions of the participants’ academic major by native region in the Web survey and the focus group interview are demonstrated in Tables 3–1 and 3–2, respectively. The study’s conceptual framework,

dependent variables, and independent variables are illustrated in Figure 3–1, Table 3–3, and Table 3–4, respectively. The instruments, data collection procedures, and data analysis methods of the Web survey and the focus group interviews are described in this chapter. The findings and results of this study are reported in Chapter 4.

Table 3–1. Questionnaire participants’ academic major distribution by native region

Native region	Hard/pure	Hard/applied	Soft/pure	Soft/applied
Africa	7	5	5	3
Central and South America	9	20	5	14
North America	0	3	3	0
Central and South Asia	31	95	5	7
East and Southeast Asia	54	102	24	33
Middle East	5	14	3	7
Europe	12	17	9	10
Oceania	2	1	0	0

Participants from North America were Canadian, and those from Oceania were Australian and New Zealanders.

Table 3–2. Focus group participants’ academic major distribution by native region

Native region	Hard/pure	Hard/applied	Soft/pure	Soft/applied
Central and South America	0	1	0	0
Central and South Asia	0	1	0	0
East and Southeast Asia	1	3	1	5
Middle East	0	1	0	1
Europe	1	1	0	0

Table 3–3. Dependent variables, description, measures, and question numbers

Dependent variable	Description	Measure	Question number
Academic performance	Self-reported current GPA	5 categories of continuous ordinal scale (4.0, 3.7–3.9, 3.4–3.6, 3.0–3.3, and < 3.0)	Q7
Choice of academic majors	Self-reported current majors	4 categories using the Biglan classification scheme (hard/pure, hard/applied, soft/pure, and soft/applied)	Q15

Table 3–4. Independent variables, description, measures, and question numbers

Independent variable	Description	Measure	Question number
Gender	Self-reported gender	Nominal scale (female or male)	9
Age	Self-reported age	Self-reported age (classified as “< 30” or “≥ 30”)	10
Native region	Self-reported home country/area	Self-reported country/area (classified as 8 native regions)	11
Graduate level	Current enrolled graduate level	Nominal scale (master or doctoral)	13
Length of time in U.S.	Length of time stay in U.S.	Continuous ordinal scale (4 categories from < 1 year to > 5 years)	16
English language proficiency	Proportion of time using native language in academic activities	Continuous ordinal scale (0%, 1%–20%, 21%–50%, and 51%–100%)	5
Continuity of academic majors	Continuity of Undergraduate and current academic majors’ type	4 categories using the Biglan classification scheme (hard/pure, hard/applied, soft/pure, and soft/applied)	14, 15
Undergraduate GPA	Self-reported undergraduate GPA	5 categories of continuous ordinal scale (4.0, 3.7–3.9, 3.4–3.6, 3.0–3.3, and < 3.0)	7
Relevance of academic background	Relevance of previous academic background	A three-level scale (no, not sure, or yes)	8
Relevance of work experience	Relevance of previous work experience	A three-level scale (no, not sure, or yes)	8
Welcome of int’l students	Hospitable welcome of international students	A three-level scale (no, not sure, or yes)	8
Family influence	Impact of family member’s opinions and values	A three-level scale (no, not sure, or yes)	8
English language ability belief	Self-assessment of English language ability	A three-level scale (no, not sure, or yes)	8
Expectation of success	Expectation of academic success	A three-level scale (no, not sure, or yes)	8
Academic interest	Academic field of interest	A three-level scale (no, not sure, or yes)	8
Major’s academic rank	Academic major’s rank	A three-level scale (no, not sure, or yes)	8
Professor’s prestige	Professor’s prestige in the academic field	A three-level scale (no, not sure, or yes)	8
Job opportunities	Job opportunities upon graduation	A three-level scale (no, not sure, or yes)	8

Table 3–4. Continued

Independent variable	Description	Measure	Question number
Major learning method	Major used learning method	Nominal scale (reading, listening, or discussion)	2
Length of weekly study time	Length of time studying every week	Continuous ordinal scale (8 categories from ≤ 10 hours to > 71 hours)	4
Studying alone	Proportion of time studying alone	Continuous ordinal scale (0%, 1%–20%, 21%–50%, and 51%–100%)	6
Studying with home country students	Proportion of time studying with students from the home country	Continuous ordinal scale (0%, 1%–20%, 21%–50%, and 51%–100%)	6
Studying with other country students	Proportion of time studying with students from other countries	Continuous ordinal scale (0%, 1%–20%, 21%–50%, and 51%–100%)	6

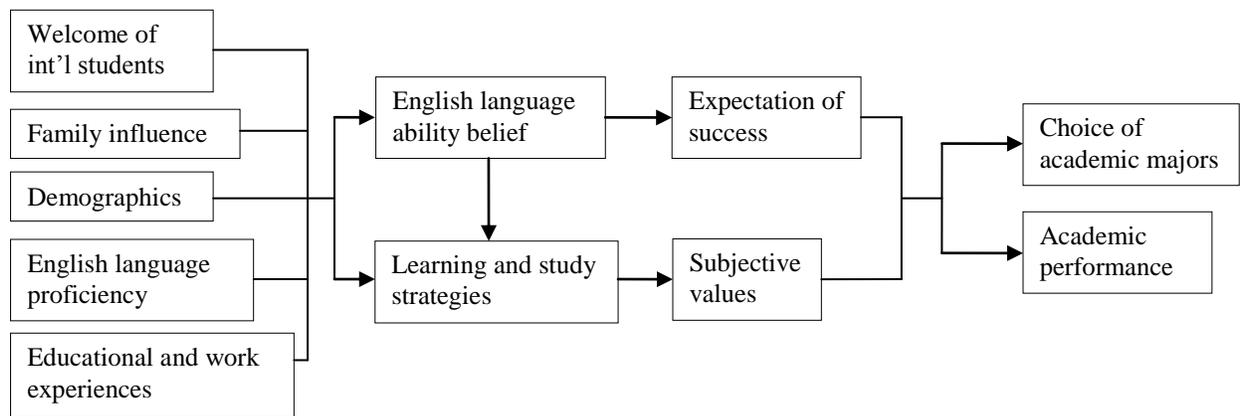


Figure 3–1. Researcher’s conceptual model of international graduate students’ choice of academic majors and academic performance.

CHAPTER 4 RESULTS

Introduction

This study investigated factors associated with international graduate students' choice of academic majors and academic performance, differences in teaching and learning methods in the home country and the United States, and learning and study strategies used while studying in the United States. A focused and original questionnaire was used to collect the primary data to answer Research Questions 1, 3, and 4. The quantitative data were analyzed by the Statistical Package for the Social Sciences (SPSS) software program. Follow-up focus group interviews were conducted to support and enhance knowledge for Research Questions 2, 5, and 6. The qualitative data were analyzed through domain analysis (Spradley, 1980). This chapter reports the findings from the descriptive statistics, as well as from the quantitative and qualitative analysis.

The results of the study were guided by the following six research questions:

1. What factors are associated with the choice of academic majors among international graduate students?
2. What reasons for choosing academic majors are reported by international graduate students?
3. What factors are associated with international graduate students' academic performance?
4. Do learning and teaching methods differ between the United States and international students' home countries?
5. What learning and teaching methods in the United States and the home country are reported by international graduate students?
6. What learning and study strategies are reported by international graduate students?

Descriptive Statistics

The length of time participants have been living in the United States was divided into six categories: from less than one year to more than five years. Table 4–1 provides the number and

proportion of participants in each category. The largest proportion of the participants (26.7%) has lived in the United States for less than one year. Table 4–2 provides mean, median, standard deviation, and range of length of time that participants lived in the United States. The median of the length of time that participants stayed in the United States was two to three years.

Participants reported the length of weekly study time, which was divided into eight categories: from less than 10 hours to more than 70 hours. Table 4–3 provides the number and proportion of participants in each category. The majority of the participants (56%) spent 21 to 50 hours on study each week. Table 4–4 provides mean, median, standard deviation, and range of length of study time that participants spent each week. The median of the length of time that participants spent on study was 31 to 40 hours per week.

The proportion of time the participants used their native languages (non-English) in academic study was reported. The proportions of time were subsequently divided into four categories: 0%, 1% to 20%, 21% to 50%, and 51% to 100%. Table 4–5 provides the number and proportion of participants in each category. Although the proportion of participants in each category was approximately 20% to 30%, the highest proportion was in the category of 1%–20%. Table 4–6 provides mean, median, standard deviation, and range of proportion of time that participants used their native languages (non-English) in academics. The median of proportion of time that participants used their native languages was 1% to 20%.

Participants reported the proportion of time they studied alone, studied with students from their home country, and studied with students from other countries. The proportion of time was divided into four categories: 0%, 1% to 20%, 21% to 50%, and 51% to 100%. Table 4–7 provides the number and proportion of participants in each category. Seventy-eight percent of the participants reported they spent more than 50% of time studying alone; 45% of the participants

reported they did not study with students from their home country; and almost 49% of the participants reported that they spent 1% to 20% of time studying with students from other countries.

Table 4–8 provides mean, median, standard deviation, and range of proportion of time that participants studied alone, studied with students from their home country, and studied with students from other countries. The median of proportion of time that participants studied alone was in the category of more than 50%, and the medians of proportion of time that participants studied with students from their home country or from other countries were 1% to 20%.

Participants reported ages from 21 to 46 years ($M = 27.9$); their ages were subsequently divided into two categories: younger than 30 years old and 30 years or older. Three hundred and fifty participants (69.3%) were younger than 30 years old, and one hundred and fifty-five participants (30.7%) were 30 years and older.

Participants reported their undergraduate and current graduate majors. If a participant reported that his undergraduate and current graduate majors were in the same category, according to the Biglan classification scheme—hard/pure, hard/applied, soft/pure, and soft/applied, he was considered as continuing the type of his academic major. Three hundred and fourteen (75.5%) participants continued the type of academic major, and one hundred and ninety-one (24.5%) participants changed the type of academic major.

Quantitative Results

The SPSS software program was used for data analysis. The *a priori* alpha for all tests was .05. Due to the fact that the proportion of students in the sample from specific countries of origin differed from the proportion on the campus, a weighting paradigm based on the country of origin was applied to correct for sampling bias.

The weighting algorithm was calculated as follows:

1. A table of the international student enrollment by original country was received from the university's Institutional Research Office website.
2. Percentages of international students from each region (eight regions) were calculated based on the table received in Step 1.
3. The product of each percentage, as derived in Step 2, and the total number of participants (n = 505) was then calculated for each region.
4. The product for each region, as derived in Step 3, was finally divided by the actual number of participants from this region. This calculated number was the weight number for this region.

The weighted data represented students from countries all over the world. Since the number of participants from North America (Canada) and Oceania (Australia and New Zealand) regions was far lower than those from other regions, data from these two regions were excluded.

Research Question One

Research Question 1 asked: "What factors are associated with the choice of academic majors among international graduate students?"

A three-level scale of "no," "not sure," and "yes" was used to measure the participants' opinions on the factors' influence on choosing their current majors. Table 4-9 provides the number and proportion of participants in each scale of each factor. The majority of the participants (53.5%) answered that the factor of family influence did not influence their choice of academic majors. The majority of the participants answered that the factor of English language ability belief, relevance of academic background, relevance of work experience, academic interest, expectation of success, professor's prestige, welcome of international students, and job opportunities influenced their academic choice.

Table 4-10 provides mean, median, standard deviation, and range of factors that impact participants' choice of academic majors in the United States. The median of the major's

academic rank and family influence were “not sure” and “no,” respectively. All other factors’ medians were in the category of “yes.”

A multivariate analysis of variance (MANOVA) was performed to investigate factors associated with international graduate students’ choice of academic majors. The dependent variables were the four categories of international graduate students’ current academic majors classified by the Biglan classification scheme: hard/pure, hard/applied, soft/pure, and soft/applied. The independent variables were gender, native regions, age, graduate level, English language proficiency, continuity of academic majors, welcome of international students, family influence, relevance of academic background, relevance of work experience, English language ability belief, expectation of success, academic interest, the major’s academic rank, professor’s prestige, and job opportunities. The Tukey test was used as the post hoc test.

The results of the MANOVA test revealed a statistically significant difference in every independent variable. Wilks’ Lambda’s F value for each independent variable is reported in Table 4–11.

When the results of the four academic major categories were considered separately, a Bonferroni adjusted alpha level of .0125 was used. Significant independent variables and corresponding F values in MANOVA tests of between-subjects effects for hard/pure, hard/applied, soft/pure, soft/applied majors are reported in Tables 4–12, 4–14, 4–16, and 4–18, respectively.

The results of the MANOVA tests of between-subjects effects revealed that native region, age, graduate level, academic interest, professor’s prestige, welcome of international students, family influence, and English language ability belief were the factors influencing international

graduate students' choice of the hard/pure academic majors. Table 4–12 provides significant independent variables and corresponding F values in the category of hard/pure academic majors.

The Tukey post hoc tests and means comparisons revealed that doctoral students and younger students (< 30 years old) were more likely to choose the hard/pure majors than their counterparts. African students were more likely to choose the hard/pure majors than Central and South Asians. Students who answered “yes” in welcome of international students, family influence, or English language ability belief—as the reason they chose their current academic majors—were more likely to choose the hard/pure majors than those who answered “no.” Students who answered “no” in professor’s prestige were more likely to choose the hard/pure majors than those who answered “yes.” Students who answered “not sure” in academic interest were more likely to choose the hard/pure majors than those who answered “no” (Table 4–13).

The results of the MANOVA tests of between-subjects effects revealed that native regions, gender, continuity of academic majors, relevance of academic background, academic interest, major’s academic rank, professor’s prestige, welcome of international students, and job opportunities were the factors influencing international graduate students’ choice of the hard/applied academic majors. Table 4–14 provides significant independent variables and corresponding F values in the category of hard/applied academic majors.

The Tukey post hoc tests and means comparisons revealed that male students and students who continued their academic majors were more likely to choose the hard/applied majors than their counterparts. African students were more likely to choose the hard/applied majors than Central and South American, East and Southeast Asian, Central and South Asian, or Middle Eastern students. Central and South Asian students were more likely to choose the hard/applied majors than students from other regions. East and Southeast Asian students were more likely to

choose the hard/applied majors than Europeans. Students who answered “yes” in relevance of academic background, major’s academic rank, professor’s prestige, or job opportunities—as the reason they chose their current academic majors—were more likely to choose the hard/applied majors than those who answered “no.” Students who answered “yes” in academic interest were less likely to choose the hard/applied majors than those who answered “no.” Students who answered “not sure” in welcome of international students were more likely to choose the hard/applied majors than those who answered “no” (Table 4–15).

The results of the MANOVA tests of between-subjects effects revealed that native regions, gender, English language proficiency, relevance of academic background, English language ability belief, expectation of success, academic interest, major’s academic rank, professor’s prestige, welcome of international students, job opportunities, and family influence were the factors influencing international graduate students’ choice of the soft/pure academic majors. Table 4–16 provides significant independent variables and corresponding F values in the category of the soft/pure academic majors.

The Tukey post hoc tests and means comparisons revealed that females were more likely to choose the soft/pure majors than males. Students from Africa were more likely to choose the soft/pure majors than Central and South American, Central and South Asian, East and Southeast Asian, or Middle Eastern students. Students from Europe were more likely to choose the soft/pure majors than Central and South American, Central and South Asian, or East and Southeast Asian students. Students who used 1% to 20% of time in their native languages (non-English) in academics were more likely to choose the soft/pure majors than those who used 0% of time. Students who answered “no” in relevance of academic background, English language ability belief, major’s academic rank, family influence, or job opportunities—as the reason they

chose their current academic majors—were more likely to choose the soft/pure majors than those who answered “yes.” Students who answered “yes” in academic interest or professor’s prestige were more likely to choose the soft/pure majors than those who answered “no.” Students who answered “yes” in expectation of success or welcome of international students were more likely to choose the soft/pure majors than those who answered “not sure” (Table 4–17).

The results of the MANOVA tests of between-subjects effects revealed that native regions, age, graduate level, gender, continuity of academic majors, English language proficiency, relevance of work experience, expectation of success, academic interest, welcome of international students, family influence, and job opportunities were the factors influencing international graduate students’ choice of the soft/applied academic majors. Table 4–18 provides significant independent variables and corresponding F values in the category of soft/applied academic majors.

The Tukey post hoc tests and means comparisons revealed that older students (≥ 30 years old), master’s students, female students, and students who changed their academic majors were more likely to choose the soft/applied majors than their counterparts. Students from Central and South Asia were more likely to choose the soft/applied majors than students from other regions. Students from Central and South America were more likely to choose the pure/applied majors than East and Southeast Asian, or European students. Students from the Middle East were more likely to choose the soft/applied majors than East and Southeast Asians. Students who used 51% to 100% of time in their native languages (non-English) in academics were less likely to choose the soft/applied majors than those who used 1% to 20% or 21% to 50% of time. Students who answered “yes” in relevance of work experience—as the reason they chose their current academic majors—were more likely to choose the soft/applied majors than those who answered

“no.” Students who answered “no” in expectation of success, family influence, or welcome of international students were more likely to choose the soft/applied majors than those who answered “yes.” Students who answered “yes” in academic interest or job opportunities were more likely to choose the soft/applied majors than those who answered “not sure” (Table 4–19).

Research Question Three

Research Question 3 asked: “What factors are associated with international graduate students’ academic performance?”

A standard multiple regression analysis was performed to investigate the factors associated with international graduate students’ academic performance. The dependent variable was international graduate students’ academic performance measured by their self-reported current GPA. The independent variables were gender, age, native regions, English language proficiency, continuity of academic majors, length of time stay in the United States, undergraduate GPA, study alone, study with students from their home country, study with students from other countries, length of weekly study time, welcome of international students, family influence, English language ability belief, expectation of success, and academic interest.

The researcher first tested whether or not international students’ academic performance differed by graduate level. The graduate level was tested as an interaction factor. The result indicated that the interaction of the graduate level (master’s or doctoral) was significant, $p = .001$. The data were therefore split and analyzed by graduate levels.

Participants who were in the master’s programs reported their undergraduate and master’s-level GPAs. The GPA score was divided into five grade units: 4.0, 3.7 to 3.9, 3.4 to 3.6, 3.0 to 3.3, and less than 3.0. Since a minimum of a 3.0 GPA is required for graduation by the university’s Graduate School policy, the GPA score categories were skewed toward high values. Table 4–20 provides the number and proportion of participants in each category at the

undergraduate and master's levels. The proportion of participants who received 4.0 GPA at the undergraduate level (5.3%) was much lower than the proportion at the master's level (28.8%), while the proportion of participants who received "lower than 3.0" at the undergraduate level (3.1%) was higher than the proportion at the master's level (.8%).

Table 4–21 provides mean, median, standard deviation, and range of GPA scores that participants received at the undergraduate and master's levels. The median of the undergraduate level GPA was in the category of 3.4 to 3.6, which was lower than the median of the master's level GPA (3.7–3.9).

The results of the multiple regression analysis revealed an overall adjusted $R^2 = .167$; $F = 4.576$, $p = .000$ at the master's level. Table 4–22 provides the correlation matrix of the factors at the master's level. The standardized Beta (B), unstandardized beta (b), and standard error for the significant factors are reported in Table 4–23.

At the master's level, nine independent variables were significantly related with the dependent variable—master's level GPA. The significant influencing factors—in decreasing order of absolute values of standardized coefficients (B)—were study alone method, length of weekly study time, Central and South Asia, Middle East, expectation of success, gender, welcome of international students, Europe, and undergraduate GPA. The factors of native regions and study alone method were negatively related to master's students' GPA; the remaining five factors were positively related to the GPA.

Compared to East and Southeast Asian students, students from Europe, Central and South Asia, and the Middle East received a lower master's level GPA. Among these regions, the Middle East's b value in Table 4–23 is the highest followed by Europe; Central and South Asia's b value is the lowest. Specifically, students from the Middle East, Europe, and Central and South

Asia received a .658, .493, and .388 lower GPA unit, respectively, than students from East and Southeast Asia.

Female students' master's level GPA was a .312 GPA unit higher than male students' (b = .312). Students who spent 10 more hours on study each week received a .127 GPA unit higher than students who did not study at the same intensity (b = .127). Students who received one unit higher undergraduate level GPA received a .118 unit of higher master's GPA (b = .118). Students who spent one more unit of proportion of time studying alone received a .480 GPA unit lower than students who did not study alone at the same intensity (b = -.480). Students who expected their academic success received a .361 GPA unit higher than students who did not have the same expectation (b = .361). Students who felt welcomed received .204 GPA unit higher than students who did not have the same feeling (b = .204).

Participants enrolled in doctoral programs reported their undergraduate and doctoral level GPAs. The GPA score was divided into five categories: from 4.0 to less than 3.0. Table 4–24 provides the number and proportion of participants in each category at the undergraduate and doctoral levels. The proportion of “4.0” at the undergraduate level (6.3%) was much lower than the proportion at the doctoral level (28.8%). The proportions of the categories of “4.0” and “3.7–3.9” at the undergraduate level were lower than the proportions at the doctoral level, and the proportions of the categories of “3.4–3.6” and “3.0–3.3” at the undergraduate level were higher than the proportions at the doctoral level. No participant reported a “lower than 3.0” doctoral GPA, while 3.8% of the participants received an undergraduate GPA in this category.

Table 4–25 provides mean, median, standard deviation, and range of GPA scores that participants received at the undergraduate and doctoral levels. The median of undergraduate GPA (3.4–3.6) was lower than the median of doctoral GPA (3.7–3.9).

At the doctoral level, the results of the multiple regression analysis revealed an overall adjusted $R^2 = .163$; $F = 10.857$, $p = .000$. Table 4–26 provides the correlation matrix of factors at the doctoral level. The standardized Beta (B), unstandardized beta (b), and standard error for the significant factors are reported in Table 4–27.

At the doctoral level, nine independent variables were significantly related with the dependent variable—the doctoral level GPA. The significant influencing factors—in decreasing order of absolute values of standardized coefficients (B)—were Africa, undergraduate GPA, Central and South America, length of time stay in the United States, study alone method, gender, length of study time, English language ability belief, and Europe.

Compared to East and Southeast Asian students, students from Africa and Central and South Asia received a lower doctoral GPA, but European students received a higher doctoral GPA than students from East and Southeast Asia. Europe's b value in Table 4–27 is the lowest and positive ($b = .176$); Africa's b value is the highest and negative ($b = -.701$); Central and South Asia's b value is also negative ($b = -.334$). Specifically, students from Europe received a .176 GPA unit higher than students from East and Southeast Asia; students from Africa and Central and South Asia received .701 and .334 GPA unit lower, respectively, than students from East and Southeast Asia.

Female students' doctoral GPA was a .129 GPA unit lower than male students' ($b = -.129$). Students who stayed in the United States one year longer received a .063 GPA unit higher than students who did not stay the same length of time ($b = .063$). Students who spent 10 more hours on study each week received a .031 GPA unit higher than students who did not study at the same intensity ($b = .031$). Students who spent one more unit of proportion of time studying alone received a .218 GPA unit higher than students who did not study alone at the same intensity

($b = .218$). Students who received one unit higher undergraduate GPA received a .125 unit of higher doctoral GPA ($b = .125$). Students who believed their English language ability received a .081 GPA unit of higher doctoral GPA than students who did not have the same belief ($b = .081$).

Research Question Four

Research Question 4 asked: “Do learning and teaching methods differ between the United States and international students’ home countries?”

Five non-parametric tests were performed to compare three learning methods (reading, listening, and discussion) and two teaching methods (lecture and seminar) in the United States and their home countries. McNemar’s Chi-square test was conducted, based on the dichotomous nature of the variables.

Participants reported their major learning method in the United States and their home countries. The proportions that participants used reading as the major learning method in the United States and their home countries were the same: 66%. The mean of the reading method in the United States ($M = .62$) was slightly higher than that in their home countries ($M = .61$). No significant difference was found between the United States and participants’ home countries in terms of reading as the major learning method, Chi-square = .006, $p = .937$. Therefore, the participants remained using reading as their major learning method after arriving in the United States.

The proportion of the listening method in the United States (13%) was lower than that in their home countries (18%). The mean of the listening method in the United States ($M = .12$) was lower than that in their home countries ($M = .16$). A significant difference was found between the United States and participants’ home countries in terms of listening as the major learning method, Chi-square = 4.691, $p = .030$. Therefore, fewer participants used listening as their major learning method in the United States than in their home countries.

The proportion of the discussion with teachers/peers method in the United States (21%) was higher than that in their home countries (16%). The mean of the discussion method in the United States ($M = .19$) was higher than that in their home countries ($M = .15$). A significant difference was found between the United States and participants' home countries in terms of discussion with teachers/peers as the major learning method, Chi-square = 4.009, $p = .045$. Therefore, fewer participants used discussion with teachers/peers as the major learning method in their home countries than in the United States.

Participants reported the major teaching method they experienced in the United States and their home countries. The proportion of the lecture teaching method in the United States (83%) was lower than that in their home countries (96%). The mean of the lecture method in the United States ($M = .78$) was lower than that in their home countries ($M = .89$). A significant difference was found between the United States and participants' home countries in terms of the lecture as the major teaching method, Chi-square = 43.214, $p = .000$. Therefore, fewer participants reported that they received the lecture as the major teaching method in the United States than in their home countries.

The proportion of the seminar teaching method in the United States (17%) was higher than that in their home countries (4%). The mean of the seminar method in the United States ($M = .14$) was higher than that in their home countries ($M = .03$). A significant difference was found in the United States and participants' home countries in terms of the seminar as the major teaching method, Chi-square = 47.266, $p = .000$. Therefore, fewer participants reported that they received the seminar as the major teaching method in their home countries than in the United States.

Qualitative Results

Three follow-up focus group interviews were conducted to explore the reasons for international graduate students' choice of academic majors, teaching and learning methods in the home country and the United States, and the learning and study strategies international students used. The focus group interviews were audio-recorded and transcribed afterwards. Domain analysis was used to analyze the qualitative data. The researcher open-coded the transcripts and then made domain worksheets based on the codes. The results of the qualitative data supported and extended the quantitative findings.

Research Question Two

Research Question 2 asked: "What reasons for choosing academic majors are reported by international graduate students?"

The domain worksheets revealed nine reasons for choosing academic majors, as reported by the focus group participants: academic interest, continuation of previous education, relevance of work experience, job opportunities, welcome of international students, career goal approach, academic major's popularity in the home country, financial assistance opportunities, and personality suitability. The most frequently mentioned reason for the choice of academic majors was personal academic interest. Several participants insisted that no matter where they resided, they chose the current majors because they liked it. A student from Central and South America said, "I chose my major first; then I chose U.S."

Continuation of previous education is another popular reason for choosing the current major. The majority of the participants reported that they had the same academic major in their home countries and the United States. During the interviews, several participants said that their home countries had no graduate program in academic fields in which they were interested.

American higher educational institutions, however, offer various graduate programs which attract more international students to continue their education in the United States.

Relevance of work experience was also reported by international graduate students. One participant changed her graduate major because of her work experience. She described her decision process:

I spent one year teaching English in my home country. I started getting interested in the area when I taught English. Because of this experience, I decided to change my major. I applied for my master's program in Teaching English as a Second Language.

Other participants reported similar experiences in choosing their current academic majors.

Considering job opportunities was the realistic motivation for selecting academic majors. A former mathematics major changed her major to statistics after considering job opportunities upon graduation. She stated:

Personally, I like mathematics, but getting a job after getting a mathematics degree is really hard, so it's kind of restrictive in that area. So actually I started thinking . . . and I thought, since I like mathematics, I'd look for something related to mathematics. So I found statistics, and after that I took a couple of classes before I changed my major, and I liked it.

International students also thought about career goals when choosing academic fields. A master's student said, "I found my personal mission in the career that I want to pursue for my entire life, so that's the reason I chose this major." An education major believed that the power of education could change a student's entire life. She saw her career as an educator who could transform a child into a good person.

An academic major's popularity in the home country influenced international students' academic choice. One participant chose her major because it was a popular major in her home country. She said:

In my home country, it's a growing profession right now. So there are a lot of people who wanted to study it, but there's not a really good program. So I felt like I needed to go outside of the country to study this major.

Although the participant did not mention why the major was popular in her home country at that time, it was clear that the popularity of this academic major in her home country influenced her academic choice in the United States.

International students also chose their current major for more financial assistance opportunities. An Asian student told the interviewers that she decided to continue her undergraduate major because of more financial aid opportunities although she wanted to study in another field. She said:

One reason I can come here is that I get a teaching assistant position . . . otherwise I couldn't have come at all. But if I had stayed in my country, probably I would go for something else because I always want to try something new, different than my field.

A hospitable welcome of international students influenced international students' choice of academic majors. An Asian student reported that she chose her current major "by accident." She studied a major that she was interested in, but she felt that the professors in the department were not friendly toward international students. She then decided to transfer to a department that would welcome international students. She said, "I changed my major because the professors there [new department] are more friendly to international students. . . . After changing my major, I started loving it."

Personality suitability was also considered by international students when choosing academic majors. Prior to deciding an academic major, a doctoral student evaluated herself. She knew herself very well so she decided to choose a more suitable major to fit her personality. She was happy with her decision.

Among these nine reasons for the choice of academic majors, as reported by international graduate students, the following five reasons were also found in the quantitative results: academic interest, continuation of previous education, relevant work experience, job opportunities, and welcome of international students. In addition, the focus group interviews

extended the questionnaire findings. The following four reasons for academic choice were reported by international graduate students: career goal approach, financial assistance opportunities, major's popularity in the home country, and personality suitability. The findings enriched the understanding of international graduate students' choice of academic majors.

Research Question Five

Research Question 5 asked: "What learning and teaching methods in the United States and the home country are reported by international graduate students?"

Teaching methods

During the interviews, participants reported that the lecture was the major teaching method in their home country. In the United States, however, discussion and presentation were utilized more often in class. A student said:

When I was in university in my country, not many discussions or presentations, just lecture . . . professor is talking and exams. . . . Here [United States] there are a lot of discussion and presentations, so I actually enjoy it a lot.

In addition, the focus group interviews revealed that teaching in English in the home country helped international students' adjustment in the English-speaking learning environment in the United States. A student from the Middle East said, "Courses in my home country are taught in English so it wasn't that difficult for me to adjust to using the English language in my area of study when I came here."

Learning methods

Listening to lectures was reported as the major learning method in the students' home countries because understanding a lecture in their native language was not difficult. A student said, "In my own country I just listen to teachers because I could fully understand the course of my mother tongue." Discussion was reported as the major learning method in the United States, but not in their home countries.

Reading textbooks was reported both in the home country and in the United States as the major learning method. A student said:

In our country, it was focused on the textbooks. . . . I also read a lot by myself [in the U.S.]. . . . I separate my days into different chunks and then I force myself to read like . . . how many pages is in this chunk . . . because if I don't do that I cannot finish my reading.

The qualitative findings provided more evidence to the quantitative research findings. In the United States, the seminar was the major teaching method, while the lecture was the major teaching method in the students' home countries. International students used the strategy of listening more in their home countries, but they used the strategy of discussion more in the United States. Reading was used both in the United States and in their home countries.

Research Question Six

Research Question 6 asked: "What learning and study strategies are reported by international graduate students?"

Participants reported their learning and study strategies in their home country as well as in the United States. Some of them reported that their learning and study strategies in the United States were the same as those used in their home country. However, more participants reported that they changed their learning and study strategies in the United States.

Various learning and study strategies were reported by international graduate students: studying with groups of international students, studying alone, studying alone plus group study, studying harder and longer, studying in libraries, reading more, reviewing class recorded videos/audios, interacting with professors, focusing on lecture and notes, previewing and reviewing classes, using only English in academics, using native language in academics, managing time differently, and using a dictionary to polish their English.

Studying with groups of international students

Most participants reported that being part of a group study was one of the learning and study strategies used both in their home country and in the United States. Participants said that they had friends or knew classmates so it was easy to find study groups in their home country. A student said, “I used to have a study group. Whenever I had a question and an exam, I always had somebody to discuss about it. Actually it helped me a lot.”

In the United States, international students also liked to study in groups. They were asked: “Who do you study with in the U.S.?” A Latin American student responded, “I have groups with only Americans, with other foreigners, with foreigners and Americans, and with Latin Americans also.” However, most participants reported they studied only with international students, not Americans or students from their home countries. One participant said, “The first semester I’ve tried different study groups. I’ve tried the American study groups; I’ve tried international study group. But I found the international study group is much more helpful.”

The participants reported four reasons for studying with international students. First, the participants noted the lack of American students. An engineering major said, “I study with usually international students because in engineering we don’t have many American students anyway.” Second, the participants commented on the American students’ fast-paced speech. “I found the international study group is much more helpful to learn . . . because Americans are speaking too fast. . . . I feel hard to follow them.” Third, the participants mentioned they did not prefer studying with students of their own nationality because they would use only their home language instead of English which is the official language in the academics. A Chinese student said, “I don’t really like working with only Chinese students because they tend to speak Chinese all the time, which I found hard to solve the questions in English.” Fourth, the participants stated

that when studying together, international students focused more on study compared with American students. A doctoral student said:

I found the international study group is much more helpful to learn . . . because international students have one goal—to solve the problem . . . to focus on the problem . . . but American students usually talk about something else . . . not focus on the problem. . . . Then I started to only work with international students.

In short, most participants chose to study with a mixed group of students from various countries.

Studying alone

Many participants reported that they preferred to study alone. This learning strategy does not change—no matter where they are. A student said, “I like to study alone . . . to actually understand and memorize things, internalize the knowledge, I need to study alone.”

However, several participants reported that studying alone is a new learning strategy they used in the United States because they could not find study-mates. A student stated:

In my home country, the group study is one of the strategies that I used; but actually in the U.S., I had a few experiences by studying in groups. . . . I studied it myself here [U.S.] because I couldn't find any group who can help me for any kind of problems.

Participants also reported that they chose to study alone because their American colleagues studied alone. An Asian student said, “People in our department also are in this way [study alone]. . . . I think I pretty much follow the strategies that my colleagues, American colleagues, do.”

A doctoral student said that she wanted to increase her independent problem-solving ability by studying alone. She said:

When studying with others, you are guided by other people and then you don't use your creativity or follow your ability . . . that's something that I would like to avoid as many times as I can . . . then I can solve the problems by myself. That is what is expected from a Ph.D. graduate.

Studying alone plus group study

One doctoral participant reported that his learning strategy was to first study independently and then study with groups. He found this learning strategy fitted his learning style, which greatly helped his studying. He said:

Learning strategies for me . . . it's always a little bit of personal study or independent study, and then a group discussion has always been helpful. I always like to study by myself before the group discussions. I can let the material sink in, and then a group discussion is always helpful for me because I can get other points of view.

Studying harder and longer

Almost all participants reported that they studied harder in the United States than in their home countries. One student said:

In my first year in U.S., I did not have my life at all. I stay late almost every night to read and write for the classes that I was taking. . . . I don't know what's the weekend. I mean I don't have weekends. I just read, work, and write.

Three reasons for studying harder and longer were mentioned during the interviews. The most frequently mentioned reason was international students' English deficiency. They spent a longer time finishing assignments in English. A Korean student said, "Reading assignment here [U.S.] was almost same as the one in Korea but time spent a lot more because of English." Another participant said, "If I'm studying in my home country it's my first language, I probably don't study so hard."

The participants also reported that a heavier graduate study workload was another reason for studying harder and longer. Graduate study required more time and energy. One student stated:

Here in the States, I'm doing now graduate work. I'm doing research so I spend the day in my office, do research, do homework, do the learning, go to classes. . . . I basically spend the whole day at the university which is definitely different than what I did in my home country.

The study motivation was also a reason for studying harder. A social science major said that the only reason she studied harder was that she was interested in the courses she took. She said, “Now every weekend I go to the library because I’m really interested in the courses I’m taking right now, so I really want to study well.”

Studying in libraries

Many participants said that they like studying in the libraries. A participant reported that he used the libraries more often than in his home country because “it is much easier to study in the library. . . . I get very focused and I’ve got all the materials so I use the library much more.”

Reading more

More reading helped learning in the United States. Several participants reported that they read more in the United States than in their home countries, read more than their colleagues do, and read more carefully. One student said:

I read it very, very carefully and make notes and try to connect to what I have already known with the new information. . . . I read two or three times so I can construct the whole structure in my mind.

Reviewing class recorded videos/audios

Since English is typically international students’ second language, some participants reported that they often reviewed recorded audios or videos after classes to catch up. One student said, “I couldn’t get the point so I should see the recorded video on the Internet provided by my department.”

Interacting with professors

Interacting with professors was one of the effective learning strategies that participants used in the United States. Several participants told the interviewers that they interacted with professors directly when they had questions. One student said: “I would ask in the class or go to

the office hours. . . . I interact with professors a lot . . . even if they didn't understand me, I will get a pencil and paper and just draw things.”

Focusing on lecture and notes

Although participants said that reading the textbook helped their academic achievement, some of them emphasized that focusing on the lecture and their notes was more important in the United States. One student said, “I take notes . . . try to copy as much as I could. . . . Here [U.S.] I found that it was more on what the professor was actually teaching in his class.”

Previewing and reviewing classes

Previewing classes and reviewing classes were common learning and study strategies that international students used. Participants reported that this strategy was a learning habit they developed since childhood, so they used it in their home country and in the United States.

Using only English in academics

Participants reported that they preferred using only English in their studies because it helped their academic success in the United States. One participant said:

For the academic study, I use English 100 percent. I think preparing everything in English is better than in my own language because I'm studying here in the United States. . . . I basically think, write and talk about things in academics in English only. . . . I think it helps a lot in study and after a while it basically becomes your first language anyway.

Some participants, however, said they were passive English users because no one spoke their home language in the department. A social science major said, “I talk in English about the academics because I'm the only one from my country in my field.” Other participants also reported that they used English because they did not know the academic terms in their home languages.

Using native language in academics

On the contrary, some participants reported that using their home language in studying helped their academic achievement. It is easier to master the knowledge in their home language and solve academic problems. One Chinese student said:

Thinking in my native language helped to solve my homework problems and exam problems . . . if I don't really understand the reading, I put the keywords in Google Mandarin, so I can get an idea about what the reading is about.

Many participants reported that they preferred using their home language rather than using English in math-related academic activities. They said that it is more efficient to do math in their home languages. A German student said:

The only thing I do still in my own language is math. I'm counting and writing equations in German, but I think it doesn't really matter, because after all it just counts what's written on the paper.

Managing time differently

In order to achieve academic success, international graduate students managed time differently, compared to how they studied in their home countries. Most participants reported that they had more leisure time in their home country than in the United States. In addition, they reported that they spent time studying on a regular base. An Indian student described the difference in his home country and in the United States:

Here in the U.S. you had to keep a continuous effort on the semester . . . you've got to do your homework, you have pop-up quizzes. . . . It was less effort but on a regular basis. But in my home country, we used to focus more on the last month, about 90% effort of the whole semester.

Using a dictionary to polish their English

Since English is the second language for the participants, they reported that they used an English dictionary to polish their English in writing. One student said, "Academically, I've never

actually required a dictionary. . . . I feel pretty confident about my English. . . . When I'm writing a paper or a project report, or I'm just looking for a certain word, then I just look it up online.”

Summary

In this chapter, six research questions were examined to investigate: (a) reasons for international graduate students' choice of academic majors categorized by hard/pure, hard/applied, soft/pure, and soft/applied; (b) factors associated with international graduate students' academic performance measured by their current GPA; (c) the differences in learning and teaching methods between the United States and their home country; and (d) learning and study strategies used by international students in the United States.

A questionnaire was used to collect the primary data that were analyzed by the SPSS software program. Research Question 1 was analyzed by MANOVA models; Research Question 3 was analyzed by standard multiple regression models; and Research Question 4 was analyzed by McNemar Chi-square tests. The qualitative data were collected by follow-up focus group interviews whose findings supported and extended the quantitative findings. Research Questions 2, 5, and 6 were analyzed by the domain analysis method. The quantitative and qualitative results are reported separately. The interpretations and implications of these results are presented in Chapter 5.

Table 4–1. Number and proportion of participants by length of time in the U.S.

Length of time (year)	Number of participants (n)	Proportion of participants (%)
< 1	135	26.7
1–2	97	19.2
2–3	81	16.1
3–4	73	14.5
4–5	41	8.1
> 5	78	15.4

Table 4–2. Mean, median, standard deviation, and range of length of time in the U.S.

	Mean	Median	S.D.	Min.	Max.
Length of time	3.04	3.00	1.767	1	6

“1” represents < 1 year; “2” represents 1 to 2 years; “3” represents 2 to 3 years; “4” represents 3 to 4 years; “5” represents 4 to 5 years; “6” represents > 5 years.

Table 4–3. Number and proportion of participants by length of weekly study time

Weekly study hour	Number of participants (n)	Proportion of participants (%)
≤ 10	27	5.3
11–20	71	14.1
21–30	92	18.2
31–40	99	19.6
41–50	92	18.2
51–60	64	12.7
61–70	36	7.1
≥ 71	24	4.8

Table 4–4. Mean, median, standard deviation, and range of length of weekly study time

	Mean	Median	S.D.	Min.	Max.
Weekly study hour	4.23	4.00	1.809	1	8

“1” represents ≤ 10 hours; “2” represents 11 to 20 hours; “3” represents 21 to 30 hours; “4” represents 31 to 40 hours; “5” represents 41 to 50 hours; “6” represents 51 to 60 hours; “7” represents 61 to 70 hours; “8” represents ≥ 71 hours.

Table 4–5. Number and proportion of participants by proportion of time using native language

Proportion of time	Number of participants (n)	Proportion of participants (%)
0%	104	20.6
1%–20%	160	31.7
21%–50%	133	26.3
51%–100%	108	21.4

Table 4–6. Mean, median, standard deviation, and range of proportion of time using native language

	Mean	Median	S.D.	Min.	Max.
Proportion of time	2.28	2.00	1.21	1	4

“1” represents 0%; “2” represents 1% to 20%; “3” represents 21% to 50%; “4” represents 51% to 100%.

Table 4–7. Number and proportion of participants by proportion of time using three study methods

Proportion of time	Study alone	Study with home students	Study with other students
0	1 (0.2%)	227 (45.0%)	128 (25.3%)
1%–20%	14 (2.8%)	175 (34.6%)	247 (48.9%)
21%–50%	95 (18.8%)	92 (18.2%)	109 (21.6%)
51%–100%	395 (78.2%)	11 (2.2%)	21 (4.2%)

Table 4–8. Mean, median, standard deviation, and range of proportion of time using three study methods

	Mean	Median	S.D.	Min.	Max.
Study alone	3.75	4.00	.508	1	4
Study with students from home country	1.78	2.00	.818	1	4
Study with students from other countries	2.04	2.00	.794	1	4

“1” represents 0%; “2” represents 1% to 20%; “3” represents 21% to 50%; “4” represents 51% to 100%.

Table 4–9. Number and proportion of participants by reasons for choice of academic majors

	No	Not sure	Yes
English language ability belief	52 (10.4%)	79 (15.9%)	365 (73.7%)
Relevance of academic background	24 (4.8%)	10 (2.0%)	462 (93.2%)
Relevance of work experience	133 (26.7%)	71 (14.3%)	292 (59.0%)
Academic interest	14 (2.8%)	32 (6.5%)	450 (90.7%)
Major’s academic rank	101 (20.4%)	157 (31.7%)	238 (47.9%)
Expectation of success	14 (2.8%)	102 (20.5%)	380 (76.7%)
Professor’s prestige	90 (18.2%)	108 (21.7%)	298 (60.0%)
Family influence	265 (53.5%)	153 (30.8%)	78 (15.7%)
Welcome of int’l students	72 (14.5%)	140 (28.2%)	284 (57.3%)
Job opportunities	83 (16.6%)	150 (30.3%)	263 (53.1%)

Table 4–10. Mean, median, standard deviation, and range of reasons for choice of academic majors

	Mean	Median	S.D.	Min.	Max.
English language ability belief	2.63	3.00	.664	1	3
Relevance of academic background	2.88	3.00	.446	1	3
Relevance of work experience	2.32	3.00	.869	1	3
Academic interest	2.88	3.00	.402	1	3
Major’s academic rank	2.28	2.00	.780	1	3
Expectation of success	2.74	3.00	.498	1	3
Professor’s prestige	2.42	3.00	.781	1	3
Family influence	1.62	1.00	.741	1	3
Welcome of int’l students	2.43	3.00	.733	1	3
Job opportunities	2.36	3.00	.752	1	3

“1” represents “no”; “2” represents “not sure”; and “3” represents “yes.”

Table 4–11. Wilks' Lambda's F values of independent variables of choice of academic majors

Independent variable	F
Native regions	10.727**
Gender	19.850**
Age	11.561**
Graduate level	36.149**
Academic major continuity	26.832**
English language proficiency	3.200**
English language ability belief	9.359**
Relevance of academic background	12.170**
Relevance of work experience	2.661*
Academic interest	9.377**
Major's academic rank	10.956**
Expectation of success	5.951**
Professor's prestige	12.991**
Family influence	12.375**
Welcome of int'l students	9.290**
Job opportunities	10.498**

*p < .01; **p < .05.

Table 4–12. Significant independent variables and F values in the hard/pure academic majors

Independent variable	F
Native regions	4.255**
Graduate level	45.856**
Age	16.822**
Academic interest	7.940**
Professor's prestige	13.695**
English language ability belief	10.279**
Family influence	17.287**
Welcome of int'l students	10.017**

*p < .0125; **p ≤ .001.

Table 4–13. Comparisons of significant factors in the hard/pure academic majors

Significant factor	Pairwise comparison
Native regions	Africa (+) vs. Central and South Asia*
Age	< 30 (+) ≥ 30**
Graduate level	Doctoral (+) vs. master**
Welcome of int'l students	Yes (+) vs. no**
Family influence	Yes (+) vs. no**
English language ability belief	Yes (+) vs. no**
Professor's prestige	No (+) vs. yes*
Academic interest	Not sure (+) vs. no*

*p < .05; **p ≤ .001. (+) indicates this group is more likely to choose this type of academic major than the other group.

Table 4–14. Significant independent variables and F values in the hard/applied academic majors

Independent variable	F
Native regions	23.812**
Gender	44.183**
Academic major continuity	53.001**
Relevance of academic background	22.773**
Academic interest	13.551**
Major's academic rank	8.244**
Professor's prestige	6.482*
Welcome of int'l students	11.007**
Job opportunities	7.643**

*p < .0125; **p ≤ .001.

Table 4–15. Comparisons of significant factors in the hard/applied academic majors

Significant factor	Pairwise comparison
Native regions	Africa (+) vs. Central and South America** Africa (+) vs. Central and South Asia** Africa (+) vs. East and Southeast Asia** Africa (+) vs. Middle East* Central and South Asia (+) vs. non-Central and South Asia** East and Southeast Asia (+) vs. Europe*
Gender	Male (+) vs. female**
Academic major continuity	Yes (+) vs. no**
Relevance of academic background	Yes (+) vs. no**
Academic interest	No (+) vs. yes*
Major's academic rank	Yes (+) vs. no**
Professor's prestige	Yes (+) vs. no*
Job opportunities	Yes (+) vs. no**
Welcome of int'l students	Not sure (+) vs. no**

*p < .05; **p ≤ .001. (+) indicates this group is more likely to choose this type of academic major than the other group.

Table 4–16. Significant independent variables and F values in the soft/pure academic majors

Independent variable	F
Native regions	9.300**
Gender	12.001**
English language proficiency	4.273*
Job opportunities	7.643**
English language ability belief	18.105**
Relevance of academic background	22.107**
Academic interest	6.118*
Major's academic rank	28.528**
Expectation of success	8.818**
Professor's prestige	25.481**
Family influence	13.862**
Welcome of int'l students	9.817**

*p < .0125; **p ≤ .001.

Table 4–17. Comparisons of significant factors in the soft/pure academic majors

Significant factor	Pairwise comparison
Native regions	Africa (+) vs. Central and South America** Africa (+) vs. Central and South Asia** Africa (+) vs. East and Southeast Asia** Africa (+) vs. Middle East* Europe (+) vs. Central and South America** Europe (+) vs. Central and South Asia** Europe (+) vs. East and Southeast Asia*
Gender	Female (+) vs. male**
English language proficiency	0% vs. 1%–20% (+)*
Relevance of academic background	No (+) vs. yes**
English language ability belief	No (+) vs. yes*
Academic interest	Yes (+) vs. no*
Major's academic rank	No (+) vs. yes**
Professor's prestige	Yes (+) vs. no**
Family influence	No (+) vs. yes**
Job opportunities	No (+) vs. yes**
Expectation of success	Yes (+) vs. not sure*
Welcome of int'l students	Yes (+) vs. not sure**

*p < .05; **p ≤ .001. (+) indicates this group is more likely to choose this type of academic major than the other group.

Table 4–18. Significant independent variables and F values in the soft/applied academic majors

Independent variable	F
Native regions	9.843**
Gender	26.325**
Age	24.881**
Graduate level	83.307**
Academic major continuity	57.660**
English language proficiency	5.263**
Relevance of work experience	5.681*
Academic interest	10.443**
Expectation of success	11.424**
Family influence	11.778**
Welcome of int'l students	5.508*
Job opportunities	26.601**

*p < .0125; **p ≤ .001.

Table 4–19. Comparisons of significant factors in the soft/applied academic majors

Significant factor	Pairwise comparison
Native regions	Central and South America (+) vs. East and Southeast Asia** Central and South America (+) vs. Europe* Central and South Asia (+) vs. non-Central and South Asia** Middle East (+) vs. East and Southeast Asia*
Age	< 30 vs. ≥ 30 (+)**
Graduate level	Master (+) vs. doctoral**
Gender	Female (+) vs. male**
Academic major continuity	No (+) vs. yes**
Relevance of work experience	Yes (+) vs. no*
Expectation of success	No (+) vs. yes**
Family influence	No (+) vs. yes*
Welcome of int'l students	No (+) vs. yes**
Academic interest	Yes (+) vs. not sure**
Job opportunities	Yes (+) vs. not sure**
English language proficiency	1%–20% (+) vs. 51%–100%** 21%–50% (+) vs. 51%–100%*

*p < .05; **p ≤ .001. (+) indicates this group is more likely to choose this type of academic major than the other group.

Table 4–20. Number and proportion of master's participants' GPA

	Undergraduate GPA	Master's GPA
4.0	7 (5.3%)	38 (28.8%)
3.7–3.9	56 (42.4%)	42 (31.8%)
3.4–3.6	40 (30.3%)	38 (28.8%)
3.0–3.3	25 (18.9%)	13 (9.8%)
< 3.0	4 (3.1%)	1 (.8%)

Table 4–21. Mean, median, standard deviation, and range of master’s participants’ GPA

	Mean	Median	S.D.	Min.	Max.
Undergraduate level	3.28	3.00	.934	1	5
Master level	3.76	4.00	.976	1	5

“1” represents < 3.0; “2” represents 3.0 to 3.3; “3” represents 3.4 to 3.6; “4” represents 3.7 to 3.9; “5” represents 4.0.

Table 4–22. Correlation matrix of master’s students’ academic performance factors

	Africa	C&S America	Europe	C&S Asia	Middle East	Age	Welcome int’l studt	Language proficiency	Undergrad GPA	Gender
Master GPA	.191	-.024	-.088	-.128	-.064	-.111	.101	-.003	.128	.162
Africa		-.090	-.050	-.107	-.048	-.110	-.103	-.170	.126	.214
C&S America			-.158	-.336	-.151	.329	.138	-.108	.085	.083
Europe				-.187	-.084	.197	-.263	-.092	.221	-.235
C&S Asia					-.177	-.299	.076	-.083	-.051	-.231
Middle East						.026	.027	.043	-.301	-.127
Age							.005	-.078	.108	.162
Welcome int’l studt								.048	-.125	-.007
Language proficiency									-.052	-.128
Undergrad GPA										.106
Gender										
Study alone										
Study home studts										
Study other studts										
Acadm major contnty										
Length of time U.S.										
Length of study time										
Family influence										
Lang ability belief										
Expect of success										

Table 4–22. Continued

	Study alone	Study home studts	Study other studts	Acadm major contnty	Length of time U.S.	Length of study time	Family influence	Lang ability belief	Expect of success	Acadm interest
Master GPA	-.072	.006	-.030	-.004	-.145	.137	.024	-.031	.158	.041
Africa	-.070	-.042	.243	-.290	-.081	.011	-.149	.073	.070	.066
C&S America	.234	-.258	-.063	.218	.234	-.075	-.179	-.119	.127	-.036
Europe	.176	-.257	-.133	-.099	.039	.099	-.177	.027	-.152	-.236
C&S Asia	-.151	.341	-.002	-.130	-.198	-.075	-.062	.235	-.040	.180
Middle East	-.306	-.128	.278	-.159	-.056	-.013	-.049	.122	.117	-.030
Age	.055	-.311	-.068	.035	.445	-.017	-.071	-.074	.009	-.105
Welcome int'l studt	-.079	.121	.212	.129	-.050	-.007	.096	.105	.137	.105
Language proficiency	.193	.281	-.083	.062	-.205	.134	.227	-.127	-.224	-.338
Undergrad GPA	.058	-.009	-.149	-.023	.021	.025	-.048	-.153	-.034	-.056
Gender	-.066	.155	.056	.025	.203	-.203	-.057	-.176	.147	.221
Study alone		-.290	-.346	.069	-.048	.148	-.129	-.092	-.043	.044
Study home studts			-.144	.120	-.211	.115	.189	.021	.018	-.093
Study other studts				-.040	.010	-.176	-.036	.156	.049	.022
Acadm major contnty					.153	.127	-.089	-.078	.0575	.063
Length of time U.S.						-.165	-.180	-.146	-.082	.193
Length of study time							.014	-.252	-.065	-.011
Family influence								.027	-.135	-.260
Lang ability belief									.068	.125
Expect of success										.360

Table 4–23. Significant factors of master’s students’ academic performance

Significant factor	B (b)	S.E.
Europe	-.137 (-.493)	.248*
Central and South Asia	-.178 (-.388)	.164*
Middle East	-.175 (-.658)	.248**
Gender	.154 (.312)	.129*
Length of weekly study time	.194 (.127)	.038**
Undergraduate GPA	.111 (.118)	.058*
Study alone	-.243 (-.480)	.132**
Expectation of success	.158 (.361)	.130**
Welcome of int’l students	.148 (.204)	.075**

*p < .05; **p ≤ .01.

Table 4–24. Number and proportion of doctoral participants’ GPA

	Undergraduate GPA	Doctoral GPA
4.0	23 (6.3%)	105 (28.8%)
3.7–3.9	145 (39.9%)	192 (52.7%)
3.4–3.6	107 (29.4%)	60 (16.5%)
3.0–3.3	75 (20.6%)	7 (1.9%)
< 3.0	14 (3.8%)	0 (0%)

Table 4–25. Mean, median, standard deviation, and range of doctoral participants’ GPA

	Mean	Median	S.D.	Min.	Max.
Undergraduate level	3.24	3.00	.978	1	5
Doctoral level	4.09	4.00	.722	1	5

“1” represents < 3.0; “2” represents 3.0 to 3.3; “3” represents 3.4 to 3.6; “4” represents 3.7 to 3.9; “5” represents 4.0.

Table 4–26. Correlation matrix of doctoral students’ academic performance factors

	Africa	C&S America	Europe	C&S Asia	Middle East	Age	Welcome int’l studt	Language proficiency	Undergrad GPA	Gender
Doctoral GPA	-.231	.102	.102	-.130	.081	-.083	.028	.124	.162	-.089
Africa		-.060	-.071	-.090	-.053	.300	.033	-.175	-.173	.083
C&S America			-.092	-.117	-.068	.134	.033	-.272	.173	-.118
Europe				-.137	-.080	.038	.039	-.014	.022	-.052
C&S Asia					-.102	-.315	.026	-.299	.210	-.059
Middle East						-.064	.007	.023	-.135	.046
Age							-.163	-.023	-.199	-.047
Welcome int’l studt								-.004	-.134	.090
Language proficiency									-.070	-.122
Undergrad GPA										.086
Gender										
Study alone										
Study home studts										
Study other studts										
Acadm major contnty										
Length of time U.S.										
Length of study time										
Family influence										
Lang ability belief										
Expect of success										

Table 4–26. Continued

	Study alone	Study home studts	Study other studts	Acadm major contnty	Length of time U.S.	Length of study time	Family influence	Lang ability belief	Expect of success	Acadm interest
Doctoral GPA	.183	-.017	-.085	.029	.152	.021	-.048	.004	.020	.031
Africa	-.059	-.062	.085	-.102	-.005	-.031	.099	.136	.071	.061
C&S America	.074	-.100	-.035	-.059	.109	.018	-.149	.007	.061	.080
Europe	.105	-.153	-.104	.050	.172	-.026	-.079	-.101	.142	.048
C&S Asia	-.086	.073	-.009	-.013	.002	-.248	.050	.207	.114	.026
Middle East	.068	-.099	-.029	.050	-.110	-.131	-.136	-.009	.060	.025
Age	-.054	-.101	.055	-.067	.332	.140	-.161	-.216	-.060	-.024
Welcome int'l studt	-.017	.029	.047	.006	-.122	-.045	.263	.280	.260	.169
Language proficiency	.120	.307	-.085	.097	-.220	.167	.055	-.175	-.060	-.121
Undergrad GPA	.018	.084	-.049	.033	-.019	.041	-.004	.044	.097	.055
Gender	.045	-.127	-.167	.026	.089	-.012	.113	.000	-.091	.119
Study alone		-.143	-.299	.064	-.014	.100	-.036	-.102	-.101	-.022
Study home studts			.065	.083	-.096	.090	.145	-.009	-.065	-.073
Study other studts				-.134	-.027	.068	.107	.079	-.042	-.015
Acadm major contnty					.040	-.131	-.106	-.115	-.012	-.067
Length of time U.S.						-.010	-.088	-.057	-.029	-.032
Length of study time							.121	-.127	-.086	-.059
Family influence								.196	.069	.087
Lang ability belief									.332	.081
Expect of success										.273

Table 4–27. Significant factors of doctoral students’ academic performance

Significant factor	B (b)	S.E.
Africa	-.207 (-.701)	.112**
Europe	.075 (.176)	.076*
Central and South Asia	-.170 (-.334)	.071**
Gender	-.090 (-.129)	.046**
Length of time stay in the U.S.	.152 (.063)	.014**
Length of weekly study time	.082 (.031)	.012**
Study alone	.145 (.218)	.048**
Undergraduate GPA	.175 (.125)	.023**
English language ability belief	.080 (.081)	.034*

*p < .05; **p ≤ .01.

CHAPTER 5 CONCLUSION AND IMPLICATIONS

Introduction

This chapter presents the conclusions and implications of the study. This chapter includes (a) a summary of the study, (b) an interpretation of the answers to the research questions and conclusions based on the data analysis, (c) implications of the results, (d) contributions of the study, and (e) recommendations for future research.

Summary of the Study

The United States has become a major host country of international students whose numbers have been increasing since the 1950s (Open Doors, 2006). International graduate students consist of 46% of all international students who are approximately 4% of the total post-secondary education enrollment (Open Doors, 2006). However, literature on international graduate students is limited. Most of the research does not distinguish between international undergraduate students and international graduate students, or the research focuses only on international undergraduate students. Only a few studies have been conducted on international students' difficulties and adjustment, learning and study strategies, and academic performance, but research on international graduate students' choice of academic majors was not found. Although international students have become a large segment of the student population on university campuses, research has indicated that existing campus services are designed primarily for domestic students. Many foreign students' needs are therefore not met by these services (Davis, 1999).

The purposes of this study were to investigate reasons for international graduate students' academic choice, factors associated with international graduate students' academic performance, differences in teaching and learning methods in the home country and in the United States, and

learning and study strategies that international graduate students used in the United States. The following six research questions were addressed in this study:

1. What factors are associated with the choice of academic majors among international graduate students?
2. What reasons for choosing academic majors are reported by international graduate students?
3. What factors are associated with international graduate students' academic performance?
4. Do learning and teaching methods differ between the United States and international students' home countries?
5. What learning and teaching methods in the United States and the home country are reported by international graduate students?
6. What learning and study strategies are reported by international graduate students?

This study's conceptual framework was adapted from Wigfield and Eccles's (2000) Expectancy-Value model of achievement motivation. Since Wigfield and Eccles's model was developed for domestic students, the researcher modified it based on the nature of international graduate students. The conceptual framework, as presented in Chapter 3, consists of 11 constructs: academic performance, choice of academic majors, demographics, English language proficiency, educational and work experiences, welcome of international students, family influence, English language ability belief, expectation of success, learning and study strategies, and subjective values.

The study was conducted at a large southeastern four-year public university offering almost 200 graduate programs; its enrollment consisted of approximately 2,100 international graduate students. The researcher designed an online questionnaire based on previous relevant studies to collect the primary data. The multivariate analysis of variance (MANOVA) tests, the standard multiple regression analysis, and nonparametric tests were performed to answer Research Questions 1, 3, and 4, respectively. Three follow-up focus group interviews were

conducted to support and enhance the findings of the questionnaire. The domain analysis method was used to answer Research Questions 2, 5, and 6. The findings of this study contributed to educational literature and theory, as well as American higher education administration and policy development.

Findings and Discussions

The findings of this study are presented in response to the six research questions.

Research Questions One and Two

Participants reported their current academic majors, which were subsequently classified by the Biglan classification scheme: hard/pure, hard/applied, soft/pure, and soft/applied. The MANOVA tests were used to investigate the factors associated with international graduate students' choice of academic majors. Table 5–1 summarizes the significant factors in each type of academic major. The results revealed significant differences by native regions. African students were more likely to choose hard/pure, hard/applied and soft/pure majors than Central and South Asian students. African students were more likely to choose hard/applied and soft/pure majors than Central and South American, East and Southeast Asian, or Middle Eastern students. Central and South Asian students were more likely to choose hard/applied and soft/applied majors than students from other regions. East and Southeast Asian students were more likely to choose hard/applied majors than European students. European students were more likely to choose soft/pure majors than Central and South American, Central and South Asian, or East and Southeast Asian students. Central and South American students were more likely to choose soft/applied majors than East and Southeast Asian or European students. Middle Eastern students were more likely to choose soft/applied majors than East and Southeast Asian students.

Gender differences were found. Male students were more likely to choose hard/applied majors, and females were more likely to choose soft/pure and soft/applied majors. Significant

differences occurred by graduate levels. Master's students were more likely to choose soft/applied majors, and doctoral students were more likely to choose hard/pure majors. Age differences were found. Students younger than 30 years old were more likely to choose hard/pure majors, and 30 years and older students were more likely to choose soft/applied majors. Continuity of academic majors was found related to students' academic choice. Students with the same type of undergraduate and graduate majors were more likely to choose hard/applied majors, while those with a different type of academic major were more likely to choose soft/applied majors. Significant differences occurred by English language proficiency. Students who used 1% to 20% of time in native languages (non-English) in academics were more likely to choose soft/pure majors than those who used 0% of time. Students who used 51% to 100% of time in native languages were less likely to choose soft/applied majors than those who used 1% to 20% or 21% to 50% of time.

In short, older female master's level students who changed the type of academic major and used 1% to 20% of time in native languages in academics were more likely to choose soft majors. Younger male doctoral level students who continued the type of academic major were more likely to choose hard majors. Hence, age, gender, graduate levels, continuity of academic majors, and English language proficiency influenced international graduate students' academic choice. In addition, Central and South Asian students were more likely to choose applied majors; African students were more likely to choose hard/applied and soft/pure majors; European students were more likely to choose soft/pure majors; and Central and South American students were more likely to choose soft/applied majors. Hence, the regional culture influenced international students' academic choice. The study suggests that international graduate students' academic advisors provide appropriate advisement on academic choice, considering the student's

age, gender, native regions, English language proficiency, continuity of type of undergraduate and graduate academic majors, and the degree they seek.

Significant differences occurred in the MANOVA tests of between-subjects effects. Academic interest and welcome of international students were found to be related to all categories of academic majors in terms of international graduate students' academic choice. The factor of job opportunities was related to the choice of hard/applied, soft/pure, and soft/applied majors. Professor's prestige was related to the choice of hard/pure, hard/applied, and soft/pure majors. Family influence was related to the choice of hard/pure, soft/pure, and soft/applied majors. Relevance of academic background and the major's academic rank were related to the choice of hard/applied and soft/pure majors. Expectation of success was related to the choice of soft/pure and soft/applied majors. English language ability belief was related to the choice of hard/pure and soft/pure majors. Relevance of work experience was related to the choice of soft/applied majors.

In short, academic interest and welcome of international students were founded to be related to international graduate students' choice of all academic majors. Family influence, professor's prestige, and language ability belief were related to the choice of pure majors; job opportunity was related to the choice of applied majors; professor's prestige was related to the choice of hard majors; job opportunities, expectation of success, and family influence were related to the choice of soft majors. The study suggests that departments and institutions that plan to attract international graduate students provide a friendly academic environment to this population in addition to offering high quality academic programs. Academic programs that plan to attract more international students may have various recruitment plans, according to the factors that impact their academic choice.

The follow-up focus group interviews revealed nine reasons for the choice of academic majors. Five of them were validated by questionnaire findings: academic interest, relevant academic background, relevant work experience, job opportunities, and welcome of international students. The results of the focus group interviews expanded the questionnaire findings. Four additional reasons were reported by focus group interviewees: career goal approach, academic major's popularity in the home country, financial assistance opportunities, and personality suitability. The study suggests that academic advisors not only be aware of the factors found in the questionnaire survey, but also keep these additional factors in mind when giving advice on the choice of academic majors to international graduate students.

Research Question Three

The results of multiple regression analysis revealed that students' current graduate level was a significant interaction factor of international graduate students' academic performance measured by the current grade point average (GPA). The data were therefore analyzed separately by graduate levels.

Nine factors were found to be significant at the master's and doctoral levels, respectively (Table 5–2). Six factors (native regions of Europe and Central and South Asia, gender, study alone method, length of weekly study time, and undergraduate GPA) were found statistically significant at both master's and doctoral levels. Students who spent more time on study or received a higher undergraduate GPA tended to receive a higher GPA at both levels. Students from Central and South Asia tended to receive a lower GPA than students from South and Southeast Asia at both levels.

Students who came from Europe tended to receive a lower GPA than students from East and Southeast Asia at the master's level, but they tended to receive a higher GPA than students from East and Southeast Asia at the doctoral level. Students who spent more time studying alone

tended to receive a lower GPA at the master's level, but they tended to receive a higher GPA than students from East and Southeast Asia at the doctoral level. Female students tended to receive a higher GPA than male students at the master's level, but tended to perform less well than male students at the doctoral level.

The native region of the Middle East, welcome of international students, and expectation of success were the additional three factors only associated with master's students' GPA. Master's students who expected academic success or felt welcomed tended to receive a higher GPA. But students who came from the Middle East tended to receive a lower GPA than students from East and Southeast Asia at the master's level.

The native region of Africa, length of time in the United States, and English language ability belief were the additional three factors only associated with doctoral students' GPA. Doctoral students who stayed longer in the United States or believed their English language ability tended to receive a higher doctoral GPA. But students who came from Africa tended to receive a lower GPA than students from East and Southeast Asia at the doctoral level.

The findings provided evidence that factors associated with master's students and doctoral students' academic performance were greatly different. The differences among factors may be caused by the difference of academic requirements and educational expectations for the master's students and doctoral students. For instance, doctoral students are expected to work independently on dissertations, and master's students are expected to be team players. This study suggests higher education administrators distinguish international graduate students by graduate levels when providing assistance to their academic success. For example, the universities may provide more support to the following students: male students who study in master's programs, and female students who enroll in doctoral programs; students from Middle East at the master's

level, and students from Africa at the doctoral level. In addition, universities may also help master's students study in groups, help master's students increase their expectation of success, and help doctoral students strengthen their English language ability belief.

Research Questions Four and Five

The results of the questionnaire and focus group interviews concurred that the lecture was the major teaching method in international students' home countries, but the seminar was the major teaching method in the United States. The change of major teaching method made it more difficult for international students to achieve academic success in the United States.

The results also revealed that listening was the major learning method in the home country, but discussion with professors and peers was the major learning method in the United States. International graduate students' learning methods matched with teaching methods. They changed their learning methods when the teaching methods in the United States were different than those in their home countries. In the home country, the lecture was the major teaching method so students used listening as the major learning method. Focus group interviewees reported that they did not have any problems in understanding lectures in home languages. However, in the United States, the seminar was often used in teaching, and most international students' English language was deficient for the seminar teaching method. Therefore, international students' major learning method was switched to discussion with professors and peers. Focus group interviewees reported they had more interaction with professors and colleagues in and out of classrooms, preferred to study in groups, and studied longer and harder. The study suggests that faculty should understand international graduate students' learning difficulties, adjust teaching methods and strategies, and provide interaction opportunities to international graduate students out of classrooms. International graduate students should prepare for changes in teaching and learning methods and adjust their learning methods to match the teaching methods.

Research Question Six

The findings of the focus group interviews revealed that some international graduate students reported that they maintained their learning and study strategies used in their home country, but most of them reported that they changed their learning and study strategies to match the new teaching methods and strategies after arriving in the United States. The focus group interviewees reported various learning and study strategies they used in the United States: studying with groups of international students, studying alone, studying alone plus group study, studying harder and longer, studying in libraries, reading more, reviewing class recorded videos/audios, interacting with professors, focusing on lecture and notes, previewing and reviewing classes, using only English in academics, using native language in academics, managing time differently, and using a dictionary to polish their English. These strategies assisted international graduate students to achieve a better academic performance. The study suggests that the university provide workshops on effective learning and study strategies found in this study to international graduate students who may use these strategies to quickly adjust to the new learning environment.

In addition, two strategies (proportion of time studying alone and length of weekly study time) were found to be significantly related to international graduate students' academic performance at the master's and doctoral levels in the questionnaire findings. International graduate students who spent more weekly study time tended to receive a higher GPA at both master's and doctoral levels. The strategy of studying longer was shared by international students at both graduate levels. However, the studying alone strategy differed by graduate levels. Master's students who spent more proportion of time studying alone tended to receive a lower GPA. But doctoral students who spent more proportion of time studying alone tended to receive a higher GPA. Perhaps the individual nature of specific work related to the doctorate is such that

it makes group study more difficult. Since the dissertation is a lonely project and must represent original research, it may lend itself more freely to study alone. The study suggests that administrators and faculty need to re-think how doctoral students can share and learn from each other, and how they can provide differential services to master's students and doctoral students to assist their learning.

Implications

International graduate students are a unique and increasing student population at American higher educational institutions. American higher education administrators and faculty expect this population to assimilate and act like the American students. Limited services and policies have been provided to support them (Davis, 1999). However, it is suggested that international graduate students be acknowledged and respected at universities and colleges in the United States. Based on the results of this study, universities may consider developing the following services, programs, and policies.

The university's International Center is the department that closely works with international graduate students. Several programs and services can be provided to meet international graduate students' needs at American universities. First, most international graduate students have difficulties in adjusting to American higher education. In addition to covering immigration laws, international students' orientation sessions may introduce American culture and offer information on the higher educational system, major teaching methods, educational expectations, and differential academic requirements of master's and doctoral levels. A series of ongoing orientation sessions should be arranged before and after international students enroll in academic programs. International graduate students should be aware of and prepare for the new learning environment.

Second, proficiency in spoken and written English is one of the contributing factors toward international students' academic success (Wray, 1981). Even though international graduate students who receive satisfactory TOEFL and GRE scores required by most universities, they may still need additional English language assistance. Ren, Bryan, Min, and Wei (2007) reported that the high scored international students had difficulties in understanding lectures, communicating with faculty and peers, and writing reports and papers. Hence, the English as a Second Language program may be offered to international students who need it.

Third, an annual "welcome back" event may be held at the beginning of each academic year. It provides international students an opportunity to support each other, maintain friendships, as well as make more connections with the university. An International Graduate Student Academic Awards ceremony may be held during the event to celebrate international graduate students' outstanding academic achievements. The winners could be invited to share their learning experience and effective and successful learning and study strategies. These strategies may be helpful to other international graduate students, especially the newcomers.

Fourth, the university's International Center is encouraged to invite students from the same regions to have regular activities, such as African Nights and the Middle Eastern Club. These activities would assist students from certain regions to reduce the sense of loneliness and to solve common problems (e.g., cultural shock) and academic difficulties (e.g., language deficiency) that people from the same region face.

Fifth, the administrators may provide differential services to master's and doctoral students. The study found that international graduate students' academic performance had a differentiated effect by the factor of graduate level, and the factors associated with master's students' academic performance were different than those associated with doctoral students'

academic performance. It is suggested that differential services and supports be provided to unique student groups, such as male master's students, female doctoral students, Middle Eastern master's students, and African doctoral students. These graduate-level-based services may meet the unique needs of international master's and doctoral students and assist their academic achievement.

Sixth, the university's International Center could provide more interaction opportunities for international students and American students, such as an international friendship service learning program, an international culture festival, a global house, and the international week. These events and activities may help international students understand American culture and educational expectations, as well as facilitating American and international students' friendships. On the other hand, these opportunities enable American students to become aware of other cultures, meet and talk with people from other countries/regions, and understand international affairs, policies, and business. In addition, departments or colleges may cooperate with the university's International Center in these activities, encouraging international graduate students and American colleagues to study and work together, providing faculty mentorship, and organizing academic discussions and research activities. All these activities not only assist international graduate students' academic success, but also make them feel supportive and welcomed on campus.

The university could provide workshops for faculty to enable them to understand international graduate students' learning difficulties and needs, provide appropriate academic advisement, and adjust their teaching methods and strategies. The workshop could include the following topics: international graduate students' academic needs and challenges, international students' learning adjustments, effective teaching methods and strategies for international

students, and appropriate academic advisement and mentorship. These workshops also could provide faculty members an opportunity to share their experience of teaching and mentoring international graduate students. This study suggests the following teaching strategies to assist international students' learning: provide handouts or slides to assist comprehension, avoid using slang or culture-related words in class, help find study-mates or discussion groups, provide more interaction opportunities after class, create opportunities to interact with American students, and have patience and respect for international students. This study suggests the following academic advising strategies: provide appropriate academic advisement on taking suitable courses and credits by considering international graduate students' academic needs and difficulties; introduce the American graduate school system, degree requirements, and educational expectations of graduates; and give advice on the choice of academic majors based on the students' gender, age, native culture, English language proficiency, continuity of academic majors, and the degree they seek.

Factors other than the Graduate Record Examination (GRE) and the Test of English as a Foreign Language (TOEFL) scores could also be considered in the admissions process. The university admissions criteria for international graduate students usually include TOEFL and GRE scores. Light and colleagues (1987) found that the overall TOEFL score has a statistically significant correlation with international graduate students' GPA. Nelson and colleagues (2004) also asserted that the GRE score is a generally valid predictor of first-year graduate grade point average (GGPA) and final GGPA. However, several researchers were not able to find clear evidence regarding the relationship between international students' TOEFL scores and their academic success, as measured by the GGPA in their studies (Neal, 1998; Simner, 1999; Yule & Hoffman, 1990). Therefore, GRE and TOEFL scores should not be used as the sole criterion

during the admissions process. The findings of this study revealed that other factors are associated with international graduate students' academic performance. The admissions officers may appropriately assess international graduate students by graduate level of application. In addition to GRE and TOEFL scores, admissions officers may consider the applicant's academic background and work experience, previous academic performance, and academic motivation. The comprehensive criteria may provide a better prediction of international graduate students' academic achievement in the United States.

This study suggests that recruitment policies could be developed to balance student population across disciplines. The study found that the majority of international graduate students were in the hard/applied majors. For example, the engineering programs were dominated by international students in graduate programs. A focus group participant said, "I study with usually international students because in engineering we don't have many American students anyway." The unbalanced student population does not contribute to diversity at American universities. International students may feel lonely when the department is dominated by Americans. American students may have the same feelings when they study in a department dominated by the international student population. Furthermore, it is unhealthy for a department to recruit students from only one country or region. A Korean student said, "There are lots of Korean students in my department so we usually discuss in Korean, which I found hard to solve the questions in English." International graduate students reported that they wanted to study with Americans and students from other countries.

On the other hand, the unbalanced student population in certain disciplines may cause the lack of Americans in certain fields in the future (e.g., resulting in an engineer crisis) because many international students return to their home countries upon graduation. The recruiting

officers may develop policies to attract international students to non-hard/applied majors and under-represented disciplines. The recruiting policies may include these suggestions: offering financial aid opportunities to international students who apply non-hard/applied majors, providing research and work opportunities with a diverse student population in under-represented departments, hiring international students from under-represented regions as recruiting assistants in their home countries, and replacing selected admissions criteria by international students' relevant work and educational experiences.

Contributions

This study contributes to educational literature, theory, practice, and policy development in international graduate students' choice of academic majors and academic performance in American higher education. First, the study added to limited research on international graduate students. International graduate students are an understudied population. The majority of existing research has focused on international undergraduate students, or it has not distinguished between international undergraduate students and international graduate students. Due to the special academic requirements of graduate level study and unique academic difficulties that international students face, this study focused on international graduate students in isolation. The study investigated factors associated with international graduate students' choice of academic majors and academic performance, based on the researcher's model of choice of academic majors and academic performance (Figure 3-1). This model was adapted from Wigfield and Eccles's (2000) Expectancy-Value model of achievement motivation (Figure 2-1). Considering the nature of international graduate students, the researcher simplified Wigfield and Eccles's (2000) model and added four new constructs in Figure 3-1: welcome of international students, English language proficiency, English language ability belief, and demographics (native regions, graduate level, and length of time in the United States).

Second, the study extended existing research on international graduate students' academic performance. Previous studies have examined such factors as English language proficiency, learning and study strategies, and cross-cultural adjustment. However, researchers also indicated that international graduate students' academic performance is multi-dimensional (Kuncel, Hezlett, & Ones, 2001). The study found that the graduate level was the interaction factor of international graduate students' academic performance. Doctoral students' previous academic experience, doctoral degree requirements, and educational expectation of doctoral graduates may be the main reasons of the significant difference between master's and doctoral levels. Native regions, gender, length of time live in the United States, length of weekly study time, undergraduate GPA, expectation of success, welcome of international students, and English language ability belief were found to be additional factors influencing this population's academic performance.

Third, the study contributed to the literature on international graduate students' choice of academic majors. The existing studies on students' choice of academic majors were focused only on American students. No study was found on international students' choice of academic majors. This study's quantitative and qualitative findings contributed to the literature gap on factors associated with international graduate students' choice of academic majors. Due to the nature of international graduate students, more factors of academic choice were found beyond the Wigfield and Eccles's (2000) Expectancy-Value model. Native cultures, welcome of international students, English language proficiency, English language ability belief, academic major's popularity in the home country, and financial assistance opportunities were additional factors that were found related to international graduate students' choice of academic majors in the United States.

Fourth, the results and implications of this study may be of interest to practitioners and policymakers in higher educational institutions with a large international graduate student population, as well as to those practitioners and policymakers in institutions who wish to attract a larger number of international graduate students. The study assisted institutional faculty and administrators to better understand this particular population and their academic needs. It also suggested new policies, services, and programs to the university policymakers, the office of enrollment management, and the university's International Center to support international graduate students' academic success and increase institutional diversity in American higher education.

Recommendations for Further Study

The researcher suggests that future research investigate the reasons for graduate level differences in international graduate students' academic performance. The graduate level was found to be the significant interaction factor in international graduate students' academic performance. The reasons for the differences in master's and doctoral level international students' academic performance may be studied to assist us to better comprehend and assist this population by graduate levels.

Future research on international graduate students' academic performance may consider evaluation methods in addition to their graduate GPA. Other evaluation methods may include length of program completion time, research productivities and contributions, and participation in academic activities. The combination of the evaluation methods may provide a more comprehensive picture of international graduate students' academic performance.

The factors associated with international graduate students' academic choice and performance are complex. Future research may explore other factors to extend the researcher's model of international graduate students' choice of academic majors and academic performance

(Figure 3–1) that was presented in Chapter 3. For example, financial assistance opportunities, career goals, and academic major's popularity in the home country may be included in the construct of subjective values; influence of academic advisors/mentors, peers, and family may be included in the construct of social influence, frequency of interaction with professors and peers may be considered as one of the learning and study strategies; and personality may be included in the construct of demographics.

Table 5–1. Significant factors associated with choice of academic majors by type of academic majors

Significant factor	Hard/pure	Hard/applied	Soft/pure	Soft/applied
Native regions	Africa (+) vs. Central and South Asia*	Africa (+) vs. Central and South America**	Africa (+) vs. Central and South America**	Central and South America (+) vs. East and Southeast Asia**
		Africa (+) vs. Central and South Asia**	Africa (+) vs. Central and South Asia**	Central and South America (+) vs. Europe*
		Africa (+) vs. East and Southeast Asia**	Africa (+) vs. East and Southeast Asia**	Central and South Asia (+) vs. non-Central and South Asia**
		Africa (+) vs. Middle East*	Africa (+) vs. Middle East*	Middle East (+) vs. East and Southeast Asia*
		Central and South Asia (+) vs. non-Central and South Asia**	Europe (+) vs. Central and South America**	
		East and Southeast Asia (+) vs. Europe*	Europe (+) vs. Central and South Asia**	Europe (+) vs. East and Southeast Asia*
Age	< 30 (+) ≥ 30**			< 30 vs. ≥ 30 (+)**
Gender		Male (+) vs. female**	Female (+) vs. male**	Female (+) vs. male**
Academic major continuity		Yes (+) vs. no**		No (+) vs. yes**
Graduate level	Doctoral (+) vs. master**			Master (+) vs. doctoral**
English language proficiency			0% vs. 1%–20% (+)*	1%–20% (+) vs. 51%–100%**
				21%–50% (+) vs. 51%–100%*

*p < .05; **p ≤ .001. (+) indicates this group is more likely to choose this type of academic major than the other group.

Table 5–1. Continued

Significant factor	Hard/pure	Hard/applied	Soft/pure	Soft/applied
Relevance of academic background		Yes (+) vs. no**	No (+) vs. yes**	
Relevance of work experience				Yes (+) vs. no*
English language ability belief	Yes (+) vs. no**		No (+) vs. yes*	
Welcome of int'l students	Yes (+) vs. no**	Not sure (+) vs. no**	Yes (+) vs. not sure**	No (+) vs. yes**
Family influence	Yes (+) vs. no**		No (+) vs. yes**	No (+) vs. yes*
Professor's prestige	No (+) vs. yes*	Yes (+) vs. no*	Yes (+) vs. no**	
Academic interest	Not sure (+) vs. no*	No (+) vs. yes*	Yes (+) vs. no*	Yes (+) vs. not sure**
Major's academic rank		Yes (+) vs. no**	No (+) vs. yes**	
Expectation of success			Yes (+) vs. not sure*	No (+) vs. yes**
Job opportunities		Yes (+) vs. no**	No (+) vs. yes**	Yes (+) vs. not sure**

*p < .05; **p ≤ .001. (+) indicates this group is more likely to choose this type of academic major than the other group.

Table 5–2. Significant factors associated with academic performance by graduate level

Significant factor	Master’s level B (b)	Doctoral level B (b)
Africa		-.207 (-.701)**
Europe	-.137 (-.493)*	.075 (.176)*
Central and South Asia	-.178 (-.388)*	-.170 (-.334)**
Middle East	-.175 (-.658)**	
Gender	.154 (.312)*	-.090 (-.129)**
Length of time stay in the U.S.		.152 (.063)**
Length of weekly study time	.194 (.127)**	.082 (.031)**
Study alone	-.243 (-.480)**	.145 (.218)**
Undergraduate GPA	.111 (.118)*	.175 (.125)**
English language ability belief		.080 (.081)*
Expectation of success	.158 (.361)**	
Welcome of int’l students	.148 (.204)**	

*p < .05; **p ≤ .01.

APPENDIX A
ONLINE QUESTIONNAIRE PROTOCOL

Informed Consent

Please read this consent document carefully before you decide to participate in this study.

Purpose of this study: The purpose of this study is to investigate international graduate students' motivation for choosing current majors in the United States, factors associated with students' academic performance, and learning experience in American higher education.

What you will be asked to do in the study: You will be asked to fill out a questionnaire.

Approximate time needed: 10 minutes.

Risks and Benefits and Compensation: There are no anticipated risks, compensation or other direct benefits to you as a participant in this survey.

Confidentiality: Your answers will be completely CONFIDENTIAL and your identity will be ANONYMOUS. Your name will not be asked. The result will be released only as summaries in which no individual answers can be identified.

Voluntary participation: Your participation in this study is completely voluntary. There is no penalty for not participating.

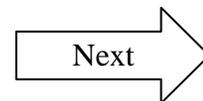
Right to withdraw from the study: You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study: Jia Ren, Department of Educational Administration & Policy, University of Florida. Address: P.O. Box 117049, Gainesville, FL 32611. Phone: (352) 392-2391.

Whom to contact about your rights as a research participant in the study: UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250. Phone: (352) 392-0433.

- * 1. I have read the procedure described above.
- I voluntarily AGREE to participate in the survey.
- I DISAGREE to participate in the survey.

*Answer required.



Questionnaire

Section I: Learning experience and academic performance

2. Please choose your major learning method.

	Reading	Listening	Discussion with teachers/peers
In the U.S.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In home country	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Please choose the major teaching method.

	Lecture	Seminar
In the U.S.	<input type="radio"/>	<input type="radio"/>
In home country	<input type="radio"/>	<input type="radio"/>

4. Please indicate the average length of your weekly study time (including all academic related activities) in the United States.

- ≤ 10 hours/week
- 11–20 hours/week
- 21–30 hours/week
- 31–40 hours/week
- 41–50 hours/week
- 51–60 hours/week
- 61–70 hours/week
- ≥ 71 hours/week

5. Currently, how much proportion do you use your NATIVE language in all academic related activities?

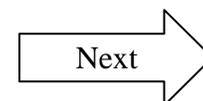
- 0 %
- 1–20%
- 21–50%
- 51–100%

6. On average, how much proportion of time do you use the following study methods in the United States?

	0%	1–20%	21–50%	51–100%
Study alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study with students from home country	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study with students from other countries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. What are/were your GPA (grade point average) scores (including your current study)?

	4.0	3.7–3.9	3.4–3.6	3.0–3.3	< 3.0	NA
Undergraduate level	<input type="radio"/>					
Master's level	<input type="radio"/>					
Doctoral level	<input type="radio"/>					



Section II: Motivation of academic choice

8. Are the following reasons why you choose your current major in the United States?

	Yes	No	Not sure
I believe my English is adequate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have relevant academic background.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have relevant work experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am interested in this academic area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know I will be academically successful in this major.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I came for the professor’s prestige in this academic field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel welcomed and accepted in this department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family wanted me to study in this major.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will have more job opportunities with a degree in this major.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This major’s academic rank is high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section III: Background information

9. Your gender: Male Female

10. Your age: _____

11. Your native country/area: _____

12. Your native language: _____

13. Which graduate level are you currently studying at?

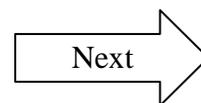
- Master’s level
- Doctoral level

14. Your undergraduate major: _____

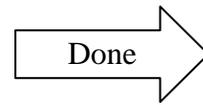
15. Your current graduate major: _____

16. How long have you stayed in the United States?

- < 1 year
- 1–2 years
- 2–3 years
- 3–4 years
- 4–5 years
- > 5 years



You have completed the questionnaire. Thank you for your time and assistance.



APPENDIX B
FOCUS GROUP INTERVIEW PROTOCOL

Informed Consent

Please read this consent document carefully before you decide to participate in this study.

Purpose of this study: The proposed study investigates international graduate students' educational experience in American higher education, learning and study strategies used in the United States, and academic major's decision-making processes.

What you will be asked to do in the study: You will be asked to provide your demographic status (excluding your name) prior to the interviews. You will be in a group of interviewees, and allow an interviewer to complete and audio-record a one-time focus group interview. The interviewers will ask general questions about your educational experience, learning and study strategies, and reasons for choosing your current academic major.

Time required: Approximately one hour.

Risks and Benefits and Compensation: A lunch will be provided before the interviews. We appreciate your voluntary participation. There are no anticipated risks, or other direct benefits to you as a participant in this survey.

Confidentiality: Your interview will be audio-recorded and later transcribed by the interviewer completing the interviews. Your answers will be completely CONFIDENTIAL and your identity will be ANONYMOUS. Your name will *not* appear on the transcript, nor be used in any report. The result will be released only as summaries in which no individual's name is included.

Voluntary participation: Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study: You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study: Jia Ren, Department of Educational Administration & Policy, College of Education, University of Florida. Address: P.O. Box 117049, Gainesville, FL 32611. Phone: (352) 392-2391.

Whom to contact about your rights as a research participant in the study: UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250. Phone: (352) 392-0433.

I have read the procedure described above. I voluntarily agree to participate in the procedure.

Participant: _____ Date: _____

Principal Investigator: _____ Date: _____

Focus Group Interview Protocol

Section I: Demographic information

Age: _____ Gender: _____
Original country/area: _____ Native language: _____
Current major: _____ Academic level: _____
Length of time in the U.S. (year): _____ Length of time learning English (year): _____

Section II: Questions

Educational Experience:

1. What were the academic challenges that you faced in the first year studying in a graduate program in the United States? How did you adjust? What are the challenges now?
2. What are the differences between your home country and the U.S. based on your educational experience? Did the differences affect your learning in the United States?

Academic Motivation:

3. Please describe the reasons why you decided to choose your current major?
4. If you stayed in your home country, would you have chosen your current major? Why or why not?

Learning and Study Strategies:

5. What were the learning and study strategies you used in your home country and in the U.S.? Were the strategies used in your home country different from those in the U.S.?
6. Do you read, think, write, and talk about things related to academics in your native language or in English? If you use your native language, in what proportion? How does using your native language help or prevent your academic success? Please briefly explain.
7. How do you manage your study time and leisure time in your home country and in the United States? Is there any reason why you manage your time in this way in the United States?

THANK YOU FOR YOUR TIME AND ASSISTANCE.

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BIOGRAPHICAL SKETCH

Jia Ren was born in Shanghai (China) in 1978 and was raised in that city. She earned a Bachelor of Arts degree in English language and literature in 2000, and a Master of Education degree in educational administration in 2003 from East China Normal University in Shanghai, China. She taught courses and conducted research while at East China Normal University, and also authored and co-authored journal articles and book chapters.

Jia Ren lived in Shanghai until 2003 at which time she left for the United States to pursue her doctoral degree. She studied at the University of Central Florida in Orlando, Florida, for one year as a Presidential Fellow. She married Lian Qi in December 2003, and then transferred to the University of Florida in 2004 where Lian was working on his doctoral degree. Jia Ren was an Alumni Fellow, research assistant, and instructor during her study at the University of Florida.

Jia Ren received a Doctoral of Philosophy degree in Higher Education Administration in 2008 from the University of Florida. Jia and Lian have become Gator fans. They have a son, Benjamin, and a daughter, Hanna.