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The Effects of Writing Proficiency on Cognitive Skills Development Among International Students

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Abstract

Utilizing data from the 2012 University of California Undergraduate Experience Survey (UCUES), the following question was addressed: *What are the direct and indirect effects of writing proficiency on cognitive development among international students?* Because many international students have chosen to study in the United States to improve their academic achievement, the higher education community has needed greater understanding of those factors which contribute significantly to the success and satisfaction of international students. Writing proficiency is one such factor, and the findings of this research study have suggested the importance of providing support and designing programs for improved writing skills.

Keywords: academic success, cognitive skills, writing skills, higher education

Introduction

International education has been described as “a dynamic concept that involves a journey or movement of people, minds, or ideas across political and cultural frontiers” (Hansen, 2002, p. 5). Arum (1987) expanded this definition by separating international education into three components: “international studies, international educational exchange, and technical assistance” (p. 5). The second element includes the international students who are studying and researching in the United States. These individuals have captured the attention of college and university leaders across the United States because of the large number of international students who are entering their higher education institutions. The *Open Doors Report* stated that in 2016–17, the number of international students in the United States increased by 3.4% to 1,078,822 students (Open Doors, 2017).

Although there are some critics who identify the cost of student supports and the filling of student seats as reasons for discouraging the influx of international students (M. Parikh, personal communication, May 15, 2013), others emphasize the many benefits associated with the enrollment of international students. Supporters have identified growth in revenue streams (Altbach, 2004; NAFSA, 2016), enhanced global intellectual competitiveness (Altbach, 2004), improved international relations (Lee & Rice, 2007), development of international perspectives (Trice, 2003), encouragement of international collaboration (Trice, 2003), provision of cultural enrichment (Hechanova-Alampay, Beehr, Christiansen, & Van Horn, 2002), and reduction of the “demographic pressures of an aging population” (Moore, Rutherford, & Crawford, 2016, p. 858) as advantages attributed to the international student population, to name a few. For these reasons, and many more, faculty and administrators of U.S. higher education institutions have

acknowledged the importance of providing the necessary college experiences to meet the academic expectations of international students (Altbach, 1989; Cole & Ahmadi, 2003; Grey, 2002; Lee & Rice, 2007; Misra, Crist, & Burant, 2003; Zhao, Kuh, & Carini, 2005).

Because previous researchers have focused primarily on the retention or academic success of international students at a single institution, justification for exploring those factors which increase cognitive skills development among international students at multiple institutions exists. Utilizing data collected from thousands of students attending large, statewide, highly selective institutions, this researcher has provided additional insight into those factors which encourage greater cognitive development among international students. Although several background characteristics, precollege experiences, and college experiences were explored, the impact of writing proficiency was examined in this research study as a significant contributor to cognitive skills development and the academic success of international students attending selective, research-based higher education institutions.

The purpose of this study was to contribute to the understanding of the higher education community of those factors which influence the cognitive skills development and academic achievement among international students. Although the comprehensive research study associated with this submission focused on a number of factors which might affect cognitive development, the impact of writing proficiency as a significant contributor to cognitive skills development and the academic success of international students was the focus of this article. The data from a statewide, research university system were used to address the following research question: What are the direct and indirect effects of writing proficiency on cognitive development among international students? The findings of this question were significant because they addressed academic growth among international students and provided direction for the higher education community as new programs are developed to encourage greater cognitive growth.

Literature Review

Cognitive Skills Development Defined

Pascarella and Terenzini (2005) acknowledged cognitive skills have a number of names: “critical thinking, reflective judgment, epistemological development, and so on” (p. 155). Moreover, these authors have also noted many theories, constructs, and approaches comprise cognitive skills development. King (2009) has expanded the definition of cognitive skills to include the following: “intelligence, scientific problem-solving, metacognition, motivation to learn, learning styles, brain research, and many kinds of cognitive activities” (p. 598). For the purposes of this research study, the following definition of cognitive skills development was adopted: “the acquisition of general intellectual or cognitive competencies and skills, which if they are not so directly tied to a particular curriculum or course of study, are nevertheless thought to be salient outcomes of postsecondary education” (Jones, 1994, as cited in Pascarella & Terenzini, 2005, p. 155).

Cognitive Skills Development Among International Students

Hesel (2012) reported many international students choosing to study at higher education institutions in the United States have only been exposed to “a pedagogic approach based on memorization and didacticism” (p. 2). Because of their limited exposure to methods of delivery other than memorization and didacticism, many of these students have cited the learning of the three skills of “critical thinking, problem solving, and intellectual creativity” (p. 6) as the single

most important reason these surveyed international students chose to study in the United States.

Researchers exploring cognitive skills development have primarily targeted domestic students. Despite its domestic focus, this body of literature has provided considerable evidence of this component as a factor in academic achievement among international students. Because Kugelmass and Ready (2011) found “students tend to improve their cognitive skills to a slightly greater extent at institutions that enroll higher-achieving students” (p. 343), utilizing the UCUES Survey (University of California, 2012) was especially appropriate.

Relationships among cognitive skills development and background characteristics, pre-college experiences, and college experiences have been found as predictors of academic achievement. Of primary interest to this researcher were those college experiences which could enhance the cognitive skills development among international students. Because writing proficiency has been found to contribute so significantly to cognitive skills development, Li, Chen, and Duanmu’s (2009) identification of English writing ability as a contributor to the academic achievement of international students attending highly selective research universities is particularly noteworthy.

Writing Proficiency

To achieve maximal cognitive growth and academic achievement during their college years, international students must be proficient writers (Mori, 2000). International students with inadequate English proficiency have found it difficult to demonstrate their knowledge on essay exams or research papers (Mori, 2000). These students are also unfamiliar with the practice of writing papers (Kuo, 2011). To add to their challenges, international students are unacquainted with the writing and style expectations of American professors (Johnstone, Ashbaugh, & Warfield, 2002). Johnstone et al. (2002) added that inadequate writing proficiency of international students can create stress which interferes with international students’ social skills, academic achievement, and cognitive skills development (Zhang & Mi, 2010).

The writing proficiency of international students has been found to be a problem across all disciplines (Zhang & Mi, 2010). Moreover, Zhang and Mi found that writing proficiency challenges even the social and academic lives of international students. Hence, if international students are to avoid significant difficulties with “grammar, accuracy and writing skills” (Zhang & Mi, 2010, p. 372) as well as social interactions, they must enter U.S. higher education institutions with adequate academic writing proficiency.

Zhang and Mi (2010) also explained international students quickly gain proficiency in English listening and speaking from their presence in American classrooms. However, for optimal academic achievement and cognitive development, exposure to an English-speaking environment is not enough. International students must be given repeated opportunities to write and to receive corrective feedback. Zhang and Mi emphasized “high-level cognitive functions,” such as planning, synthesizing, organizing, composing, and revising must be practiced if international students are to become proficient in writing (p. 384). Johnstone et al. (2002) concurred: “Writing is a general problem-solving activity (e.g., articulating and establishing a position on a problem, organizing relevant information, and creating an effectively supported argument) that requires high levels of cognitive ability” (p. 305).

Still another aspect of writing challenges some international students: cultural differences in rhetorical conventions, schemata, and writing perspectives or expectations (Zhang & Mi, 2010).

To become proficient writers, international students must learn the literary skills of their new culture. Unfortunately, researchers have indicated the process of acquiring these new literary skills requires more time than it takes for these international students to complete their tertiary education.

Astin (1993) found that writing ability affects more than cognitive skills development: Writing proficiency predicts the GPA, cognitive learning, critical thinking skills, and academic growth of international students. Such convincing evidence should impress the higher education community of the need for programs which develop international students' writing proficiency. Program directors are tasked with the provision of repeated practice in "writing within a specific task domain" (Johnstone et al., 2002, p. 305) and exposure to the writing and style expectations of American professors if international students are to experience optimal cognitive skills development and academic achievement.

Conceptual Framework

This study of cognitive skills development was guided by Astin's (1993) I-E-O model. Three elements comprise the I-E-O model: *inputs*, *environment*, and *outcomes*. The inputs "refer to the characteristics of the student at the time of initial entry to the institution" (p. 7). The environment "refers to the various programs, policies, faculty, peers, and educational experiences to which the student is exposed" (p. 7). The outcomes "refer to the student's characteristics after exposure to the environment" (p. 7). One outcome or dependent variable provided the focus for this study: cognitive skills development among international college students. Pre-college writing proficiency was identified and explored for its influence on cognitive skills development.

Method

Data Source and Sample

The data source for this research study was the 2012 University of California Undergraduate Experience Survey (UCUES). Approximately 172,873 students participated in this survey which is managed by the University of California Office of the President. International students comprised 7,637 of these students or 4.4%. Because the purpose of this research study was to explore the effects of college experiences on cognitive skills development and writing proficiency, the study sample was restricted to junior and senior international students, with only 875 students providing meaningful data. Of this analytical sample, 54.0% were female, 9.0% were first generation, and 7.0% learned to speak English after the age of 16.

Variables

For this data analysis, 68 variables were utilized from the 2012 UCUES survey (see Tables 1, 2, 3, and 4). The abbreviation for each variable is provided under the *Item* column of the table. The question corresponding with the variable is provided under the *Question* column. Also included in this table are the means and standard deviations of each variable. These variables were then used to create the following latent variables: pre-college cognitive skills development and post-college cognitive skills development, critical reasoning engagement, elevated academic interest, faculty-student interaction, and extracurricular activity. Two hypothesized scales determined the magnitude of cognitive skills development and other learning skills: the students' self-reported abilities when they began college; and the students' self-reported abilities after they completed college. Specifically, international students were asked to rate their ability to write when they

entered college and then again when they completed college. These students evaluated their proficiency in writing with a 6-point Likert scale (1 = *very poor*, 2 = *poor*, 3 = *fair*, 4 = *good*, 5 = *very good*, 6 = *excellent*).

Table 1. Means and Standard Deviations of the Core UCUES 2012 Questions ($N = 875$)

Item	Question	Mean	SD
RUCCHLLNGCLSDIS	Contributed to class discussion	4.14	1.27
RUCCHLLNGDIFCLS	Brought up ideas or concepts from different courses during class discussions	3.67	1.29
RUCCHLLNGASKIN	Asked an insightful question in class	3.47	1.35
RUCCHLLNGINTRST	Found a course so interesting that you did more work than was required	3.79	1.28
RUCCHLLNGCOURSE	Chosen challenging courses, when possible, even though you might lower your GPA by doing so	4.14	1.33
RUCCHLLNGPRESN	Made a class presentation	3.29	1.48
RUCEXPLAIN	Explain methods, ideas, or concepts and use them to solve problems	4.93	0.92
RUCANALYZING	Break down material into component parts or arguments into assumptions to see the basis for different outcomes	4.61	1.01
RUCEVALUATION	Judge the value of information, ideas, actions, and conclusions based on soundness of sources, methods, and reasoning	4.53	1.08
RUCGENERATION	Create or generate new ideas, products, or ways of understanding	4.36	1.12
RUCUSEDFACTS	Used facts and examples to support your viewpoint	4.76	1.02
RUCSYNTHESIS	Incorporate ideas or concepts from different courses when completing assignments	4.40	1.10
RUCREXAMINED	Examined how others gathered and interpreted data and assessed the soundness of their conclusions	4.31	1.14
RUCREASSESS	Reconsidered your own position on a topic after assessing the arguments of others	4.35	1.10
RUCCHLLNGNAME	Had a class in which the professor knew or learned your name	3.68	1.44
RUCFCLTYSMNR	Taken a small research-oriented seminar	2.26	1.49
RUCFCLTYCOMMUN	Communicated with a faculty member by email or in person	4.18	1.26
RUCFCLTYDISCEXT	Talked with the instructor outside of class about issues and concepts derived from a course	3.53	1.38
RUCFACLTYLECTURE	Interacted with faculty during lecture class sessions	3.31	1.37
RUCFACLTYOTHACT	Worked with a faculty member on an activity other than coursework (e.g., student organization, campus committee, cultural activity)	2.43	1.53

Note: Above survey items used 6-point Likert scale (1 = Never; 2 = Rarely; 3 = Occasionally; 4 = Somewhat often; 5 = Often; 6 = Very often)

Table 2. Means and Standard Deviations of Time Allocation ($N = 875$)

Item	Question	Mean	SD
RUCTIMEMOVIES	Attending movies, concerts, sports, or other entertainment events	2.57	1.11
RUCTIMECOMMSRV	Performing community service or volunteer activities	1.90	1.22
RUCTIMEEXERCISE	Participating in physical exercise, recreational sports, or physically active hobbies	0.55	1.14
RUCTIMESPIRIT	Participating in spiritual or religious activities	1.67	1.15
RUCTIMECLUB	Participating in student clubs or organizations	2.22	1.20
RUCTIMECREATE	Pursuing a recreational or creative interest (arts/crafts, reading, music, hobbies, etc.)	2.46	1.10
RUCTIMEPARTY	Partying	1.75	1.06
RUCTIMEFAMILY	Spending time with family	1.83	1.21
RUCTIMECMPTRNON	Using computer or smart phone for non-academic purposes (games, shopping, email, instant messaging, etc.)	3.87	1.66
RUCTIMETV	Watching TV	1.77	1.15
RUCTIMESTUDY	Study and other academic activities outside of class	4.28	1.65
RUCTIMEFRIEND	Socializing with friends	3.16	1.22

Note: Above survey items used 8-point Likert scale (1 = 0 Hours; 2 = 1–6 Hours; 3 = 8–11 Hours; 4 = 11–15 Hours; 5 = 16–20 Hours; 6 = 21–25 Hours; 7 = 26–30 Hours; 8 = More than 30 hours)

Table 3. Means and Standard Deviations of Academic Skills. ($N = 875$)

Item	Question	Mean	SD
RUCSKILLCRIT_CRITT1	Analytical and critical thinking skills (when you started here)	3.49	1.01
RUCSKILLWRITE_WRITET1	Ability to be clear and effective in writing (when you started here)	3.20	1.00
RUCSKILLREAD_READT1	Ability to read and comprehend academic material (when you started here)	3.44	0.97
RUCSKILLMJR_MJRT1	Understanding of a specific field of study (when you started here)	3.46	0.98
RUCSKILLSPEAK_SPEAKT1	Ability to speak clearly and effectively in English (when you started here)	3.71	1.19
RUCSKILLCRIT_CRITT2	Analytical and critical thinking skills (current ability level)	4.30	0.88
RUCSKILLWRITE_WRITET2	Ability to be clear and effective in writing (current ability level)	4.11	0.93
RUCSKILLREAD_READT2	Ability to read and comprehend academic material (current ability level)	4.28	0.88
RUCSKILLMJR_MJRT2	Understanding of a specific field of study (current ability level)	4.48	0.97
RUCSKILLSPEAK_SPEAKT2	Ability to speak clearly and effectively in English (current ability level)	4.42	0.97

Note: Above survey items used 6-point Likert scale (1 = Never; 2 = Rarely; 3 = Occasionally; 4 = Somewhat often; 5 = Often; 6 = Very often)

Table 4. Means and Standard Deviations of Miscellaneous Demographics (*N* = 825)

Item	Mean	SD
Gender (Recoded: 1 = Female; 2 = Male)	1.55	0.50
Social class (Coded: 1 = Wealthy; 2 = Upper-middle or professional-middle; 3 = Middle-class; 4 = Working class; 5 = Low-income or poor)	2.83	0.81
English learned (Coded: 1 = English is my native language; 2 = Before I was 5 years old; 3 = 6–10 years old; 4 = 11–15 years old; 5 = After turning 16 years old)	3.08	1.00
Nonresident (Recoded: 1 = Yes; 2 = No)	1.00	1.00
Parents attended college (Recoded: 0 = No; 1 or more = Yes)	1.79	0.78
GPA (Recoded: 0 = Lower than 2.0; 1 = 2.01–3.00; 2 = 3.01–4.00; 3 = 4.01–5.00)	2.21	0.48

Analysis

Adopting the recommendations from Tabachnick and Fidell (2007), the data were screened and cleaned. Because Structural Equation Modeling (SEM) analysis cannot be conducted with missing data values, an analysis of missing data was conducted using the Missing Value Analysis (MVA) function of SPSS 22.0 to remove the possibility of patterns. The Mahalanobis distance identified the outliers for removal. SEM, a confirmatory statistical analysis, was utilized to explore the direct, indirect, and total effects of writing proficiency and its contribution to cognitive development among international students attending highly selective research universities. The researcher graphed the study’s underlying theoretical and final models with AMOS 22 software. Two methods were used for testing model fit: confirmatory factor analysis tested how well the observable behaviors represented the latent variables, and path analysis explored the underlying relationships among the latent variables.

The pictorial model (Figure 1) represents a series of regression equations which permit the exploration of underlying relationships (Byrne, 2010). Utilizing assumptions and theories, this research study’s hypothesized structural regression model was constructed with arrows entering the *endogenous* variables and arrows exiting *exogenous* variables to enter other variables. The ultimate endogenous variable was post-cognitive skills development. The predictive latent constructs labeled endogenous were faculty-staff interaction, extracurricular engagement, elevated academic effort, critical reasoning engagement, pre-college cognitive skills development, and post-college cognitive skills development. The endogenous observed variables were the writing proficiency of entering international students and the hours spent studying. The exogenous, observed variables included gender, high school GPA, and first-generation status.

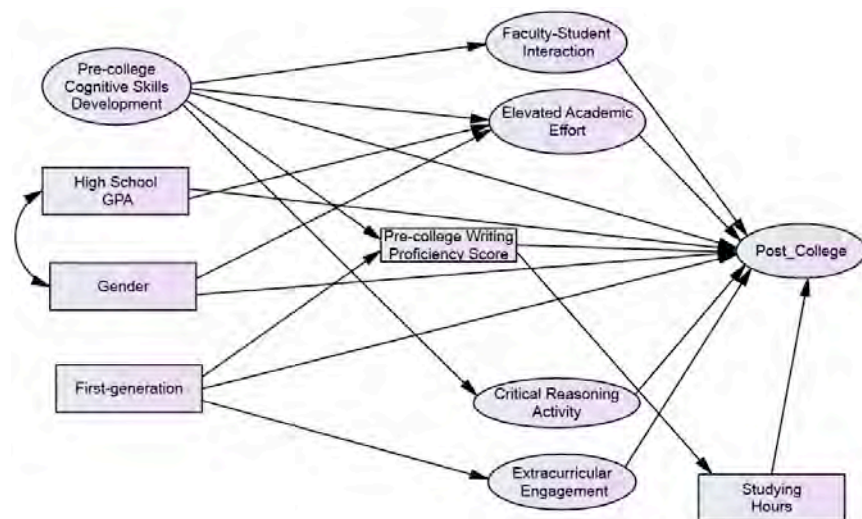


Figure 1. Theoretical structural regression model with latent constructs.

Findings

Before SEM was conducted, the mean and standard deviation scores were calculated for the 68 variables. For their entering proficiency in writing, international students evaluated themselves as fair ($M = 3.20$, $SD = 1.00$). For their current writing ability, international students indicated that their writing proficiency was good ($M = 4.11$, $SD = 0$).

According to Byrne (2010), the chi-square statistic is best to determine goodness-of-fit for structural equation modeling. However, in the cases of large datasets such as this one, the chi-square statistic becomes highly inflated. Hence, two other measurement statistics were utilized. First, the root mean square error of approximation (RMSEA) was calculated. RMSEA, an adjusted index, identifies the fit between the hypothesized structural equation model and a fully saturated model in which all the variables in the model are assumed to be interrelated. RMSEA values range between 0 and 1. According to most researchers, RMSEA values less than .06 are indicators of good model fit. The second utilized measurement statistic was the comparative fit index (CFI). The CFI statistic compares an independent model with no correlations among its independent variables with the hypothetical model. The CFI values range from 0 to 1 as well, with 1 indicating a perfect fit. Any value greater than .95 is considered by most researchers as a good fit.

Producing a structural regression model which satisfactorily addressed the research question regarding the contribution of writing proficiency to cognitive development among international students attending highly selective universities resulted in a model with the following excellent goodness-of-fit statistics: [$\chi^2 = 1220.768$ ($df = 540$, $p < .001$), PGFI = .751, PCFI = .816, CFI = .952 (comparative fit index: $> .90$ indicates good fit), RMSEA = .038 (root mean square error of approximation: $\leq .05$ indicates good fit), and CMIN/DF = 2.261 (relative chi-square: < 3.0 indicates good fit)]. For a depiction of the final trimmed structural regression model with latent constructs, see Figure 2. This structural regression model explained 57% of the total variance in cognitive skills development.

Because the focus of this research study was to explore the relationship between writing proficiency and cognitive skills development, the direct, indirect, and total effects were examined. Writing efficiency (standardized total effect = .638, $p < .001$) impacted cognitive skills development, significantly. As Table 5 depicts, writing proficiency also had an effect on the latent constructs *elevated academic interest* (standardized total effect = .214, $p < .001$), *faculty-student interaction* (standardized total effect = .188, $p < .001$), and *extracurricular engagement* (standardized total effect = .133, $p < .001$); and the observed variable *time studying* (standardized total effect = .155, $p < .001$).

The results of these statistical analyses indicated these literature-supported relationships among variables do impact the degree of cognitive skills growth among international students. Significantly, this researcher found of all the latent constructs and observed variables, the contribution of writing proficiency exceeded that of the sum of all the other variables ($R^2 = .559$).

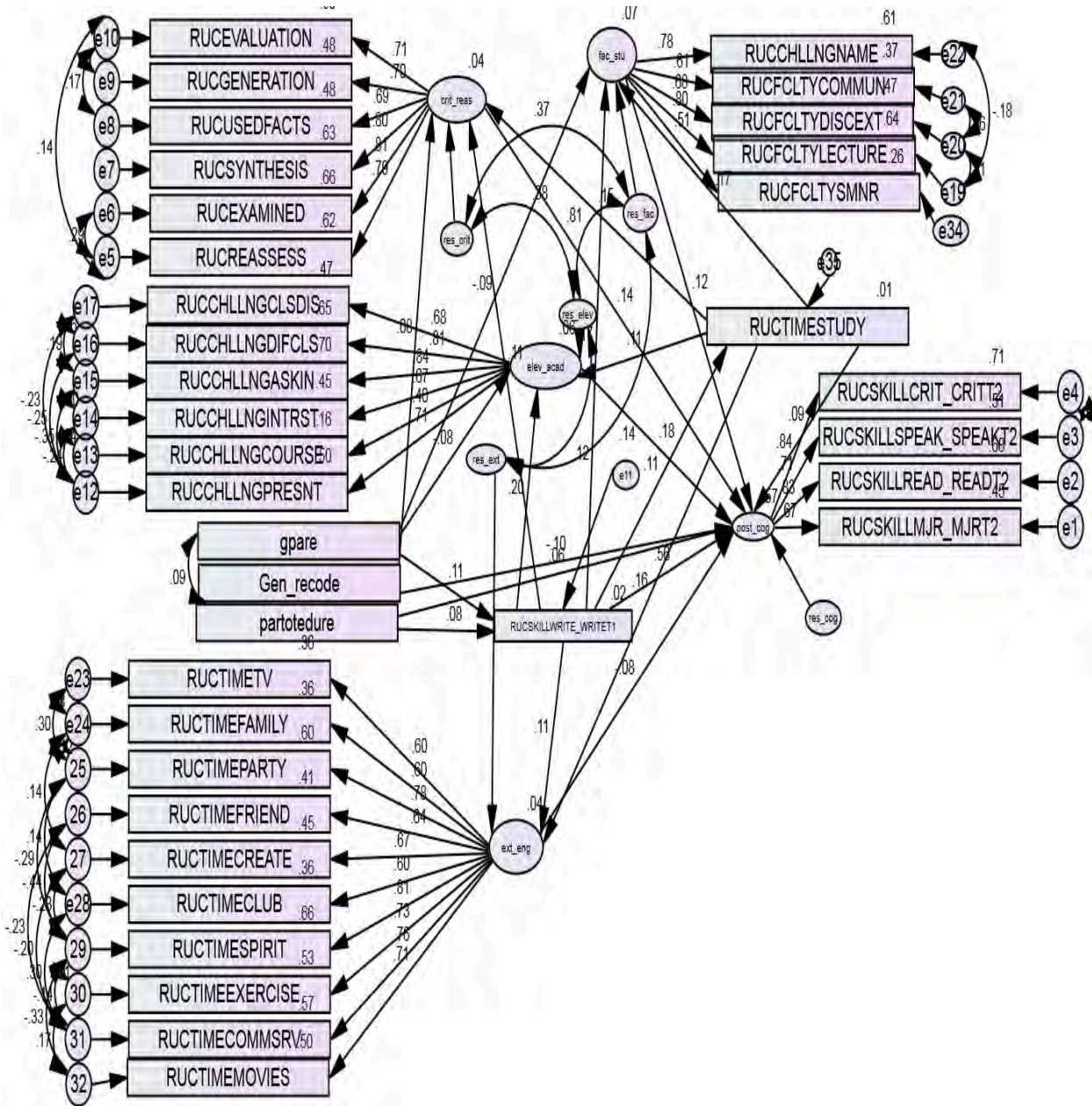


Figure 1. Final trimmed structural regression model with latent constructs

Table 5. Direct, Indirect, and Total Effects of Writing on Latent and Observed Variables

Variable	Direct Effect	Indirect Effect	Total Effect
Time Studying	0.115	0.000	0.115
First-Generation Status	0.085	0.000	0.085
High School GPA	0.105	0.000	0.105
Gender	0.000	0.000	0.000
Elevated Academic	0.201	0.013	0.214***
Critical Reasoning Engagement	0.109	0.017	0.126
Extracurricular Engagement	0.114	0.019	0.133
Faculty-Student Interaction	0.168	0.019	0.188
Cognitive Skills Development	0.559	0.079	0.638***

Note: ***p < .001

Impact of Writing Proficiency

The findings above confirmed writing proficiency did account for 56% of the growth in cognitive skills development among international students attending highly selective universities. Moreover, optimal cognitive skills development resulted in greater academic achievement (Andrade, 2009; Li et al., 2009; Lin & Yi, 1997). Hence, students entering higher education institutions with adequate English proficiency do experience more academic growth.

Researchers have found international students with poor writing skills struggle with expressing themselves well in research papers and exams (Mori, 2000). In addition, these students are unaccustomed to the writing expectations of domestic professors (Johnstone et al., 2002). Furthermore, the use of critical writing is a common pedagogical approach of domestic professors. This approach is not implemented in many international educational systems (Kuo, 2011). To summarize, the level of writing proficiency of international students attending highly selective universities in the United States has significantly impacted cognitive skills development.

Limitations

The most important limitation of this research study was the failure of the UCUES 2012 survey to ask the participants from which country they came. Students were asked only whether they were a resident or non-resident. Hence, international students were considered in the aggregate rather than as individuals possessing different cultural expectations and practices. As suggested by other researchers, the direct and indirect causal paths may differ among the latent constructs, observed variables, and cognitive skills development depending from which country and culture the international student came (Kim & Sax, 2009; Lee & Rice, 2007). However, because this large survey (172,873 participants) was focused primarily on domestic students, and the international students comprised a small subset of participants (7,637), the decision to consider this population as a group was justified.

Other limitations of this research study existed as well. First, there was the statistical reliability of the findings. The findings are much more robust for the domestic (resident) student population than they are for the international (resident) population because the international population was so small in comparison to the domestic (resident) population (Kim, Edens, Iorio, Curtis, & Romero, 2015). Another limitation is the applicability of the findings to all types of higher education institutions. This research study utilized a large survey from a system of highly selective research institutions on the West Coast. Hence, the same findings may not be reproduced at private higher education institutions or universities with a teaching focus rather than a research emphasis. Still another limitation was the self-reported data. Johnstone et al. (2002) emphasized: "Cognitive processes . . . are inherently difficult to measure" (p. 305). Hence, the latent constructs of this study were measured using the responses provided by the students on the UCUES survey. Kuh (2001) noted that researchers have questioned whether or not students' responses are accurate. A final limitation was the survey itself. Because the variables were identified by those administering the survey, the ability to examine other variables was eliminated.

Conclusions

This research study sought to provide greater understanding of the effects of writing proficiency on cognitive skills development among international students. The UCUES (2012) items associated with writing proficiency have been stated above. Confirming the work of other

researchers (Andrade, 2009; Li et al., 2009; Lin & Yi, 1997), this researcher found writing proficiency impacts academic growth significantly. Furthermore, this researcher has confirmed those international students with better writing proficiency accomplish more of their academic goals and experience greater cognitive development growth. Writing did indeed impact cognitive skills development (standardized total effect = .622), both indirectly (.063) and directly (.559). Of all the latent constructs and observed variables, writing proficiency contributed far more than all of the variables added together ($R^2 = .559$).

Those international students with poor writing proficiency struggled with expressing themselves well in research papers and exams (Mori, 2000), with completing unfamiliar types of writing assignments, and with frustration caused by the intolerance of their professors of writing errors, even though they were “motivated, intelligent, and talented” (Angelova & Riazantseva, 1999, p. 494). Echoing these researchers, Johnstone et al. (2002) found the expectations of the professors in these students’ home countries were much different than those standards of domestic professors. To compound the writing challenges faced by international students, critical writing as a pedagogical approach, is not one utilized in many of these students’ countries (Kuo, 2011).

Heggins and Jackson (2003) confirmed the biggest challenge for international students to overcome is a lack of English proficiency. Those students with poor English proficiency when they first arrived in the United States did not struggle with reading, but with speaking and listening. Classroom exposure quickly improved speaking and listening. However, writing proficiency did not improve as rapidly; therefore, overall academic achievement and cognitive skills development continued to be a major challenge (Lloyd-Jones, Neame, & Medaney, 2007; Zhang & Mi, 2010).

Research findings do not support writing proficiency as the sole predictor of cognitive skills development and academic achievement among international students. Astin (1993) found writing ability, in addition to a number of other college student experiences, impacts the academic achievement and cognitive development among domestic students. Because writing proficiency is so critical to cognitive growth and academic achievement among domestic students (Astin, 1993; Pascarella & Terenzini, 2005), one can assume writing proficiency is equally important to the cognitive skills development among international students when entering highly selective universities.

Because the entry level of writing proficiency has been shown to be such a significant factor in the development of cognitive skills among international students attending highly selective research institutions, provision of specific programs which encourage language skills development must be provided for these students. Not only do international students need basic speaking and writing skills, but they also need the discipline-specific language of their majors. From these findings, one can conclude the provision of additional writing support would result in greater cognitive skills development and academic achievement growth.

Implications

Documentation of the many benefits resulting from the presence of international students at higher education institutions in the United States has been provided in the introduction. Also stated earlier were the major challenges international students face on these campuses. Because the intention of invested individuals who value the presence of international students should be to support the academic goals of these students, greater understanding of their learning and development is critical. Exploring the predictors of maximal cognitive skills development has resulted in findings

which are helpful to higher education leaders. These findings contribute in a major way to educational theory and practice at the tertiary level.

The most significant finding of this research study was the contribution of entry-level writing proficiency to the college experiences of international students attending higher education institutions in the United States. Writing proficiency has been found to be the largest contributor to cognitive skills development. Because cognitive skills development has been identified as the single most important reason international students choose to study in the United States (Hesel, 2012), writing proficiency becomes critical to ensuring international students are able to accomplish their educational goals and achieve academic success.

Second, English writing involves high-level cognitive functioning. To write proficiently, international students must be able to plan, synthesize, organize, compose, and revise their writing well (Zhang & Mi, 2010). Moreover, Johnstone et al. (2002) noted students must possess high levels of cognitive ability if they are to articulate and establish a position on a problem. Hence, international students entering higher education institutions in the United States with a writing deficit begin with low-level cognitive functioning which interferes with their ability to reach their academic goals.

Third, because international students hope to improve the three skills of “critical thinking, problem solving, and intellectual creativity” (Hesel, 2012, p. 6), and because these three skills are important components of cognitive skills development, the significant contribution of writing proficiency to cognitive skills development becomes more critical. The practices of writing proficiently, thinking critically, solving problems effectively, utilizing intellect creatively, and functioning cognitively at high levels are complexly interwoven.

As explained earlier, international students are affected by the culture from which they come. Love and Guthrie (1999) noted how students acquire their knowledge has been impacted by their culture. Hence, cognitive skills development also becomes affected by the students’ cultural approach to knowledge acquisition. Zhang (1999) emphasized that international students find themselves inexperienced in decision-making and ill equipped to develop cognitively at the college level. Most of their educational systems have implemented straight lecture or direct teaching rather than an interactive pedagogy. Thinking with complexity and valuing multiple perspectives are two cognitive skills which may not been encouraged and take significant time to develop (Glass, 2012). Yet, these two skills are prerequisites for proficient writing and maximal cognitive development at the tertiary level.

This study has identified that entry-level writing proficiency predicts cognitive skills development. In addition, the above paragraphs have emphasized the need for high-level cognitive functioning if international students are to be proficient at high-level writing. Also stated has been the goal of international students to develop better critical reasoning (Hesel, 2012). For increased critical reasoning ability, VanLehn (1996) found students need to learn single and multiple principles so that they can comprehend the structural features of examples and generalize solutions. Once students understand these generalizations, they can implement critical reasoning to solve a problem through transference.

Invested individuals who hope to keep the stream of international students entering their higher education institutions must address the cognitive deficits of many of these students. If the pre-college cognitive skills and writing proficiency of international students are affecting their optimal

acquisition of cognitive skills and interfering with their achievement of their academic goals, then programs must be implemented to support these students in their endeavors to achieve these academic aspirations.

Additional language support must be provided for international students attending highly selective institutions in the United States because entry-level writing proficiency has been found to be such a significant predictor of academic success and cognitive skills development. Also of importance is greater understanding among professors and international students of the expectations and assignments associated with the tertiary disciplines on these campuses. Programs offering additional practice in those areas in which international students are unaccustomed should also be available. College experiences which provide international students exposure to English words and expressions should be encouraged, as this study has demonstrated their importance to elevated academic effort, faculty-student interaction, and participation in extracurricular activities. International students should receive assistance from student support personnel in how to accurately convey their thoughts. Finally, if international students are to improve their English writing proficiency, greater understanding of the differences among cultures in terms of “rhetorical conventions (ways of presenting ideas and developing arguments), cultural schemata (whether one transforms/extends knowledge or reproduces knowledge), and writing perspectives or expectations (as it is the writers’ responsibility or the reader’s responsibility to make sense of the text),” must be cultivated (Zhang & Mi, 2010, p. 385).

Development of cognitive skills which lead to growth in critical reasoning and writing proficiency takes time. These skills grow slowly and steadily (Glass, 2012; King & Kitchener, 1994; Baxter-Magolda, 1992; Perry, 1968, 1970, 1981). Hence, international students may struggle to achieve their academic goals if they are entering U.S. higher institutions with deficits in cognitive skills and writing proficiency. To promote the goals of these students, higher education leaders could implement programs which support growth in writing proficiency and cognitive development.

According to Bista and Foster (2011), the number of international students attending higher education institutions in the United States continues to increase. The emphasis that higher education admission personnel place upon maintaining this stream of incoming students has been justified previously. The benefits which accompany this campus population are many. However, the challenges faced by international students who enroll in U.S. colleges and universities are also numerous. One of these challenges, English proficiency, is most likely the biggest obstacle to the academic success of international students (Heggins & Jackson, 2003).

As noted by many researchers, international students continue to enroll in higher education institutions because they expect to achieve their educational goals and to experience other positive academic outcomes (Grey, 2002; Heggins & Jackson, 2003; Lee & Rice, 2007). As mentioned earlier, a number of factors affect the academic achievement of these students. However, for the purposes of this research study, the entry-level of the international students’ cognitive skills and writing proficiency when enrolling in higher education institutions has been identified as critical to the students’ academic achievement and cognitive growth during their tertiary years.

Furthermore, proficient writing has been linked to well-developed critical thinking, which is a critical component of the cognitive processes and academic achievement. As stated above, the development of critical thinking and optimal academic achievement have been identified as the primary goals of international students. Finally, this student population improves the tertiary experience for both domestic and international students. For this reason, research findings such as

these should assist higher education professionals in their planning and implementation of student supports for international students to ensure their academic goals can be met.

Future Research

Because the growing number of international students choosing to study in the United States is a relatively new phenomenon, research studies focused on this campus population have been few. Needed are research studies which explore those experiences which encourage the greatest academic achievement among international students. Much more research focus needs to be directed toward international students and student supports which will ensure a satisfactory educational experience in the United States.

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