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**ENGLISH LANGUAGE PROFICIENCY AND ACADEMIC ACHIEVEMENT OF
INTERNATIONAL STUDENTS: A META-ANALYSIS**

by

Rachawan Wongtrirat

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirement for the Degree of

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May 2010

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ABSTRACT**ENGLISH LANGUAGE PROFICIENCY AND ACADEMIC ACHIEVEMENT
OF INTERNATIONAL STUDENTS: A META-ANALYSIS**

Rachawan Wongtrirat
Old Dominion University, 2010
Director: Dana Burnett, Ph.D.

Studies have been conducted to determine the impact of English language on the academic achievement of international students in higher education institutions in the United States. The results of these investigations have been varied and at times contradictory. The purpose of this meta-analysis was to investigate studies from 1987-2009 that examined the correlation between the Test of English as a Foreign Language (TOEFL) on grade point average (GPA) and course completion. The results indicated that the TOEFL has a small predictive ability on GPA and course completion of international students at both the undergraduate and graduate levels. The findings are useful for university admissions offices and academic departments responsible for admissions decisions for international students.

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As an international student in the U.S., this study is not only of academic interest but also of personal importance to me. Coming from a country where English is not the native language, my educational achievement would not be easily accomplished without support from Old Dominion University, the Darden College of Education, the administrative staff, friends, faculty and especially my dissertation committee.

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CHAPTER I

INTRODUCTION

Student mobility has been a very prominent subject for higher education institutions around the world and has become a significant element in institutional operations. As learning opportunities and knowledge are no longer limited by a nation's borders, higher education institutions have been profoundly influenced by the international expansion of academic institutions, scholars and research (Altbach, Reizberg & Rumbley, 2009; Childress, 2009).

Higher education institutions and their host countries recognize the value of international students and their impact on academics, economics, culture; and the political impact on campuses, communities, and the nation. According to the United Nations Education Science and Cultural Organization (UNESCO), in 2005, there were 2.17 million students enrolled in higher education institutions in countries other than their own. UNESCO predicts that the global demand for international education enrollment will increase to 7.6 million by 2025 (Altbach, et al., 2009), which would be a 70% increase in twenty years. The expansion of international student enrollment and demand, therefore, is one of the essential goals and commitments of higher education institutions (Basile, 2005; Kember, 2009). However, success in enrolling international students also comes with the institutional responsibility to welcome, support, provide service and to ensure the academic achievement of these students (Georgeine, 1993; Stephenson, 2004).

Institutions compete for students, reputation, rankings and funding. Many public institutions enroll international students, in part, because they pay a higher tuition rate, which helps offset declining state funding. To entice international students to their

campus, institutions have enhanced international student enrollment policies as a part of institutional strategic plans, improved the recruiting strategies for the international student market, and focused on support services to assist international students on campus (Basile, 2005; O'Hara, Raftus, & Stedman, 2000).

The United States enrolls the largest international student population in its higher education institutions (Munche, Kelo, & Wachter, 2004). *Open Doors*, the annual publication of the Institute of International Education (IIE) with support from the United State Department of State's Bureau of Educational and Cultural Affairs, reported in 1987/88 that there were 356,187 international students enrolled in U.S. higher education institutions. This number comprised 2.8% of the total student population in higher education. The latest *Open Doors* report for the 2008/09 academic year indicated 671,616 international students were enrolled on U.S. campuses (Institute of International Education [IIE], 2009). This enrollment marked an 8% increase from 2007/08 and was the largest percentage increase in international enrollment since 1980, equating to over a 180% increase in international student enrollment in just over the past twenty years.

Table 1 presents international student enrollment in the 2008/09 academic year from the top 10 countries of origin. According to *Open Doors*, students from the top ten leading countries have captured over 40 % of the overall international student population. Nine out of ten are countries where English is not the first language (Canada is the only English speaking country). India remains the leading country of origin for the eighth consecutive year, increasing by 9 % to 103,260 students from the previous year, while China remains second with an increase of 21% for a total of 98,510 students.

Table 1

Top 20 Leading Places of Origin of International Students, 2007/08 & 2008/09

Rank	Place of Origin	2007/08	2008/09	% of Total 2008/09	% Change
1	India	94,563	103,260	15.4	9.2
2	China	81,127	98,235	14.6	21.1
3	South Korea	69,124	75,065	11.2	8.6
4	Canada	29,051	29,697	4.4	2.2
5	Japan	33,974	29,264	4.4	-13.9
6	Taiwan	29,001	28,065	4.2	-3.2
7	Mexico	14,837	14,850	2.2	0.1
8	Turkey	12,030	13,263	2.0	10.2
9	Vietnam	9,873	12,823	1.9	46.2
10	Saudi Arabia	9,004	12,661	1.9	28.2
Top 10 Total		382,584	417,183	43.84	-
World Total		623,805	671,616	100.0	8

Note. Adapted from “Open doors: 2008/09 Report on International Educational Exchange”, 2009. Retrieved from <http://www.iie.org/en/Research-and-Publications/Open-Doors>. Copyright 2009 by the Institute of International Education.

The two countries showing the greatest increase in the number of their citizens who studied in the U.S. in 2008/09 were Vietnam and Saudi Arabia. Vietnam jumped into the ninth spot with a dramatic 46% increase to 12,823. Its 2008/09 growth followed increases of 45% in 2007/08 and 31% in the 2006/07 academic year. Saudi Arabia, the tenth leading exporter of students increased enrollment by 28% to 12,661 students. This was due to the continued investment by the Saudi Arabian government in their students through a scholarship program launched in 2005 (IIE, 2008/09).

Students from Turkey who study in the U.S. increased by 10% to 13,263, moving Turkey to a ranking of the eighth largest in the U.S., in terms of number of students from a particular home country. Other notable increases were seen in enrollments from Nepal, which increased 30% to 11,581 students, Germany, which increased 9% to 9,679, and Brazil, which increased 16% to 8,767 students enrolled in the United States higher education institutions. *Open Doors* reported the majority of international students in the United States came from countries where English is not the native language, and (61%) these students came from Asia (IIE, 2008/09).

Statement of the Problem

The academic success of these students is very important to both the student and to the host institution. In this regard, a significant challenge for the host institutions is to predict which applicants are most likely to be academically successful. In general, the admissions criteria for international students who seek admittance to U.S. colleges and universities is similar to domestic students, except that those for whom English is not the native language, must submit an evaluation of their English language proficiency as part of the application process.

In the U.S., nearly all higher education institutions require a score from an English standardized test. The Test of English as a Foreign Language (TOEFL) is the most frequently submitted score in the U.S., along with the Institutional English Language Testing System (IELTS) and the Michigan Test of English Language Proficiency (Stephenson, 2004). Knowing that English language proficiency plays an important role in admissions, many researchers have examined the impact of English language proficiency on academic achievement of international students (Dunn 2006; Krausz, 2005; Light & Xu, 1987; Lo, 2002; Ng 2007; Salinas, 2007; Stoyhoff, 1997; Tanchaoenrat, 1988;; Thannisch, 1992; Yan, 1995; Yul & Hoffman, 1990; Zhang, 1996). However, the results of the findings have been contradictory over the time period.

The purpose of this study was to conduct a meta-analysis of studies that examined the relationship of English proficiency and academic achievement of international students from 1987 through 2009. The correlations of English proficiency and academic achievement from 22 studies were re-calculated and used to systematically determine the overall relationship of these two variables.

Research Questions

The main research question was “What is the average correlation between English proficiency and academic achievement of international students?”

The sub research questions were:

1. What is the average correlation between TOEFL scores and grade point average (GPA) of international students?
2. What is the average correlation between TOEFL scores and grade point average (GPA) of international undergraduate students?

3. What is the average correlation between TOEFL scores and grade point average (GPA) of international graduate students?
4. What is the difference between the correlation of TOEFL scores and grade point average (GPA), of international undergraduate and graduate students?
5. What is the average correlation between TOEFL scores and course completion of international students?
6. What is the average correlation between TOEFL scores and course completion of international undergraduate students?
7. What is the average correlation between TOEFL scores and course completion of international graduate students?
8. Is there any difference between the correlation of TOEFL scores and course completion of international undergraduate and graduate students?

Significance of the Study

As U.S. higher education institutions continue to recruit and admit more international students, the implications and wide ranging effects of these students' academic achievement should increase in importance for offices of international admissions and academic departments. The results provide comprehensive information that admissions offices and academic departments can use as a guideline to enhance or to adjust current admissions requirements, and to identify and implement effective admissions decisions for prospective international student applicants.

Definition of Key Words

International student. A student enrolled in a U.S. higher education institution. The student must not be a U.S. citizen or permanent resident, and must be a holder of a student or exchange student visa. The word “international student” can be interchanged with “foreign student”.

Non-native English Speaker. A student for whom English is not the first language.

English language proficiency. English language abilities measured by international standardized tests.

Test of English as a Foreign Language (TOEFL). A standardized test measuring the English language abilities of students.

Academic achievement. The quality of academic work measured by grade point average (GPA) or number of credits/courses completed or both. Academic achievement can be interchanged with academic performance, academic accomplishments and academic success.

Grade Point Average (GPA). The average grades for the semester or accumulated GPA depending on the number of semesters enrolled.

Course completion. Course completion is defined as the sum of course enrollments where the student received an official grade of A, B, C, or Credit (CR) divided by attempted course enrollment (Ng, 2007).

CHAPTER II

LITERATURE REVIEW

Secretary of State Hillary Clinton commented on the importance of international education in an interview during her visit to Thailand on July 22, 2009:

“We have been working together for 176 years, and there have been a number of important initiatives over that long period of time. But I think educational exchanges and student exchanges are among the most important, and I would like to see even more of them. I’d like to see more American students going to Thailand. I’d like more American faculty going to Thailand, and I’d like more students and faculty from Thailand coming to the United States.

I think that one of the reasons that our alliance has been so strong over so many years is that people know a little bit more about each other’s culture. We have experienced it. We respect each other. And I’d like to see us do even more of that.”

United State Department of State (2009)

International Students in the United States

Although the 671,616 international students enrolled on U.S. campuses in 2008/2009 comprised only 3.7% of the total U.S. higher education student population, the educational, cultural, political and economic impact of these students is extensive and reflects a noteworthy resource of goodwill. The U.S. Department of Commerce reported that international education is one of the fastest-growing segments of the U.S. economy, and ranked higher educational services as the nation’s fifth largest segment of the commodity service sector (IIE, 2008/09). During the 2000/01 academic year, international students contributed approximately 13 billion dollars to the U.S. economy and over 17.8 billion dollars in 2008/09 through tuition fees, cost of living, and other expenses (IIE, 2008/09). In the international market, international students also help generate demand for U.S. dollars as they must exchange or transfer money from their

countries currency for expenses during their study in the U.S. International alumni are also considered great customers and future business partners (Potts, 1992).

The education of international students is also beneficial to political and foreign policy. Higher education degrees from a host country provide an international student with an appreciation of the host country's culture and create a foundation for future mutual understanding and goodwill (Goodman, 1996). International students return to home countries as unofficial ambassadors for a host country as they share stories and experiences with friends, family, and others (Thorstensson, 2001). The social contacts and relationships formed during their school years compensation both short and long-term dividends to the U.S. economy (Waters, 1992). The significance of the political impact of international students has been confirmed by the U.S. Department of State. The list of international students of yesterday who have become the foreign leaders of today has been published by the United States Department of State's Bureau of Educational and Cultural Affairs. A short list if the leaders show in Table 2.

Table 2

Foreign Leaders Who Graduated from U.S. Institutions of Higher Education

Country	Name	Position	Alma Maters
Afghanistan	Amir Shah Hasanyar	Minister of Higher Education	Colorado State University
Bangladesh	Iajuddin Ahmed	President	University of Wisconsin
China	Wang Guangya	Ambassador to the United Nations	Johns Hopkins University

Ghana	Kofi Annan	UN Secretary General (former)	Macalester College MIT
Indonesia	Susilo Bambang Yudhoyono	President	Webster University
Norway	Haakon Magnus	Crown Prince	University of California/ Berkeley
Pakistan	Shafqat Ali Shah Jamot	Federal Minister for Food, Agriculture & Livestock (former)	University of Virginia
Saudi Arabia	Dr. Nasir Al Sallum	Minister of Communications, Riyadh	Arizona State University
Thailand	Surin Pitsuwan	Minister of Foreign Affairs (former)	Harvard University

Note. Adapted from U.S. Department of State's Bureau of Educational and Cultural Affairs, 2009. Retrieved from http://exchanges.state.gov/uploads/VX/Gh/VXGhNXMfd4N_jILMrp2cg/OGEP_LEADER_2008.pdf.

International students provide academic benefits to the host institution educating them (Stohl, 2007). International students enhance an institution's intellectual environment by offering different perspectives that enrich the education of all students, both inside and outside of the classroom (Fitzer, 2007). Faculty have indicated a positive response to having international students in the classroom because they augment class discussions, share new perspectives, are respectful and are interesting to teach (Fitzer, 2007; Trice, 2003). In addition, international students often demonstrate excellent academic performance and persistence, provide positive academic values, and help elevate the standard of higher education of the host countries (Trice, 2005).

International students add cultural values to campuses and communities. They help diversify the campus by creating a multicultural learning and living environment for domestic students (O'Hara, et al, 2000). Domestic students' interactions with international students provide the first close and extensive contact with people from foreign countries. Therefore, international student enrollment is necessary to create a genuine global learning environment on campus so that domestic students will be better equipped to become successful citizens of the twenty-first century (NAFSA, 2001).

International Student Enrollment

The Institute of International Education (IIE) has conducted an annual statistical survey of international student enrollment since 1919, but the official report of international student enrollment was first published in *Open Doors* in 1954/55. This report has been supported by the U.S. Department of State's Bureau of Academic and Cultural Affairs since the 1970s. International student enrollment and percentage changes from 1954/55 through 2008/09 can be found in an Appendix A.

In the 1954/55 academic year, there were only 34,805 international students enrolled on U.S. campuses. The enrollment increased to 356,187 students in 1987/88, which marked a 1,000 % increase in enrollment within just three decades. Numbers of international students enrolled in the U.S. continued to grow until terrorists attacked the World Trade Center buildings on September 11, 2001. The tragedy led to heightened security and stricter immigration regulations in the U.S., making it more difficult for international students to continue their international education objectives (Fitzer, 2007; IIE, 2002; Keith 2005). This resulted in a decline of international student enrollment which continued until 2005/06.

However, due to global demand for international education around the world, after three years of decline, enrollments bounced back again in 2006/07 and continued increasing through 2007/08. The latest report for the 2008/09 academic year indicated the highest enrollment of all time of 617,661 international students on U.S. campuses, an 8 % increase from the previous year (IIE, 2008/09).

The TOEFL and Academic Achievement of International Students

Academic achievement is a critical and primary goal for international students. Many international students choose to study in the U.S. because of the academic reputation of American institutions and the advanced knowledge of faculty that may not be available in their home country (Basile, 2005; Kemper, 2009; Munche, Kelo, & Wachter, 2004; O'Hara, et al, 2000). In many countries outside the United States, possessing a degree from the U.S. not only provides better employment opportunities and a chance to receive higher pay, but it also elevates the social status of students and their

families (Yoshihara, 1998). Academic achievement and the commensurate degree completion is, therefore, very important for international students.

Although the U.S. is a decentralized system of higher education, most institutions have similar admission requirements for international applicants and their domestic students, with the exception of proof of English language proficiency for students for whom English is not the native language (Munche, et al, 2004). As the majority of international students in U.S higher education institutions came from a country where English is not the first language, determining their potential for academic success can be quite a challenge.

As the U.S. has the highest international student enrollment in the world, the academic achievement of these students is of great interest to institutions around the country, especially since it is not easy to predict the academic success of those who do not speak English as a first language. In the U.S., the Test of English for Foreign Language (TOEFL) score is the most common standardized test accepted for admission of international students (Stephenson, 2004). The TOEFL is written and distributed by the Educational Testing Service (ETS) and is administered at test centers in countries around the world. The purpose of the TOEFL is to measure language proficiency of a non-native English speaker. Although there are questions about the prognostic ability of the TOEFL scores, it provides decisive information for the admissions office and academic department by providing a general idea of a student's level of language proficiency (Graham, 1987; Light, Xu & Mossop, 1987; Ng, 2007).

The proficiency of international student applicants in English language ability is very important as it is difficult to presume that students will perform academically well if they are not able to understand instructors, answer questions, do homework and respond to the exam. In addition, language difficulty impacts not only international student academic performance, but the instructors and the classroom environment (Meloni, 1986). Therefore, it certainly benefits an institutions' admission office and academic departments to know how language proficiency impacts the academic success of international students.

Over the years, researchers have investigated the impact of English language proficiency on international student academic achievement. Indeed, contradictory evidence exists in the literature about the affect of English proficiency on academic performance. (Abadzi, 1984; Ayer, et al, 1992; Bostic, 1981; Burgess & Greiz, 1984; Hail & Alemoni; 1974; Krausz et.al, 2005; Light et, al, 1991; Lo, 2002; Ng, 2007; Salinas, 2007; Stoyhoff, 1997; Thannisch, 1992; Rigg, 1982). It is important to note that these researchers may have measured academic achievement either by GPA, numbers of courses completed or both. Grade Point Average (GPA) is generally defined as the average grade for the semester or accumulated GPA depending on the number of semesters enrolled. Course completion is defined as the sum of course enrollments where the student received an official grade of A, B, C, or Credit (CR) divided by attempted course enrollment (Ng, 2007).

Burgess and Greis (1970) examined the relationship between English language proficiency scores from various standardized tests and the academic performance of 17 international students at Portland State University. TOEFL scores was found to be

significantly correlated to grade point average ($r = .53$). Writing was found to be a good predictor of total GPA, $r = .64$; with weighted GPA, $r = .66$), while listening ability was not ($r = .30$). The research concluded that proficiency in English reading and writing was important to college success, but the finding may not be generalized because the sample size was very small.

In contrast, Hwang and Dizney (1970) investigated a relationship between English-language proficiency and the academic success of 63 Chinese graduate students at the University of Oregon. The results indicated that English language test scores were poor predictors ($r = .19$) of students' GPA.

Gue and Holdaway (1973) conducted a study of the correlation between TOEFL and GPA of 123 Thai students. The relationship was found to be statistically significant but not strong. The correlation between the summer TOEFL scores and GPA was .49, and between the fall TOEFL scores and GPA the correlation was .59, both significant at the $p < .01$ level. Gue and Holdaway concluded that in their study, English proficiency was not a good predictor because of a small population of only 123 students and due to other personal character factors that impacted academic achievement of this group of students.

In 1981, Bostic examined the predictability of the TOEFL with a sample of 154 undergraduate international students at Oklahoma colleges and universities and found significant but not large positive correlations ($r = .17$) between the TOEFL scores and overall GPA. Again, the researcher concluded that this was because the population was small, although the correlation was positive it was not strong enough to conclude that the TOEFL scores is a good predictor of GPA.

Light, Xu and Mossop (1987) conducted a study of the impact of the TOEFL score as a predictor of academic success for 376 international graduate students at the State University of New York at Albany. The findings revealed that the TOEFL scores did not effectively predict ($r = .14$) academic achievement as measured by the GPA of international students. The study suggested that future research should consider non-language factors that might account for the academic achievement of the students admitted to universities.

In 1991, Light and Teh-Yuan examined the relationship between social perceptions, language proficiency, and academic success of 58 Soviet undergraduate students in the U.S. The study found that the TOEFL scores had a positive correlation with GPA and course completions.

Spurling (1987) found that the TOEFL is a good predictor for Hispanic students, but not students from other countries. The study also found that many students, particularly Vietnamese females, performed well in these courses even though they had not performed well on the English proficiency tests required for admission. The study suggested that English language scores should be used as advisory information rather than compulsory information for admissions.

Ayer & Quattlebaum (1992) reported a study on the impact of English language proficiency and academic achievement of 67 Asian students enrolled in a master's degree program in Engineering at Tennessee Technological University. The result indicated that English language proficiency measured by the TOEFL scores had a correlation at 0.5 with student academic achievement as indicated by their GPA. The researcher concluded that the TOEFL score was not an effective predictor of academic achievement.

Thannisch (1992) investigated the relationship between the TOEFL and the academic performance of 166 undergraduate international students at Texas A& M University. The result indicated that the TOEFL did not have an impact on academic achievement as measured by grade point average of the student sample.

Moore (1995) examined various indicators and their impact on academic success which included GPA and course completion of international students at Santa Monica College in California. The findings indicated that there were significant relationships between the TOEFL and the GPA.

Hui Zhang (1996) examined the relationship between English proficiency of international students in engineering programs from five different native language groups; Arabic, African, Chinese, other Asian and German-Spanish groups, and their academic performance as measured by GPA. The finding revealed that there was no significant relationship between international student the TOEFL scores and their first semester GPA or their overall GPA.

Stoyhoff, (1997) examined the factors associated with the academic achievement of 77 freshman international students during their first six months enrolled in a university. Language proficiency and selected learning and study strategies were found to correlate with students' academic performance (as measured by three variables--GPA, credits earned, and number of withdrawals). The findings were consistent with previously reported studies (Johnson, 1988; and Light, Xu, & Mossop, 1987) which indicated that the TOEFL scores have a moderate relationship in relation to the academic success of international students.

Krausz et.al (2005) examined the relationship between academic performance in a graduate financial accounting class and the TOEFL scores of international MBA students. The results indicated that the TOEFL scores are not associated with academic performance in graduate accounting for the international students.

In 2007, Ng investigated the relationship between English proficiency and student achievement of 433 international students. In addition to the TOEFL scores, the study also examined non-academic factors and their relationship with academic achievement. The research results indicated that the TOEFL scores are not a good predictor of international student academic achievement.

The studies mentioned in this chapter examined the relationship between English proficiency as measured by the TOEFL score and the academic achievement of international students. Because the findings lacked consistently high correlations between English test scores and academic achievement, conclusions about the strength of association between these variables has been mixed. After reviewing each research study, as a whole they did not reveal clear-cut answers for institutions looking for conclusions and guidance in making admissions decisions. Although researchers hypothesized that the TOEFL scores are useful predictors of academic success, research findings appear to different conclusions. Therefore, it is important to conduct a meta-analysis on the impact of English language proficiency on academic achievement of international students. Achieving a greater understanding of the relationship between these two variables may assist colleges and universities to more accurately predict the future academic success of international students in U.S. higher education institutions.

A Meta-Analysis of Academic Achievement of International Students

A meta-analysis related to the academic achievement of international students was first performed by Zorine Vogel (Vogel, 1989). This analysis analyzed studies that fell within the 1966-1986 time period and was undertaken to determine the impact of selected variables on the academic achievement of international students enrolled at higher education institutions in the United States. Nine independent variables; English proficiency, age, sex, country of origin, field of study, marital status, previous grade point average, aptitude test scores and source of financial support, were calculated to determine the effect size of each variable. The measure of effect size was used to measure the strength of association between the independent and dependent variables. Although the study included 19 studies in the analysis, each study examined different variables and had a small number of studies for each variable. Although the most frequent variable in the meta-analysis was English language proficiency, it was found in only 9 out of 19 research studies.

The meta-analysis indicated that English language proficiency has medium impact ($r = .28$) on the academic achievement of international students. Table 3 provides a list of studies that were used for the meta-analysis as cited in Vogel's study (1989). A review of the studies reported from 1987-2009 revealed that both academic and non-academic variables have been employed to investigate the academic achievement of international students. In addition, similar to Vogel's study, English proficiency was the predictor variable most frequently employed and, therefore, was selected as the predictor variable for this meta-analysis.

Table 3

English Language Proficiency and the Effect Size on the Academic Achievement of International Students Reported in Vogel, 1989

Researcher	Year	Weighted Average Effect Size
Ayers & Peters	1970	$r = 0.40$
Elting	1970	$r = 0.97$
Hwang & Dizney	1970	$r = 0.60$
Martin	1970	$r = 0.41$
Meledez-Craig	1970	$r = 0.37$
Sugimoto	1966	$r = 0.04$
Tan-Angarmtrong	1979	$r = 0.19$
Thomas	1972	$r = 0.36$
Wilcox	1974	$r = 0.46$
Mean Effect Size		0.28

Note. Adapted from “A meta-analysis of studies on the academic success of foreign students” Doctoral dissertation, University of Wisconsin, Madison. Copyright 1989 by Zorine Vogel.

CHAPTER III

METHODOLOGY

Chapter 3 presents the methodology used for this meta-analysis. The order of the steps performed were as follows: define the theoretical relationship of interest; collect the population of studies that provide data on the relationship; code the studies and compute effect sizes; examine the distribution of effect sizes and analyze the impact of moderating variables; interpret and report the results (DeCoster, 2004).

This study conducted a meta-analysis of 22 studies spanning 1987-2009 that reported a relationship between English language proficiency and academic achievement of international students in the United States.

In this study, English language proficiency referred to the TOEFL scores and the academic achievement included grade point average (GPA) and course completions of international students. The analysis utilized correlation coefficients (r) to calculate the average correlation from the included studies.

Research Questions

The main research question was “What is the average correlation between English proficiency and academic achievement of international students?”

The sub research questions were:

1. What is the average correlation between TOEFL scores and grade point average (GPA) of international students?
2. What is the average correlation between TOEFL scores and grade point average (GPA) of international undergraduate students?

3. What is the average correlation between TOEFL scores and grade point average (GPA) of international graduate students?
4. What is the difference between the correlation of TOEFL scores and grade point average (GPA) of international undergraduate and graduate students?
5. What is the average correlation between TOEFL scores and course completion of international students?
6. What is the average correlation between TOEFL scores and course completion of international undergraduate students?
7. What is the average correlation between TOEFL scores and course completion of international graduate students?
8. Is there any difference between the correlation of TOEFL scores and course completion of international undergraduate and graduate students?

Population

The research population of this meta-analysis consisted of 22 studies that reported the relationship between the TOEFL scores and the academic achievement of international students in the United States from 1987-2009.

Variables

The predictor variable was the TOEFL score and the criterion variable was the academic achievement of international students as measured by grade point average (GPA) or number of courses completed.

Data Collection

There are specific procedures for searching the research literature to find studies that can be included in a meta-analysis. These procedures must be followed meticulously. Keywords that were used to search for the studies included: international students, foreign students, academic achievement, academic success, academic accomplishment, admissions, English language proficiency, English as a Second Language, and Test of English as a Foreign Language (TOEFL).

The retrieval of studies was conducted using the following resources:

1. Electronic database: ERIC (Educational Resource Information Center), Proquest (Dissertation and Theses Full Text), SAGE full text collection, MasterFile Premier Wilson Web, Psychological Abstracts, Sociological Abstracts, and Education Research Complete (EBSCOHost).
2. Professional journals: Journal of Studies in International Education, Journal of Research in International Education, and TESOL Quarterly
3. International educator network: The researcher sent an email to NAFSA: Association of International Educator's knowledge communities' listserv to request and ask for assistance in obtaining reports or research studies. A list of the knowledge communities are:
 - 3.1 International education leadership
 - 3.2 International student and scholar services
 - 3.3 Recruitment, admissions and preparation
 - 3.4 Teaching, learning and scholarship

4. Websites of organizations related to international education: NAFSA

Association of International Educators, Institute of International Education (IIE), World Education Services (WES), the Educational Testing Services (ETS), The College Board, IELTS International, Association of International Education Administrators (AIEA), Association for Studies in International Education (ASIE) and Council for International Exchange of Scholars (CIES), etc. were searched for research reports and publications.

Criteria of Included Studies

The following are the criteria that were used when determining which studies to include in the meta-analysis:

1. The studies utilized a quantitative research design.
2. The studies were reported in a journal article, report or dissertation in English between 1987 and 2009.
3. The studies examined the relationship between English language proficiency and academic achievement of international students in higher education institutions of the United States.
4. The studies reported number (n) in samples or populations.
5. The studies reported correlation coefficient or contained sufficient statistical data that could be used to calculate correlation coefficient so as to provide uniform analysis.

Coding Process

The initial search provided 82 possible studies for the analysis. After all studies were thoroughly examined, 22 studies met the criteria to be included in this meta-analysis. A list of included studies is presented in Table 4.

Table 4

A List of Studies Included in the Meta-Analysis

Researcher	Source of Study	Year
Ayers, J, et al	Educational and Psychological Measurement	1992
Case, C.A.	Dissertation	1992
Dunn, J.W.	Dissertation	2006
Hu, S. P.	Dissertation	1991
Johnson, P.	TESOL Quarterly	1988
Krausz, J, et al	Accounting Education: An International Journal	2005
Light, R., et al	TESOL Quarterly	1991
Light, R., et al	TESOL Quarterly	1987
Lo, Jih-Wang	Dissertation	2002
Moore, S.K.	Dissertation	1995
Ng, Jacob	Dissertation	2007
Perry, W.S.	Dissertation	1988
Saisupaluck, S.	Dissertation	1997

Salinas, A.	Dissertation	2007
Sprotte, N.	Dissertation	1988
Stoynoff, S.	Journal of Instructional Psychology	1997
Tancharoenrat, O	Dissertation	1988
Thannisch, E. R.	Dissertation	1992
Wimberley, D.W., et al	Comparative Education Review	1992
Yan, Y.	Dissertation	1995
Yul, G., et al	TESOL Quarterly	1990
Zhang, H.	Dissertation	1996

All studies included in the meta-analysis were systematically added into Excel spread sheets. The characteristics of sample size, correlation coefficients of each study that examined English language proficiency, and academic achievement was recorded in the coding form for calculation.

Analytical Procedures

Analysis began by determining the average correlation coefficient (effect size) of English language proficiency and academic. Effect size measurements describe the degree to which the predictor variable affects the criterion. It serves as a way for comparing the magnitude between predictor variable and criterion variable (Rosenthal, 1991). In this meta-analysis, the Pearson's correlation coefficient was utilized to calculate for the relationship as measured by the effect size. The researcher extracted the correlation coefficient between each predictor variable and criterion variable that was

reported in the included studies. The conversion of effect sizes is one of the key elements of meta-analysis. Effect sizes must be converted when the database does not provide a coefficient from the same family (Schulze, 2004).

The correlation coefficients between variables obtained from the included studies were combined and calculated for the mean of the correlation in order to determine which predictor variables had a large, medium, or small effect on the academic achievement of international students (Schulze, 2004).

The steps for calculating for correlation effect size were as follows:

1. Record the sample size of each included study and calculate the total n of the population.

2. Calculate the correlation coefficient (r) from each individual inclusion study.

Correlation coefficients are widely used in meta-analysis as a measure of the linear relationship between two continuous variables. Table 5 indicates the formula provided by Rosenthal (1991) that can be applied to convert statistical data from the other type of the test of significance into the correlation coefficient.

3. Transforming r value to Fischer's Z

Fisher developed an equation that converts Pearson correlation r to the normally distributed variable Z called Fischer's Z , used when the sampling distribution of a correlation coefficient is somewhat skewed, especially if the population correlation is large. The transformation was performed using Fisher's r -to- Z transformation.

$$Z = .5 [\ln(1 + r) - \ln(1 - r)]$$

Table 5

Formulas for Converting Selected Inferential Statistics to r

Statistic	Formula
<i>t</i> -scores	$r = \sqrt{t^2 / (t^2 + df)}$ <p>where $df = n_1 + n_2 - 2$</p>
<i>F</i> values	$r = \sqrt{(F(1,-) / (F(1,-) + df_{error}))}$ <p>where $F(1,-)$ indicates any F with $df = 1$ in the numerator</p>
<i>Z</i> values	$r = \sqrt{Z^2 / n} = Z / \sqrt{N}$ <p>in case that none of tests of significance have been reported</p>
Cohen's <i>d</i>	$r = d / \sqrt{d^2 + (1/pq)}$ <p>when only Cohen's <i>d</i> available</p>

Note. Adapted from "Meta-Analytic Procedures for Social Research". CA: Sage.

Copyright 1991 by Rosenthal.

4. Computing the average effect size from weighted average *Z*

$$W_z = \sum (Z \times N) / \sum (N)$$

To calculate the mean of effect sizes, the researcher calculated the average sum of effect sizes divided by the number of effect sizes, resulting in one reported weighted (average) effect size for each sample in order to minimize sampling error variance. These weighted scores within studies contributed to an estimate of the overall effect of predictor variables (Rosenthal, 1991).

5. Calculating Standard Error

It is possible that some or all of the studies included in a meta-analysis contain errors and that these errors have affected the effect size of the study (Hunter & Schmidt, 2004). The errors that may have an impact on the outcome of a study are: (a) sampling error; (b) error of measurement of the criterion variable; (c) error of measurement of the predictor variable; (d) dichotomization of a continuous dependent variable; (e) dichotomization of a continuous independent variable; (f) range variation in the independent variable; (g) attrition artifacts: range variation in the dependent variable; (h) deviation from perfect construct validity in the independent variable; (i) deviation from perfect construct validity in the dependent variable; (j) reporting on transcriptional error (i.e., inaccuracy in coding data, or computational errors); and (k) variance due to extraneous factors (Hunter & Schmidt, 2004). Computation for standard error is as follows:

$$\sigma_z = 1/\sqrt{n-3}$$

6. Computing the confidence interval for z

Confidence intervals (CI) indicate the probability of a parameter falling within a certain range. When computing a confidence interval, the mean of the sample is calculated in order to estimate the mean of the population. A confidence level of 95% is commonly used, usually because an alpha level of .05 is very common, and the confidence interval is simply 1 minus the alpha level. A 95% confidence interval indicates that the calculated intervals would contain the population mean difference 95% of the time. A 95% confidence interval for a population mean difference is constructed by taking the sample mean difference and adding and subtracting 1.96 standard errors of the

mean difference (Schulze, 2004). The equation for computation of confidence intervals is as follows:

Upper Bound Confidence Interval = Weighted average z + 1.96 x Standard Error

Lower Bound Confidence Interval = Weighted average z - 1.96 x Standard Error

7. Interpretation of Effect Size

The guideline for effect size that can be used for interpretation of the analysis as presented in Table 6.

Table 6

Size of Effect Guideline

Size of Effect (r)	Interpretation
.1	Small
.3	Medium
.5	Large

Limitations

This meta-analysis relied solely on the statistical information of primary research studies. Although the research inclusion criteria were designed to include a wide range of studies to be analyzed so that a comprehensive knowledge of predictor variables on academic achievement of international student can be summarized, only a small number of studies qualified.

It is important to know the limitations of the research synthesis. Meta-analysis has the same weaknesses and strengths that primary research literature has (Lipsey, Wilson, 2000). The limitation of this analysis was due to the small number of the included

studies. This meta-analysis included twenties-two studies, more than Vogel's study (1989) which included 9 studies that used English proficiency as the predictor variable. Although the TOEFL was ultimately selected as the predictor variable for this research, the initial search was not limited to only English proficiency or the TOEFL. Other variables were also assessed including gender, aptitude test scores, country of origin, financial resources, age, field of study, marital status, and other non-academic factors. The initial investigation provided a potential 82 studies for study inclusion. English language was reported in 42 studies while other variables were found in a smaller number. Further investigation found that the TOEFL was reported in 25 studies, but only twenty-two studies qualified for the purpose of this analysis. The other studies related to English were not included because they did not measure academic achievement, but instead academic satisfaction. Some studies utilized a qualitative approach while for some studies students self-rated their English language proficiency. For these reasons, TOEFL was the only predictor variable that was selected for the purpose of this meta-analysis.

CHAPTER IV

RESULTS

Chapter 4 summarizes the results of the analysis of 22 studies from 1987-2009 that reported correlation coefficients between English language proficiency and academic performance of international students enrolled at U.S. higher education institutions. The explanation of the findings is presented in response to the research questions.

Research question #1: What is the average correlation between TOEFL scores and grade point average (GPA) of international students?

In order to answer this research question, a total of 22 studies were assessed. In the included studies, a total of 3,937 international student participants from both undergraduate and graduate degree levels were included. The correlations between TOEFL scores and GPA are presented in Table 7. In addition, researchers, year published, number of study participants, level of education, and effect size between TOEFL score and GPA of each inclusion study are also reported in the table.

Table 7

The Correlation between TOEFL Scores and GPA of Undergraduate and Graduate International Students as Summarized from Selected Studies

Researcher	Year	N	Level of Education	Fisher's Z
Ayers, J, et al	1992	67	Graduate	-.050
Case, C.A.	1992	71	Graduate	-.070
Dunn, J.W.	2006	203	Graduate	.576

Hu, S. P.	1991	247	Graduate	.177
Johnson, P.	1988	196	Undergraduate	.377
Krausz, J, et al	2005	38	Graduate	-.053
Light, R., et al	1991	48	Undergraduate	.343
Light, R., et al	1987	376	Undergraduate	.141
Lo, J.	2002	149	Undergraduate	.100
Moore, S.K.	1995	164	Undergraduate	.365
Ng, J.	2007	433	Undergraduate	.129
Perry, W.S.	1988	516	Graduate	.229
Saisupaluck, S.	1997	255	Graduate	.171
Salinas, A.	2007	34	Graduate	.449
Sprotte, N.	1988	278	Undergraduate	.078
Stoynoff, S.	1997	77	Undergraduate	.412
Tancharoenrat, O	1988	53	Graduate	.211
Thannisch, E.	1992	166	Undergraduate	.020
Wimberley, D., et al	1992	120	Graduate	.002

Yan, Y.	1995	345	Graduate	.060
Yul, G., et al	1990	59	Graduate	.141
Zhang, H.	1996	42	Undergraduate	.347
<hr/>				
Total population		3,937	Upper Bound Confidence Interval	.212
Weighted average Z		.181	Upper Bound Confidence Interval	.150
Standard Error		.016		
<hr/>				

From Table 7, the highest correlation of .576 was found in the study Jennifer Dunn reported in 2006, followed by Salinas' report in 2007 that presented a correlation of .448, however, the sample size was quite small ($n=34$). There were 3 studies (Ayers, 1992; Case, 1992 and Krausz, et al., 2005) that provided negative correlations between TOEFL scores and GPA of international students. The analysis of the average correlation indicated that TOEFL scores had a small predictive ability (.181) on GPA of international students.

Research Question # 2: What is the average correlation between TOEFL scores and GPA of international undergraduate students?

To answer this research question, nine studies that reported the academic achievement of international undergraduate students were included in the analysis. Table 8 reports the correlation between TOEFL and GPA of international undergraduate students.

Table 8

*The Correlation between TOEFL score and GPA of International Undergraduate**Students as Summarized from Selected Studies*

Researcher	Year	N	Level of Education	Fisher's Z
Johnson, P.	1988	196	Undergraduate	.377
Light, R., et al	1991	48	Undergraduate	.343
Light, R., et al	1987	376	Undergraduate	.141
Lo, Jih-Wang	2002	149	Undergraduate	.100
Moore, S.K.	1995	164	Undergraduate	.365
Ng, Jacob	2007	433	Undergraduate	.129
Sprotte, N.	1988	278	Undergraduate	.078
Stoynoff, S.	1997	77	Undergraduate	.412
Thannisch, E. R.	1992	166	Undergraduate	.020
Zhang, H.	1996	42	Undergraduate	.347
Total population		1,553	Upper Bound Confidence Interval	.238
Weighted average Z		.188	Upper Bound Confidence Interval	.139
Standard Error		.025		

According to Table 8, there were a total of 1,553 international undergraduate students included in this analysis. Four out of 9 studies utilized for the analysis reported a comparable effect size: Johnson, 1988 (.377); Light R, et al, 1991 (.343); Moore, 1995 (.365); and Zhang, 1996 (.362). The lowest correlation (.078) was found in Spratt, 1988. None of the studies found negative correlations between the variables.

The correlations of the studies were re-calculated and the finding denoted an average effect size of .188 which demonstrated that TOEFL scores had a small predictive ability for the GPA of international students.

Research Question # 3: What is the average correlation between TOEFL scores and GPA of international graduate students?

A total of 13 studies that investigated the academic achievement of graduate level international students were examined in order to answer this research question. Table 9 displays information about these studies and also the correlation between TOEFL scores and GPA of international students enrolled in the graduate level of education.

Table 9 reveals that there were 11 studies included in the analysis with a total population of 2,384 international students. The lowest correlation (.002) was reported by Wimberly (1992) whereas the highest correlation of .576 was reported from a study conducted by Dunn (2006). The meta-analysis calculation reported the average effect size of these studies at .176. Once again this demonstrated a small predictive ability of TOEFL scores on GPAs of graduate level international students.

Table 9

The Correlation between TOEFL scores and GPA of International Graduate Students as Summarized from Selected studies

Researcher	Year	N	Level of Education	Fisher's Z
Ayers, J, et al	1992	67	Graduate	-.050
Case, C.A.	1992	71	Graduate	-.070
Dunn, J.W.	2006	203	Graduate	.576
Hu, S. P.	1991	247	Graduate	.177
Krausz, J, et al	2005	38	Graduate	-.053
Perry, W.S.	1988	516	Graduate	.229
Saisupaluck, S.	1997	255	Graduate	.171
Salinas, A.	2007	34	Graduate	.449
Tancharoenrat, O	1988	53	Graduate	.211
Wimberley, D.W., et al	1992	120	Graduate	.002
Yan, Y.	1995	345	Graduate	.060
Yul, G., et al	1990	59	Graduate	.141

Total population	2,384	Upper Bound Confidence Interval	.212
Weighted average Z	.176	Upper Bound Confidence Interval	.150
Standard Error	.020		

Research Question #4: What is the difference between the correlation of TOEFL scores and GPA of undergraduate international students compared to graduate international students?

The findings found that the difference between the correlations of TOEFL scores and GPA of international students at the undergraduate and graduate level was .012. The standard error calculated from the studies was .033, the upper confidence interval difference was .076 and the lower confidence interval difference was -.059. These findings can be interpreted to mean that there was no difference between predictive ability of TOEFL scores on GPA of international students at both the undergraduate and graduate education level.

Research Question #5: What is the average correlation between TOEFL scores and course completion of international students?

To answer this research question, a total of 13 studies that investigated the academic achievement of international students enrolled at the undergraduate education level were examined. Table 10 presents information related to the correlation between the TOEFL and course completion of international students at both the undergraduate and graduate level of education.

Table 10

The Correlation between TOEFL Scores and Course Completion of International Students as Summarized from Selected Studies

Researcher	Year	N	Level of Education	Fisher's Z
Light, R., et al	1991	48	Undergraduate	.255
Light, R., et al	1987	376	Graduate	.192
Moore, S.K.	1995	164	Undergraduate	.070
Ng, Jacob	2007	433	Undergraduate	.299
Saisupaluck, S.	1997	260	Graduate	-.070
Stoynoff, S.	1997	77	Undergraduate	.354
Total population		1,358	Upper Bound Confidence Interval	.226
Weighted average Z		.173	Upper Bound Confidence Interval	.119
Standard Error		.027		

According to Table 10, there were 1,358 international students included in the analysis. Within 6 studies that examined the correlation between the TOEFL and course completion of international students, Saisupaluck (1997) was the only study that reported a negative correlation (-.07) between the two variables. Although not very high, the highest correlation of .354 was founded in Stoynoff (1997). The analysis of all 6 studies

demonstrates an effect size of .173, revealing that TOEFL scores had a small predictive ability on the course completion of international students.

Research Question #6: What is the average correlation between TOEFL scores and course completion of international undergraduate students?

The results of the investigation are presented in Table 11. A total of 722 undergraduate students comprised the population presented in 4 studies in this analysis. The highest correlation (.345) between TOEFL scores and course completion was found in the study of Stoyloff (1997), but the study consisted of only 77 students. The lowest correlation of .070 was found in a study of Moore (1995) which provided a larger sample size of 164 international students. The computation for the average effect size indicates that the TOEFL score had a small predictive ability (.250) on the course completion of international students.

Table 11

The Correlation between TOEFL Scores and Course Completion of International Undergraduate Students as Summarized from Selected studies

Researcher	Year	N	Level of Education	Fisher's Z
Light, R., et al	1991	48	Undergraduate	.255
Moore, S.K.	1995	164	Undergraduate	.070
Ng, Jacob	2008	433	Undergraduate	.299
Stoyloff, S.	1997	77	Undergraduate	.354

Total population	722	Upper Bound Confidence Interval	.323
Weighted average Z	.250	Upper Bound Confidence Interval	.177
Standard Error	.037		

Research Question #7: What is the average correlation between TOEFL scores and course completion of international graduate students?

The analysis further examines the predictability of TOEFL scores for the course completions of international graduate students. There were only 2 studies in this analysis as presented in Table 12.

Table 12

The Correlation between TOEFL Scores and Course Completion of International Graduate Students as Summarized from Selected Studies

Researcher	Year	N	Level of Education	Fisher's Z
Light, R., et al	1987	376	Graduate	.192
Saisupaluck, S.	1997	260	Graduate	-.070

Total population	636	Upper Bound Confidence Interval	.163
Weighted average Z	.085	Upper Bound Confidence Interval	.007
Standard Error	.040		

According to Table 12, a total of 636 graduate students comprised the population presented in 2 studies in this analysis. The highest correlation (.192) between TOEFL scores and course completion was found in the study of Light (1987), whereas Saisupaluk (1997) found a negative correlation of -.070. The computation for the average effect size indicated that TOEFL scores had almost no predictive ability (.085) on the course completion of international students.

Research Question #8: What is the difference between the correlation of TOEFL scores and course completion among international undergraduate students and graduate international students?

The research findings indicate the difference between the correlations of TOEFL scores and course completion of international students at both the undergraduate and the graduate level was .165. The standard error difference was .055 whereas the upper confidence interval difference showed .272 and the lower confidence interval difference was -.478. This analysis leads to the conclusion that there is no difference between the predictive ability of the TOEFL for the course completion of international students at both the undergraduate and graduate levels of education.

CHAPTER V

DISCUSSION

International student enrollment reached a peak of 671,616 students at U.S. higher education institutions in 2009. *Open Doors* reported the place of origin of international students as follows: Asia, 61%; Europe, 13%, Latin America, 10%; Africa, 5 % , Middle East, 4%; North America, 4% & and Oceania, with less than 1% (IIE, 2008/09). This indicates that the majority of international students came from countries where English is not the native language.

This study examined the correlation between English language proficiency and academic achievement of international students enrolled in U.S. higher education institutions. A meta-analysis of studies reported from 1987-2009 was performed. Twenty-two studies were used to calculate the average association between TOEFL scores and GPA and course completion of international students. The study also extended the analysis to assess the difference in the correlation between international students at the undergraduate and graduate levels.

Research question #1: What is the average correlation between TOEFL scores and grade point average (GPA) of international students?

Answer. The average correlation between TOEFL scores and GPA of international students was .181. This size of effect indicates a small predictability of the TOEFL on GPA.

Research Question # 2: What is the average correlation between TOEFL scores and GPA of international undergraduate students?

Answer. The correlations of the studies were re-calculated and the finding denoted an average effect size of .188. This indicates that the TOEFL had a small predictive ability on the GPA of international undergraduate students.

Research Question # 3: What is the average correlation between TOEFL scores and GPA of international graduate students?

Answer. The meta-analysis calculation reported an updated average effect size at .176. This demonstrates that TOEFL scores had a small predictive ability on GPA of international graduate students.

Research Question #4: What is the difference between the correlation of TOEFL scores and GPA of international undergraduate and graduate students?

Answer. The difference between the correlations of the TOEFL and GPA of international students at the undergraduate and graduate level was .012. The standard error calculated from the studies was .033, the upper confidence interval difference was 0.069 and the lower confidence interval difference was -.059. This finding indicates that there is no difference in the predictive ability of the TOEFL on the GPA of international students at both the undergraduate and graduate education level.

Research Question #5: What is the average correlation between TOEFL scores and the course completion of international students?

Answer. The meta-analysis of all 6 studies demonstrated an effect size of .173, revealing that the TOEFL had a predictive ability on the course completion of international students.

Research Question #6: What is the average correlation between the TOEFL and course completion of international undergraduate students?

Answer. The computation for the average correlation indicated that the TOEFL had a small predictive ability (.249) on the course completion of international undergraduate students

Research Question #7: What is the average correlation between TOEFL scores and the course completion of international graduate students?

Answer. The computation for the average effect size indicated that the TOEFL had almost no impact (.085) on the course completion of international graduate students.

Research Question #8: What is the difference in correlation of TOEFL scores and course completion among international undergraduate and graduate students?

Answer. The research finding indicates the difference in correlations of TOEFL scores and GPA of international students of both undergraduate and graduate level was .165. The standard error difference was .055 whereas the upper confidence interval difference showed .272 and the lower confidence interval difference was -.478. No difference was found between the predictive ability of TOEFL scores on the course completion among international undergraduate and graduate students.

This meta-analysis leads to the conclusion that the TOEFL has a small predictive ability on academic achievement of international students whether measured by GPA or the course completion. The finding was dissimilar to the meta-analysis conducted from research reported from 1966-1986 conducted by Vogel in 1989 which indicated that English proficiency had a moderate contribution to academic achievement of international students (Vogel, 1989). However, Vogel only included nine studies that used English language proficiency as a predictor variable, and did not report the total study population in the analysis whereas this meta-analysis included 22 studies that

included 3,954 total international students. In addition, the 1989 meta-analysis study included different English language tests such as the TOEFL, the Michigan Test of English Language Proficiency (MTELP) and the Cooperative English Test (CET), and combined them into one English proficiency variable whereas this meta-analysis only uses the TOEFL.

The reason that the researcher took a different approach from the previous meta-analysis study was because each English language test may be different in nature, in particular the approach, scale, administration and interpretation of the results (Graham, 1987; Zhang, 1996). These different approaches might impact the substance of the research findings. TOEFL was found to be the most frequently utilized test score and appeared the most in research studies that focused on the academic achievement of international students in U.S. higher education institutions. The International English Language Test Services (IELTS) was found in some research studies, but these investigations included only students from Australia and the United Kingdom (Ingram & Bayliss, 2007; Paul, 2007; Rea-Dickins, et al, 2007). The search of the literature for this meta-analysis found only one qualified study that utilized the Michigan test score (Bauer, 1993) and two studies that used other English language tests (Kreuger, 1989; Patkowski; 1991). Because of the small number of reported studies that utilized tests other than the TOEFL, they were not included. These factors may have had an impact on the resulting difference in effect size between Vogel (1989) and this meta-analysis.

The Test of English as a Foreign Language (TOEFL)

This meta-analysis looked at research reported from 1987-2009. During this period of time, Educational Testing Service (ETS) has launched three different versions of the TOEFL examination: paper-based (PBT), computer-based (CBT), and internet-based (iBT) to measure international students' English language skills. The TOEFL-PBT assesses only three language skills: listening, structure/written expression, and reading. The TOEFL-CBP added writing to the test, while TOEFL-iBT measures five skills including a speaking part, and combines skills into 4 sections (Salinas, 2007). Although each version of the TOEFL measures language skills on a slightly different scale, ETS provides a comparable score for the user. The different format and characteristics of the test may have impacted the test score outcome. This study did not separate the three versions of the TOEFL in the analysis because there was no clear description of which version of the TOEFL was used in each study. Therefore, it is possible that an international student from country A may take the TOEFL-iBT while another student also from country A may have taken TOEFL-PBT. The findings of this analysis might have been different if the researcher had specific information from each of the primary studies so that all three versions of TOEFL may have been compared.

In summary, the results of this meta-analysis revealed that although the TOEFL scores are the most accepted scores to accompany applications for admission of international students, its predictive value on academic achievement is very small. The findings are supported by guidelines of the Educational Testing Services (ETS) that indicated institutions should not use the TOEFL as a cutoff score for admission decision (ETS, 2006). The ETS also advises that, although the TOEFL alone may not be a good

single resource to predict the academic achievement, the TOEFL is very helpful indication when used in combination with other requirements (El-Agha, 1991; Hu, 1991; Johnson; 1988; Ng, 2007; Salinas, 2007). The ETS claims that they have been and will be continue to improve the reliability and prognostic ability of the TOEFL. Therefore, a future analysis may indicate different results.

Range of restriction

As with other admissions tests, the range of restriction may have an impact on the correlation of the study. Decisions to admit students are usually made on the basis of minimum requirements, especially when dealing with English language ability (Stephenson, 2004). Although some institutions may have offered conditional admission to international students based on qualifications other than English language proficiency, students deemed deficient in English proficiency must usually attend the English as a Second Language program offered at the institution until they meet the language requirement (Patkowski, 1991).

In this regard, the range in the TOEFL scores of international students is usually restricted because only students with a score above a predetermined cutoff score are admitted to most U.S. colleges and universities. The more restricted the accepted scores, the greater the tendency to underestimate the test's predictive ability (Yan, 1995). The effect is to exclude international students with very low TOEFL scores from the admission requirement score, and in the process exclude these data from the studies. This factor may apply especially to institutions that have highly selective admissions. A highly selective institution generally sets a higher minimum requirement for English language

proficiency scores (Wimberly, 1992). A list of TOEFL score requirements of different institutions is presented in Table 13.

Table 13

The TOEFL Requirements for International Student Applicants

Institution	TOEFL – PBT		TOEFL - CBT		TOEFL- iBT	
	<u>Paper-and-pencil</u>		<u>Computer-based</u>		<u>Internet-based</u>	
	(310-677)		(0 – 300)		(0 – 120)	
	UG	GR	UG	GR	UG	GR
Tidewater Community College	450	-	133	-	45	-
University of Texas A & M, Kingsville*	500	550	173	250	61	79
University of Wisconsin, Madison*	550	550	213	213	80	80
Harvard University	600	600	250	250	100	100

Note: *Institutions included in the meta-analysis.

The TOEFL score requirement indicated in the table may vary, depending on each institutional academic program. The table was adapted from the international admission requirements of the following institutions:

Tidewater Community College: www.tcc.edu

University of Texas A & M, Kingsville, www.tuamk.edu

University of Wisconsin, Madison, www.uwis.edu

Harvard University, www.harvard.edu

Table 13 provides examples to explain the restriction of range in the TOEFL requirements of each institution for undergraduate (UG) and graduate (GR) levels. Harvard University, known as one of the most selective institutions, represents the highest selectivity with a minimum score of 600 on paper-based, 250 for computer-based and 100 for internet-based tests. One would expect a smaller degree of correlation because the range between the minimum score and the highest probable TOEFL paper-based test score is only 77 points. The University of Wisconsin (UW), Madison, has the second highest minimum required score, TOEFL-Paper Base Test at 550, TOEFL-Computer Base Test at 213, and TOEFL- Internet Base Test at 80. This minimum required score is found at most four year higher education institutions. Interestingly, UW-Madison was an institution that appeared in the inclusion of this meta-analysis study and the study reported that the TOEFL has a low correlation ($r = .18$) on the academic achievement of international students at UW- Madison (Perry, 1988).

GPA and Course Completion

Although GPA is the most widely used measure of academic achievement, the reliability of GPA from each institution, instructor and program of study are not controlled for by the nature of meta-analysis. There exists a possibility that international students received different grading standards by instructors, such as forgiving grammatical errors of student work due to the sympathy to non-native speaker students (Graham, 1987; Yan 1995). Some instructors may be stricter than others (Trice, 2003). Another reason is the limited range of GPA, especially at the graduate level. This might result in a low probability of a high correlation between TOEFL scores and GPA.

Some researchers have noted that GPA is not always a valid indicator of academic achievement (Graham, 1987).

The issue of international students and their course completion should also be taken into account (Light & Teh-Yuan, 1991; Light & Xu, 1987; Stoyhoff, 1997). In general, international students in the U.S. must be enrolled full time during their study in the U.S. unless there is a special circumstance such as illness. Therefore, the measurement of academic achievement of international students using number of courses completed may be a valid measure of academic achievement. However, of the 22 studies, GPA was reported in all 22, with only 6 reporting the use of course completion as a means to measure the academic achievement of international students. The analysis may have produced better information if course completion was reported in more studies.

Other Factors

Another possible explanation for the low correlation between the TOEFL scores and academic achievement would be that some other factors may have a greater impact on academic achievement and these factors may not be associated with TOEFL scores at all, but may impact the academic achievement of international students. These factors included study habits, academic background, motivation, and other adjustment factors (Stoyhoff, 1997).

Recommendations

Admissions offices and academic departments should consider complimenting TOEFL scores with other predictors when making admissions decisions for international students for whom English is not their native language (ETS, 1993, Graham, 1987; Salinas, 2007; Stoyhoff, 1997; Yan 1995). Aptitude tests, previous academic records,

letters of recommendation and interviews are some of the alternatives commonly use on some campuses (Hu, 1991; Krausz, 2005; Kreuger, 1989; Lo, 2002; Salinas, 2007). Each institution must conduct an analysis of the relationship between documents submitted as part of the admissions package and the academic success of admitted students.

Future Research Suggestions

Although this analysis found that TOEFL is not a good predictor of academic achievement for international students, the investigation of the relationship between these variable should be continued and another meta-analysis of studies that are published after 2009 should be conducted in the future so that one can have an historical perspective on this topic.

There are many other variables that have been used in research related to the academic success of international students. Country of origin, academic major, aptitude test scores and other non-academic variables, are just a few of these. The reason that this meta-analysis focused on the TOEFL score as the predictor variable was because of the limited number of other comparable variables that have been found that can be utilized for the analysis during a set time span (1987-2009). Future research may use different time durations as it might provide a larger number of research studies for the meta-analysis. The possibility of a meta-analysis related to academic achievement could examine the predictability of not only academic, but non-academic factors such as student motivation, student perception, student problems, student satisfaction, and adjustment. In addition to non-academic factors, the effect of institutional type on the academic achievement of international students is another promising and potentially valuable area for future research.

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APPENDIX A

International Student Enrollment (U.S.) from 1954/1955 to 2008/09 09

Year	Enrollment	% Change
1954/55	34,232	-
1987/88	356,187	1,500
1988/89	366,354	2.9
1989/90	386,851	5.6
1990/91	407,529	5.3
1991/92	419,585	3.0
1992/93	438,618	4.5
1993/94	449,749	2.5
1994/95	452,635	0.6
1995/96	453,787	0.3
1996/97	457,984	0.9
1997/98	481,280	5.1
1998/99	490,933	2.0

1999/00	514,723	4.8
2000/01	547,867	6.4
2001/02	582,996	6.4
2002/03	586,323	0.6
2003/04	572,509	-2.4
2004/05	565,039	-1.3
2005/06	564,766	-0.05
2006/07	582,984	3.2
2007/08	623,805	7.0
2008/09	617,661	8.0

Note: Adapted from “Open doors: 2008/09 Report on International Educational Exchange”, 2009, Retrieved from <http://www.iie.org/en/Research-and-Publications/Open-Doors>. Copyright 2009 by the Institute of International Education.