

Examining the Educational Benefits of Interacting with International Students

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Abstract

Through the analysis of alumni survey data from three graduating cohorts, this study examined the influence of interaction with international students on domestic students' college outcomes and explored factors that helped to promote international interaction on college campuses. The findings indicate that in comparison to non-interactive domestic students, highly interactive domestic students reported significantly higher levels of development in a wide range of areas across the three cohorts. Also, the findings suggest that active engagement in college activities, such as coursework outside the major, contact with faculty outside class, ethnic or cultural clubs or organizations, and visiting speakers, was likely to promote interaction across cultures.

Keywords: international interaction; questioning beliefs; skill development; educational benefits; college activities; college outcomes.

Over the past half century, a growing number of international students have enrolled at U.S. colleges and universities. According to the latest report by Farrugia, Chow and Bhandari (2012), the number of international students in the U.S. reached an all-time high of 764,495 in the 2011/12 academic year, reflecting a 31% increase over a decade ago. This steady increase is largely due to the active recruitment efforts by many U.S. academic institutions and the actions by the U.S. government to promote American higher education as well as a rising middle class in key source countries that could afford to send their children to study abroad (Fisher, 2009).

With the greater involvement of many countries in the global free trade economy and a new environment of budgetary cuts, the competition for talented and self-funded international students among nations has become intense and strategic in recent decades for two major reasons. First, international students provide a strong talent pool and make academic and cultural contributions to college campuses (Andrade, 2009; Choudaha & Chang, 2012; McCormack, 2007). Second, international students make a significant contribution to the economy of host countries (Farrugia,

Chow, & Bhandari, 2012). In 2011/12, for instance, international students contributed over \$22.7 billion to the U.S. economy through expenditures on tuition and living expenses.

Although many institutions world-wide aspire to maintain their financial health by aggressive recruitment of international students, it is claimed that the main purpose of most colleges and universities in recruiting international students is “to provide international and cross-cultural perspectives for their students and to enhance their curricula” (Altbach & Knight, 2007, p. 293). The significant impact of international students on the local, state, and national economy is apparent and has been quantified in indisputable monetary terms. Also, a sizable body of research highlights the challenges international students face while adapting themselves to the living and learning environments of the host country (e.g., Abe, Talbot, & Geelhoed, 1998; Lee, 2010; Trice, 2004; Ward, 2001). Despite these facts, few empirical studies have systematically examined the extent to which international students contribute to the intellectual and cultural environments on U.S. college campuses from the perspective of domestic students (Geelhoed, Abe, & Talbot, 2003).

This study seeks to provide empirical evidence for claims of potential outcomes and to equip institutions with useful information on how to develop programs to enhance students’ collegiate experiences, by examining whether interaction with international students benefits U.S. students’ college experiences and to identify factors that are likely to promote such interaction. Three research questions guide this study: (a) To what extent does international interaction influence U.S. students’ questioning of beliefs and values about politics, religions, and the nature of human beings or society during the course of their undergraduate studies? (b) To what extent does international interaction correlate with U.S. students’ perceived cognitive and affective skill development in comparison to other potential factors? and (c) What factors are likely to promote students’ international interaction? As a concept, international interaction includes interaction with people who are international, such as international undergraduate and graduate students, faculty, and staff. As this study focuses on interaction of native U.S. college students with international undergraduate students, however, we define international interaction as domestic undergraduate students’ engagement with international undergraduate students in discussion and exchange of ideas and perceptions both inside and outside the classroom.

Review of Related Literature

Perceptions of International Diversity

Several authors claim that international students, who have been previously raised and educated in cultural and social environments different from those of the host country, constitute an important source of diversity; they are a rich resource for international education on college campuses, enriching not only student population but also campus culture and intellectual life (Choudaha & Chang, 2012; Mamiseishvili, 2012; Zhao, Kuh, & Carini, 2005). Presumably, the presence of international students would expose domestic students to different cultures, and the interaction between domestic and international students would not only lead to a deeper understanding of each other’s culture but also develop networks that would be mutually beneficial in terms of exchanges of information, ideas, and support in the future (Andrade, 2009; Grayson, 2008).

In order to promote intercultural interactions and friendships, many institutions worldwide have developed peer-pairing programs to match international students with domestic students for substantial interaction outside the classroom (Summers & Volet, 2008). In examining the effects of such a program on international student adjustment, Abe et al. (1998) found that international student participants at a Midwestern U.S. public university scored higher on social adjustment than did nonparticipant students. Also, in a comparative study of international students in such a matching program in both Canada and Australia over a period of four years, Westwood and Barker

(1990) noted that international participants in these matching programs had higher academic achievement and retention rates than did nonparticipants. The interactions with local students appeared to have enabled the international participants to learn and gain a deeper understanding of “the unwritten codes of the local culture” (p. 260). Also, studies show that intercultural interactions and friendships demand effort from both international and domestic students (Pavel, 2006; Russell, Rosenthal, & Thomson, 2010).

Benefits of Interaction with International Students

In the past decade, researchers have also begun to examine the educational benefits of the peer-pairing programs for domestic student participants. For instance, Geelhoed et al. (2003) found that U.S. participants gained new cultural perspectives, developed empathy, and became more competent in their intercultural interactions. Particularly noteworthy, ongoing interactions of U.S. students with their international partners positively affected U.S. students’ family and friends’ attitudes toward international students. Also, in her study of the impacts of intercultural business communication, Cheney (2001) noted that structured international interaction could generate two specific benefits for both groups of students: (a) increased awareness of language usage in both English and foreign language and (b) the development of international friendships, which might “serve as a valuable source of social, cultural, political, and economic knowledge when US students enter the workforce” (p. 99). Moreover, with increased cultural sensitivities and skills needed to work effectively with people from different backgrounds, domestic students could well have “a competitive advantage” in the marketplace in an increasingly interconnected, globalized world (Calleja, 2000; Montgomery, 2009).

In addition, interacting with international students seems to benefit domestic students in the development of their cognitive skills. In their study of the effects of diversity experiences, Pascarella, Palmer, Moye, and Pierson (2001) found that having serious discussions with international students had a significant, positive effect on third-year critical thinking for Caucasian female students. In a similar study on diversity impacts, Hu and Kuh (2003) noted that male students, juniors, and seniors were more likely than female students, freshmen, and sophomores to interact with international students. Also, they found that interactional diversity experiences had substantial, uniformly positive effects on all college outcome variables (i.e., general education, personal development, science and technology, vocational preparation, intellectual development, total gains, and the diversity competence measures). Because the study did not examine the unique effects of each of the six items of the interactional scale, the effect of international interaction on college outcomes per se was not specifically explicated.

Through the use of alumni survey data and the documentation of the perceptions of three graduating cohorts on their collegiate diversity experiences, this study seeks to build on previous research and identify the effects of international interaction over time for a nuanced understanding of the impact of international interaction on college outcomes. The alumni survey data were chosen for the inquiry for three reasons. First, former students had gained through their rich experiences in various areas after college, useful perspectives on the subsequently most beneficial skills and capacities that they acquired in college, perspectives which provide the ultimate form of accountability for their collegiate learning experience (Bowen & Bok, 1998). Second, as an appropriate and effective method for collecting required information about institutional and program effectiveness, alumni research has enjoyed, and will continue to enjoy, a powerful advantage for the future conversation about accountability and U.S. policies (Ewell, 2005). Third, the examination of alumni’s retrospective assessment of their undergraduate experiences offers us an important avenue to replicate, validate, and even extend the findings of previous research.

Theoretical Perspectives

As concluded by Sanford (1966), learning is a process of challenge and response: For development to occur, students must be presented with environmental challenges balanced by support. Indeed, active engagement with the college environment plays a crucial role in student development. According to Astin (1985), “Students learn by becoming involved” (p. 133). The more actively students are engaged with their college environment, the more learning and growth will occur. Astin’s theory of involvement not only emphasizes the central role of students in determining the quality and magnitude of their college development, but it also stresses the vital role of the institutional environment in providing students with varied academic and social opportunities for involvement with new ideas, people, and experiences (Pascarella & Terenzini, 2005).

In light of the person-environment interaction theories and research advances in cognitive psychology, we consider learning as a constructive process (Bruning, Schraw, & Ronning, 1995), and international interaction provides not only a forum for students encountering ideas and perceptions differing from their own but also an important way to foster students’ development of more complex modes of intellectual and moral reasoning as well as intercultural competence (Grayson, 2008). Also, we hypothesize that a larger number of international students on campus could provide more opportunities for domestic students to interact across cultures and challenge their existing belief and value systems. Institutional initiatives and structures that foster higher levels of international interaction and serious questioning of beliefs and values could ultimately influence students’ intellectual growth and skill development not only substantially but also consistently.

Data and Methodology

Data, Instrument, and Sample

This study used data from comprehensive alumni surveys of former students from the 1985, 1995, and 2000 graduating cohorts of four U.S. private, highly selective research universities, administered roughly 5, 10, and 20 years after graduation. The four universities were chosen as a convenience sample (Creswell, 2011) for three major reasons. First, they were members of a research consortium and agreed to share survey data. Second, despite variations in location and size, they are coeducational and residential and offer similar undergraduate academic programs. Third, they share a general goal of promoting diversity in all aspects of university life and enroll an increasing number of international students to that end. For instance, the proportion of international students in the total cohort population at one of these universities amounted to 3.8% in the 1985 cohort but reached 4.9% in the 1995 cohort and 7.4% in the 2000 cohort.

Developed by a research consortium and designed to gather the perceptions of former students on a variety of issues, the survey instrument, which had been used for more than three decades by the consortium members, contained three sets of questions relevant to the present purpose. One set of questions asked respondents to indicate on a 5-point scale ranging from 1 (*none*) to 5 (*very high*) the level of involvement in 25 college activities, including academic and extracurricular activities and on- and off-campus employment (Table 5). The second set asked respondents to indicate the extent to which they interacted with groups of fellow students while in college and whether they had seriously questioned their beliefs or values in 7 areas during college (Table 3). Responses for the question on interaction with students from outside the U.S. on campus were measured on a 4-point scale: 1 (*none*), 2 (*little*), 3 (*some*), and 4 (*substantial*), whereas response options for the questioning of beliefs were “yes” or “no.” The third set asked respondents to indicate how much their undergraduate institution contributed to their development in 21 areas, with each response measured on a 5-point scale, with 1 indicating “very little or none” and 5 “a great deal” (Table 2). Other questions in the survey asked for factual demographic information.

The survey was conducted online by the research consortium in spring 2005, with a response rate of nearly 41%, almost equal across cohorts and institutions. The 2005 alumni survey data were chosen over the alumni survey data in more recent years for the present inquiry mainly because the 2005 survey instrument included all key variables of interest. For this study, only respondents who indicated they were U.S. citizens ($N = 5,676$) were examined. As indicated in Table 1, although U.S. male respondents outnumbered U.S. female respondents in the 1985 cohort (56% vs. 44%), the gender representation in the 1995 cohort was roughly equal. In contrast to the 1985 cohort, U.S. female respondents in the 2000 cohort outnumbered their male counterparts (52% vs. 48%), reflecting the general national trend that women are making gains in college participation and degree attainment. Excluding roughly 2% of students across cohorts who did not indicate their race or ethnicity, the study indicated that there were approximately 14% non-Caucasian students in the 1985 cohort, 28% in the 1995 cohort, and 33% in the 2000 cohort. As in the cohort population, the sample representation of students of color was more than doubled in the 2000 cohort when compared with that of the 1985 cohort, with a notable, triple increase of Asian students. Also, social science majors outnumbered any other majors. The sample representation by gender, race or ethnicity, and major field reflected on the whole the general characteristics of the cohort population.

Table 1

Characteristics of Respondents and Degree of International Interaction by Cohort

	Characteristics of Respondents			χ^2		
	Cohort 1985	Cohort 1995	Cohort 2000			
Gender				26.59**		
Men	56.0%	49.6%	47.5%			
Women	44.0%	50.4%	52.5%			
Race/ethnicity				176.83**		
Asian	6.8%	17.2%	19.5%			
African American	4.4%	6.2%	6.9%			
Hispanic	3.4%	5.2%	6.9%			
Caucasian	83.6%	69.9%	65.0%			
Other	1.8%	1.5%	1.7%			
Major field				33.64**		
Humanities	12.7%	13.4%	11.1%			
Social sciences	31.2%	30.5%	32.8%			
Natural sciences	15.9%	18.8%	19.2%			
Engineering	19.5%	13.8%	15.0%			
Other	20.7%	23.5%	21.9%			
<i>N</i>	1494	1993	2189			
	Degree of International Interaction by Cohort			χ^2		
	Cohort 1985	Cohort 1995	Cohort 2000			
Degree of international interaction				80.53**		
None	3.5%	1.9%	1.5%			
Little	29.5%	23.4%	20.0%			
Some	43.2%	45.2%	44.8%			
Substantial	23.8%	29.5%	33.7%			
	Mean Comparisons of International Interaction by Cohort					
	Cohort 1985		Cohort 1995		Cohort 2000	
	<i>N</i>	<i>M (SD)</i>	<i>N</i>	<i>M (SD)</i>	<i>N</i>	<i>M (SD)</i>
	1494	2.87 (0.81) ^{ac}	1993	3.02 (0.78) ^{bc}	2189	3.11 (0.77) ^{ab}
<i>F</i>				39.43**		

Note. One-way ANOVAs were used for mean comparisons. *Post hoc* Dunnett T3 results: a, b, and c indicate the pairs of groups significantly different at $p < .01$, with a = Cohort 1985 vs. Cohort 2000, b = Cohort 1995 vs. Cohort 2000, and c = Cohort 1985 vs. Cohort 1995.

* $p < .01$. ** $p < .001$.

Variables and Analytical Procedures

The primary dependent variable of this study was students' assessment of their alma mater's contribution to their development in 21 areas. Although we referred to self-reported gains in abilities in the 21 areas as "skill development," most of the items included actually involve complex development of not only intellectual and practical competence but also social and leadership capacity, covering both cognitive and affective college outcomes. To examine these areas' internal structure, we conducted an exploratory, principal components factor analysis with varimax rotation, which identified four factors, accounting for roughly 53% of the total variance (Table 2): (a) General Education (Cronbach's alpha = .78), (b) Leadership Skills and Personal Development (Cronbach's alpha = .77), (c) Intellectual Development (Cronbach's alpha = .75), and (d) Science Literacy (Cronbach's alpha = .67). When appropriate, these four scale variables were used as the primary dependent variables in regression analysis.

The key independent variables of this study comprised two sets of variables. The first set included student demographic characteristics, such as race, gender, major field, and year of graduation, and the second set consisted of peer interactions, questioning beliefs, and involvement in college activities. The variable "questioning beliefs" was made up of the total number of topics students seriously questioned while in college. By taking account of these possible, influential factors, we hoped to accurately characterize the unique contribution of international interaction to skill development. For our analyses, we grouped respondents into three broad categories based on their responses to the question on international interaction: (a) none or little, (b) some, and (c) substantial. When reporting the findings, we referred to, for brevity, U.S. students who indicated having none or little international interaction as non-interactive U.S. students; U.S. students who had some international interaction as somewhat interactive U.S. students; and U.S. students who reported having substantial international interaction as highly interactive U.S. students.

To answer the first research question, we performed Chi-square tests and ANOVAs to determine significant differences. In addressing the second research question, as multiple groups were involved and the results of Levene's test showed unequal group variances in most cases, we conducted ANOVA analyses, followed by the Dunnett T3 post hoc tests for group comparisons because it was considered robust to the analysis of unequal variances (Meyers, Gamst, & Guarino, 2005). To reduce the risk of a Type 1 error that tended to accumulate over a series of post hoc tests, we used the alpha level $p < .01$ to determine significant differences. Finally, to answer the third research question, we controlled for students' personal attributes, cohort effects, and campus differences and performed multiple regression analyses to identify significant factors likely to promote international interaction.

Major Findings

Extent of International Interaction

Overall, approximately 67% of U.S. respondents in the 1985 cohort reported having some or substantial international interaction, whereas 75% in the 1995 cohort and 79% in the 2000 cohort reported so (Table 1). In comparison to the 1985 cohort, the percentage of highly interactive U.S. students in recent cohorts increased significantly by 6–14% (up from 24% in the 1985 cohort to 30% and 34% in the 1995 and 2000 cohorts, respectively), $\chi^2(4, n = 5676) = 80.53, p < .001$. To examine the magnitude of the effect, we calculated Cohen's (1988) d using the mean difference divided by the pooled standard deviation, and the results showed effect sizes ranging from 0.12 to 0.30. Also, logistic regression showed that with more international students on campus, the odds of U.S. students in the 1995 and 2000 cohorts engaging in substantial international interaction

increased considerably, approximately 1.4 and 1.6 times as great as the odds for corresponding U.S. students in the 1985 cohort, respectively.

Questioning Beliefs

As indicated by the higher average number of topics students questioned during college, highly interactive U.S. students across three cohorts appeared far more likely than their non-interactive U.S. peers to have widely challenged the belief and value systems of society as well as their own (Table 3). Particularly noteworthy, a significantly larger proportion of highly interactive U.S. students in the 2000 cohort not only seriously questioned their political beliefs, but also challenged their beliefs about other religions, other races or ethnicities, and people with other sexual orientations, than did their non-interactive peers.

Skill Development

In comparison to non-interactive U.S. students, highly interactive U.S. students indicated significantly higher levels of skill development in 9 areas across all cohorts (Table 2): (a) reading or speaking a foreign language; (b) relating well to people of different races, nations, or religions; (c) acquiring new skills and knowledge independently; (d) formulating creative or original ideas or solutions; (e) synthesizing and integrating ideas and information; (f) achieving quantitative abilities; (g) understanding the role of science and technology in society; (h) using computers; and (i) gaining in-depth knowledge of a field. The effect sizes for the 9 areas ranged from 0.20 to 0.73. Also, somewhat interactive U.S. students reported higher levels of engagement in 4 of the aforementioned areas (i.e., b, d, g, and h) than non-interactive U.S. students across all cohorts.

Student skill development was influenced by a variety of factors, including personal characteristics, peer interaction, and participation in academic and extracurricular activities (Table 4). Notably, with the control for gender, race or ethnicity, major field, and cohort, international interaction was significantly positively associated with general education ($\beta = .08, p < .001$), leadership skills ($\beta = .08, p < .001$), intellectual development ($\beta = .06, p < .001$), science literacy ($\beta = .08, p < .001$), and total gains ($\beta = .10, p < .001$). Also, questioning beliefs was correlated with all the outcome categories except science literacy.

Major Predictors

International interaction was significantly correlated with gender and cohort (Table 5). Among academic activities, engagement in coursework outside the major ($\beta = .05, p < .001$), contact with faculty outside class ($\beta = .06, p < .001$), and study abroad ($\beta = .04, p < .01$) contributed positively to international interaction. Of extracurricular activities, involvement in ethnic or cultural clubs or organizations ($\beta = .04, p < .01$) and visiting speakers ($\beta = .09, p < .001$) made positive contributions to international interaction. Participation in a fraternity or sorority displayed, however, a negative association with international interaction ($\beta = -.07, p < .001$). With the control for gender, race or ethnicity, major field, cohort, and level of participation in academic and extracurricular activities and on-campus employment, individual campus also emerged as a significant predictor of international interaction, suggesting the vital role the institutional environment played in fostering international interaction.

TABLE 2
Factor Structure of Skill Development Items and Comparisons of Skill Development by Degree of International Interaction

Skill Development Scale Label and Loading Items	Factor Loadings	Comparisons of Skill Development by Degree of International Interaction											
		Cohort 1985			Cohort 1995			Cohort 2000					
		None or Little (n = 451) M (SD)	Some (n = 582) M (SD)	Substantial (n = 335) M (SD)	None or Little (n = 455) M (SD)	Some (n = 834) M (SD)	Substantial (n = 534) M (SD)	None or Little (n = 422) M (SD)	Some (n = 882) M (SD)	Substantial (n = 671) M (SD)			
General Education													
Acquire broad knowledge in the arts and sciences	.75	3.75 (1.07)	3.86 (1.03)	3.69 (1.20)	3.82 (0.97)	3.85 (1.02)	3.90 (1.07)	3.81 (0.97)	3.87 (0.98)	3.93 (1.01)			
Appreciate art, literature, music, drama	.71	3.57 (1.18)	3.67 (1.15)	3.48 (1.27)	3.58 (1.15)	3.70 (1.13)	3.69 (1.22)	3.40 (1.14) ^{ac}	3.65 (1.10) ^c	3.69 (1.17) ^a			
Place current problems in historical perspective	.69	3.45 (1.12)	3.56 (1.17)	3.44 (1.26)	3.43 (1.15) ^{ac}	3.64 (1.10) ^c	3.67 (1.22) ^a	3.52 (1.15)	3.47 (1.16) ^b	3.68 (1.16) ^b			
Develop an awareness of social problems	.68	3.01 (1.11)	3.14 (1.07)	3.03 (1.21)	3.20 (1.09) ^{ac}	3.39 (1.10) ^c	3.45 (1.22) ^a	3.05 (1.13) ^{ac}	3.26 (1.08) ^c	3.37 (1.17) ^a			
Read or speak a foreign language	.52	2.28 (1.27) ^a	2.39 (1.29)	2.58 (1.36) ^a	2.54 (1.28) ^a	2.65 (1.32)	2.84 (1.39) ^a	2.41 (1.40) ^a	2.60 (1.30) ^b	2.83 (1.43) ^{ab}			
Identify moral and ethical issues	.48	2.84 (1.09)	2.94 (1.08)	2.86 (1.24)	2.84 (1.08) ^a	3.00 (1.06)	3.15 (1.10) ^a	2.76 (1.10) ^{ac}	2.96 (1.08) ^c	3.06 (1.20) ^a			
Leadership Skills and Personal Development													
Function effectively as a member of a team	.76	2.80 (1.13)	2.79 (1.09)	2.87 (1.11)	2.96 (1.09)	3.10 (1.08)	3.09 (1.13)	3.04 (1.17) ^{ac}	3.24 (1.13) ^c	3.28 (1.16) ^a			
Lead and supervise tasks and groups of people	.72	2.55 (1.14)	2.61 (1.16)	2.61 (1.17)	2.69 (1.13) ^c	2.88 (1.14) ^c	2.84 (1.21)	2.75 (1.23) ^{ac}	2.99 (1.16) ^c	3.06 (1.20) ^a			
A healthy lifestyle	.62	2.25 (1.09)	2.24 (1.05)	2.19 (1.10)	2.43 (1.14)	2.38 (1.12)	2.35 (1.14)	2.28 (1.22)	2.39 (1.11)	2.41 (1.21)			
Understand myself	.59	3.09 (1.15)	3.14 (1.22)	3.11 (1.25)	3.33 (1.12)	3.47 (1.17)	3.39 (1.21)	3.28 (1.24)	3.47 (1.17)	3.47 (1.24)			
Develop self-esteem, confidence	.57	3.17 (1.21)	3.18 (1.18)	3.16 (1.34)	3.22 (1.22)	3.27 (1.18)	3.30 (1.22)	3.03 (1.26) ^a	3.22 (1.20)	3.28 (1.28) ^a			
Relate well to people of different races/nations	.39	2.96 (1.18) ^{ac}	3.34 (1.13) ^{bc}	3.78 (1.10) ^{ab}	3.27 (1.11) ^{ac}	3.70 (1.05) ^{bc}	4.05 (1.02) ^{ab}	3.23 (1.19) ^{ac}	3.68 (1.10) ^{bc}	3.95 (1.07) ^{ab}			
Intellectual Development													
Acquire new skills and knowledge on own	.75	3.82 (0.99) ^{ac}	4.08 (0.91) ^c	4.18 (0.94) ^a	3.83 (1.06) ^a	3.98 (0.96)	4.09 (1.01) ^a	3.85 (1.00) ^a	4.00 (0.94)	4.14 (0.98) ^a			
Formulate creative and original ideas	.73	3.47 (1.00) ^{ac}	3.76 (1.01) ^c	3.87 (1.06) ^a	3.48 (1.01) ^{ac}	3.66 (1.04) ^{bc}	3.86 (1.04) ^{ab}	3.50 (1.08) ^{ac}	3.69 (1.00) ^{bc}	3.85 (1.02) ^{ab}			
Synthesize and integrate ideas and information	.63	3.98 (0.88) ^{ac}	4.16 (0.86) ^c	4.18 (0.95) ^a	3.94 (0.91) ^a	4.05 (0.87) ^b	4.23 (0.89) ^{ab}	3.95 (0.94) ^a	4.05 (0.87)	4.16 (0.92) ^a			
Communicate well orally	.51	2.99 (1.12)	3.12 (1.13)	2.93 (1.25)	3.05 (1.10)	3.19 (1.12)	3.13 (1.24)	3.03 (1.17) ^a	3.16 (1.12)	3.25 (1.19) ^a			
Write effectively	.46	3.63 (1.15)	3.74 (1.12)	3.52 (1.24)	3.75 (1.10)	3.77 (1.08)	3.71 (1.17)	3.69 (1.14)	3.81 (1.09)	3.78 (1.13)			
Science Literacy													
Quantitative abilities	.75	3.11 (1.29) ^a	3.32 (1.24) ^b	3.71 (1.29) ^{ab}	2.95 (1.31) ^{ac}	3.18 (1.30) ^{bc}	3.46 (1.31) ^{ab}	3.15 (1.35) ^a	3.32 (1.26) ^b	3.57 (1.29) ^{ab}			
Understand the role of science and technology	.66	2.86 (1.14) ^{ac}	3.21 (1.10) ^c	3.23 (1.20) ^a	2.84 (1.12) ^{ac}	3.05 (1.10) ^{bc}	3.33 (1.19) ^{ab}	2.97 (1.12) ^{ac}	3.25 (1.05) ^c	3.38 (1.15) ^a			
Use computers	.63	2.30 (1.32) ^{ac}	2.59 (1.37) ^{bc}	2.95 (1.44) ^{ab}	2.62 (1.28) ^{ac}	2.92 (1.26) ^{bc}	3.18 (1.32) ^{ab}	3.26 (1.22) ^{ac}	3.53 (1.19) ^c	3.59 (1.24) ^a			
Gain in-depth knowledge of a field	.54	3.59 (1.11) ^a	3.79 (1.09)	3.94 (1.09) ^a	3.49 (1.12) ^a	3.61 (1.12)	3.73 (1.15) ^a	3.54 (1.13) ^a	3.68 (1.09)	3.82 (1.11) ^a			

Note. One-way ANOVAs were used for mean comparisons of skill development. Post hoc Dunnett T3 results: a, b, and c indicate the pairs of groups significantly different at $p < .01$, with a = Substantial vs. None or Little, b = Substantial vs. Some, and c = Some vs. None or Little.

TABLE 3

Percent of Students Who Seriously Questioned Their Beliefs or Values during College by Degree of International Interaction

	Cohort 1985			Cohort 1995			Cohort 2000			χ^2
	None or Little	Some	Substantial	None or Little	Some	Substantial	None or Little	Some	Substantial	
1. Own political beliefs	51.3%	53.7%	61.5%	54.3%	57.6%	64.8%	52.5%	57.0%	62.7%	13.00**
2. Own religious beliefs	44.7%	45.9%	51.0%	44.5%	45.1%	49.7%	41.4%	48.2%	47.9%	6.66
3. Own moral ethical values	45.9%	44.5%	48.4%	47.0%	48.9%	55.7%	48.3%	52.7%	55.9%	6.64
4. Beliefs about nature of humans or society	57.5%	64.3%	65.0%	63.4%	66.9%	71.6%	63.0%	67.2%	71.1%	8.56
5. Beliefs about other religions	50.9%	57.5%	60.9%	53.0%	57.3%	64.2%	53.5%	59.7%	64.9%	15.58**
6. Beliefs about other races or ethnicities	40.3%	45.1%	48.9%	51.8%	52.4%	57.8%	45.7%	51.1%	56.7%	14.12**
7. Beliefs about people with other sexual orientations	47.0%	56.2%	56.2%	53.3%	61.4%	64.0%	46.5%	53.3%	58.2%	15.83**

	Cohort 1985			Cohort 1995			Cohort 2000			F
	None or Little (n = 476) M (SD)	Some (n = 626) M (SD)	Substantial (n = 342) M (SD)	None or Little (n = 487) M (SD)	Some (n = 875) M (SD)	Substantial (n = 575) M (SD)	None or Little (n = 459) M (SD)	Some (n = 965) M (SD)	Substantial (n = 722) M (SD)	
Number of Beliefs Questioned	3.39 (2.32) ^a	3.67 (2.27)	3.89 (2.41) ^a	3.65 (2.32) ^a	3.89 (2.34) ^b	4.29 (2.34) ^{ab}	3.50 (2.26) ^{ac}	3.90 (2.36) ^c	4.17 (2.25) ^a	11.91**

Note. The “Number of Beliefs Questioned” referred to the total number of topics students seriously questioned while in college. One-way ANOVAs were used for mean comparisons. Post hoc Dunnett T3 results: a, b, and c indicate the pairs of groups significantly different at $p < .01$, with a = Substantial vs. None or Little, b = Substantial vs. Some, and c = Some vs. None or Little.

* $p < .01$. ** $p < .001$

Table 4

Standardized Regression Coefficients for Analyses on the Impact of International Interaction and Questioning Beliefs on Skill Development

Independent Variables	Skill Development				
	General Education	Leadership Skills	Intellectual Development	Science Literacy	Total Gains
Interaction with International Students	.08**	.08**	.06**	.08**	.10**
Number of Beliefs Questioned	.15**	.06**	.07**	.02	.11**
Academic Activities	.18**	.17**	.27**	.24**	.28**
Extracurricular Activities	.14**	.23**	.10**	.03	.18**
Employment	-.04	-.07**	-.04	.00	-.05**
Gender (Male)					
Female	.05**	.03	.02	-.07**	.02
Race/Ethnicity (Caucasian)					
Asian	.02	.05**	-.01	.04**	.04*
African American	.00	-.02	.03	.01	.00
Hispanic	.05**	-.00	.03	.01	.03
Major Field (Humanities)					
Social Science	.02	.05*	.01	.02	.03
Natural Science	-.10**	.01	-.08**	.24**	.01
Engineering	-.35**	-.01	-.10**	.38**	-.06**
Cohort (Cohort 1985)					
Cohort 1995	.03	.08**	-.03	-.02	.03
Cohort 2000	-.03	.08**	-.06*	.08**	.03
Adjusted R ²	.25**	.14**	.13**	.28**	.20**

Note. Regression coding schemes: (a) Gender: female = 1, male = 0; (b) Race/ethnicity: African-American = 1, Asian = 1, Hispanic = 1, and Caucasian = 0; (c) Major Field: Social Science = 1, Natural Science = 1, Engineering = 1, and Humanities = 0; and (d) Cohort: Cohort 1995 = 1, Cohort 2000 = 1, and Cohort 1985 = 0. Male, Caucasian, Humanities, and Cohort 1985 were used as comparison groups for gender, race/ethnicity, major field, and cohort, respectively. Total Gains referred to sum of skill development.

* $p < .01$. ** $p < .001$.

Table 5

Standardized Regression Coefficients on Factors That Contribute to International Interaction

Variable Blocks	Standardized Regression Coefficients				B^{\dagger}		
	Model 1	Model 2	Model 3	Model 4			
Background	Female	-.10**	-.10**	-.11**	-.11**	-.17	
	Asian	-.00	-.02	-.02	-.04	-.08	
	African American	-.01	-.01	-.02	-.03	-.10	
	Hispanic	.03	-.01	-.01	-.01	-.04	
	Social Sciences	-.00	-.00	-.00	.01	.02	
	Natural Sciences	.04	.04	.05*	.04	.08	
	Engineering	.07**	.09**	.08**	.02	.05	
	Cohort 1995	.11**	.12**	.12**	.13**	.21	
	Cohort 2000	.14**	.14**	.14**	.13**	.21	
Academic Activities	Coursework in major	-.01	.01	.01	.02	.02	
	Coursework outside major	.08**	.06**	.07**	.05**	.05	
	Internships	.02	.02	.01	-.00	-.00	
	Independent study	.03	.03	.02	.02	.01	
	Faculty research	.05*	.06**	.05*	.01	.01	
	Faculty contact outside class	.06**	.04	.04	.06**	.05	
	Interaction with pre-major advisor	.04*	.04	.04	.02	.02	
	Interaction with major advisor	.00	-.00	.00	-.01	-.01	
	Contact with campus staff	.07**	.05*	.03	.03	.02	
	Study abroad	-.03	-.02	-.01	.04*	.02	
	Off-campus study in the U.S.	-.02	-.02	-.02	-.01	-.01	
	Extracurricular Activities	Student or campus government		-.02	-.02	-.03	-.02
		Intercollegiate athletics		.03	.03	.01	.01
Intramural sports			.04	.03	.01	.01	
Student publications			.01	.01	.00	.00	
Performing arts or music			.03	.03	.01	.01	
Political organization or club			.02	.02	.01	.01	
Ethnic or cultural club			.06**	.05*	.04*	.03	
Community service			-.01	-.02	.01	.01	
Fraternity or sorority			-.09**	-.09**	-.07**	-.04	
Religious groups or activity			.01	.01	.02	.01	
Residential hall life			.02	.02	.04	.02	
Visiting speakers		.07**	.07**	.09**	.07		
Employment	On-campus employment			.07**	.07**	.04	
	Off-campus employment			.05**	.03	.02	
Campus	Campus A				.30**	.67	
	Campus B				.22**	.37	
	Campus C				.13**	.23	
R^2	.073	.093	.101	.155			
Change in R^2	.073**	.020**	.008**	.055**			
F	18.61**	15.13**	15.69**	23.56**			
N	4516						

Note. Regression coding schemes: (a) Gender: female = 1, male = 0; (b) Race/ethnicity: African-American = 1, Asian = 1, Hispanic = 1, and Caucasian = 0; (c) Major Field: Social Science = 1, Natural Science = 1, Engineering = 1, and Humanities = 0; (d) Cohort: Cohort 1995 = 1, Cohort 2000 = 1, and Cohort 1985 = 0; and (e) Campus: Campus A = 1, Campus B = 1, Campus C = 1, and Campus D = 0. Male, Caucasian, Humanities, Cohort 1985, and Campus D were used as comparison groups for gender, race/ethnicity, major field, cohort, and campus, respectively.

†Unstandardized coefficients for Model 4.

* $p < .01$. ** $p < .001$.

Discussion

Our findings suggest that among other factors, with more international students on campus, U.S. students were more likely to have opportunities to engage in international interaction and encounter various ideas and perspectives sharply different from their own both inside and outside the classroom (Astin, 1993; Chang, 1996). Also, the findings support previous research, which documented that students who engaged in frequent interactions with diverse peers showed a greater openness to diverse perspectives and a willingness to challenge their own beliefs (Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1996). Importantly, this study shows that substantial international interaction contributed to U.S. students' serious questioning of their beliefs and values. Further analyses revealed that students' questioning their beliefs and values was positively related to their acquisition of general education, leadership skills, and intellectual development.

Most notably, our study shows that substantial international interaction was positively correlated with U.S. students' perceived skill development in a wide range of areas across three cohorts. When identifying factors likely to contribute to international interaction in the regression analysis, we found that international interaction was significantly correlated with students' personal attributes. Consistent with the study by Hu and Kuh (2003), this study shows that even with the control for major field, male U.S. students were more likely than their female counterparts to interact with international students. Also, the 1995 and 2000 cohorts were more likely than the 1985 cohort to engage in international interaction. This increased international interaction is, as this study suggests, strongly associated with a larger enrollment of international students and institutions' commitment to enriching students' collegiate experiences. Of course, this finding by no means implies that the mere presence of more international students on college campuses will automatically lead to substantial interaction between U.S. students and their international peers. Rather, it underscores the important role institutions have in leveraging greater international diversity and other forms of diversity as well. As revealed by the regression analysis, college campus was a robust predictor of international interaction. With the campus environment now more diverse than ever before, institutions should promote a welcoming, caring, and productive learning environment and foster opportunities for meaningful, substantial interactions in order to enhance students' educational experiences.

Our analysis also reveals that both academic and extracurricular activities provided important contexts for international interaction to occur. Among the academic activities, most notably, engagement in coursework outside the major emerged as a consistent, solid booster for international interaction. This is mainly because supporting courses from outside the department sponsoring the major are more often designed expressly to foster interaction across cultural and social boundaries and focus on issues of identity, diversity, globalization, and power. Taking these courses appears to have provided students with not only opportunities for interacting across disciplines but also chances for interacting across cultures.

Moreover, our analysis shows that contact with faculty outside class was significantly correlated with international interaction. Informal contact between students and faculty with intellectual substance and depth has been shown to have substantial impact on student learning, personal development, and the amount of effort they devoted to other educational activities (Kuh & Hu, 2001; Pascarella & Terenzini, 2005). Apparently, operating at a more personal level and covering a broader range of issues, informal contacts with faculty outside the classroom might have strongly stimulated students' active engagement in college activities and extensive interaction with international students.

Furthermore, our analysis demonstrates that study abroad was positively associated with international interaction. Study abroad benefits undergraduates across a number of dimensions,

including greater intercultural awareness, greater tolerance and acceptance of others, increased interest in international economic, political, and cross-cultural issues, higher commitment to peace and international cooperation, and greater friendliness for visiting foreign nationals (Geelhoed et al., 2003; Pascarella & Terenzini, 2005). Indeed, as noted by Geelhoed et al., 12 of the 16 host student participants in their peer-pairing program had previously studied or traveled abroad and indicated a high level of comfort with international students. Apparently, U.S. students' previous international experiences had both equipped and motivated them to find common ground for engagement in substantial interaction across cultures.

Finally, our analysis reveals that involvement in ethnic or cultural clubs or organizations, visiting speakers, and on-campus employment provided U.S. students with opportunities for interacting across cultural boundaries. Participating in cultural clubs or organizations offers opportunities for students to meet new people, learn about various cultures, and become cognizant about and connected with the campus environment (Baxter Magolda, 1992) and positively affects students' intellectual and psychosocial development, multicultural competence, interpersonal skills, and leadership capabilities (Astin, 1993; Pascarella & Terenzini, 2005). Also, attending visiting speakers series, which are used on many university campuses, helps to bring alive the beliefs and theories studied in the classroom and builds strong connections with issues and challenges in the real world, and having a job on campus provides another way for students to get involved in campus life. Through participation in these and also many other activities during their undergraduate years, students are likely to encounter people with sharply differing backgrounds, ideas, and perspectives. This type of encounter produces cognitive disequilibrium, dissonance, or incongruity, which promotes mental activity and cognitive growth (Piaget, 1985). As international students tend to have a stronger background in math and science (Moore, 2008), engaging in substantial interaction with international peers might also benefit U.S. students in the development of their quantitative abilities and computer skills. Considered in conjunction with these research findings, small wonder that highly interactive U.S. students reported greater development in a wide range of areas, providing strong evidence that international diversity supports not only the developmental goals of higher education but also the intellectual and social goals of internationalization.

Limitations

This study has several limitations. First, as the three graduating cohorts were 5, 10, and 20 years apart, events that occurred during these years as well as possible age and maturational differences and different sociopolitical environments might have had positive or negative impact on former students' retrospective perceptions of their previous educational experience. Second, using the 2005 alumni survey data, this study did not examine the changes that might have happened during the intervening years, which may affect people's perceptions. Third, this study relied mainly on former students' self-reported improvement in skill development rather than on more objective measures of student learning such as standardized test scores. Fourth, this study focused on the characteristics of former students in private, highly selective, and residential research institutions. As student academic backgrounds and educational experiences may vary with types of institutions, the international interaction patterns at other types of institutions may be somewhat different. Finally, this study did not examine the effects of interacting with U.S. students on international students' skill development, nor did it investigate with which international cultural groups U.S. students interacted.

As some regions or countries have cultures or educational systems sharply different from those of the U.S., future research may examine the interaction patterns of both U.S. and international students and identify the unique impact of interacting with specific international cultural groups. Doing so may yield interesting information that would be useful in guiding the design of campus programs to foster higher levels of international interaction.

Implications

While it is encouraging to note that increasingly more U.S. students in recent cohorts engaged in substantial international interaction in our sample, we also found that roughly 22-25% of U.S. students in recent cohorts indicated having none or little international interaction. Apparently, there is still a need for institutions to strengthen programs to foster greater international interaction. To stimulate discussion among faculty, administrators, and student affairs professionals on strategies for promoting beneficial international interaction and increasing gains in international diversity that institutions have achieved in recent years, we offer a few recommendations below.

First, institutions should reinforce faculty's commitment and engagement with undergraduates. As contact with faculty outside class was significantly related to international interaction, enhancing faculty-student interaction is of vital importance to leveraging the increasing representation of international students on U.S. domestic campuses for greater intellectual growth of all students, domestic and foreign alike. Through their roles as undergraduate instructors and advisors, faculty members can promote international interaction, both directly or intentionally and indirectly or serendipitously. Hence institutions can encourage faculty members, for instance, to take a more proactive role in helping students develop a positive attitude toward international interaction and in advising clubs or organizations to be more open and inclusive. Also, institutions can promote student participation in international activities by calling upon faculty members to attend such activities together with students.

Second, as coursework outside the major was positively correlated with international interaction, institutions should underscore the importance of crossing disciplinary boundaries in the curriculum and enlist faculty's help in designing interdisciplinary courses or programs. Engaging students in interaction across disciplines will not only likely foster integrative learning but also likely produce interdisciplinary perspectives and create original solutions to problems.

Third, as depth of interaction can play a decisive role in students' collegiate experience, institutions should encourage deep and collaborative interactions between U.S. and international students. To this end, faculty and student affairs professionals may think about strengthening both groups of students' involvement with the campus community via sponsoring, for instance, campus cultural events and debates on global issues of mutual interest. Furthermore, institutions can encourage faculty to place greater emphasis on group or cooperative course projects involving both U.S. and international students in order to create a natural environment conducive to enhancing group process abilities, fostering leadership skills, and developing multiple perspectives. When designing such projects, however, faculty should heed the timeframe for the projects and make it sufficiently long for culturally different participants to overcome initial difficulties and enjoy the ultimate benefits of cultural diversity (Summers & Volet, 2008).

Fourth, as study abroad is a significant predictor of international interaction, institutions may bring international students and U.S. students who have studied abroad together to share their experiences and knowledge with other students who are unable to participate in study abroad programs due to various reasons. As the number of students able to study abroad is still extremely small on many campuses, doing so can increase intercultural awareness and foster campus international interaction on a larger scale. For better results, intercultural communication experts should be invited to guide such talks.

Fifth, institutions should encourage students to extend their social activities beyond participation in only culturally homogenous social groups. As participation in a fraternity or sorority was negatively associated with international interaction, Greek letter organizations may be encouraged to examine the extent to which their group personae deter international student

participation or encourage assimilation of differing cultures to their group identity rather than appreciation of difference and engagement on a mutually beneficial footing. Also, in our sample, while 54-65% of international respondents across three cohorts participated in ethnic or cultural clubs or organizations, only 20-31% of U.S. respondents did so. To enable U.S. students to gain more opportunities for international interaction, institutions may encourage them to attend campus cultural events or better to join cultural and service-oriented groups (Trice, 2004). Involvement in more cultural clubs or organizations could help students find a place to belong and develop friendships with individuals who know what it is like to be different from everyone else. The social skills gained through such involvement could also be invaluable for all participants. Meanwhile, international students should be encouraged to expand their friendship networks beyond their bonds with mainly fellow citizens or students from other nations (Bochner, Hutnik, & Furnham, 1985) and become more actively involved in campus activities.

Finally, institutions should regularly evaluate their existent programs to identify areas for further improvement and intentionally implement new initiatives to foster substantial international interaction. Studies have shown that international students desired more intercultural interaction than they had actually experienced (Ward, 2001) and cited “lack of opportunities to interact with U.S. students” as the biggest barrier to the development of meaningful intercultural relationships (Yang, Teraoka, Eichenfield, & Audas, 1994). Research has also noted that domestic students had generally favorable perceptions of international students, but they were largely uninterested in initiating contact with their international peers (Pavel, 2006; Spencer-Rodgers, 2001; Ward, 2001). To address these issues, institutions should evaluate their residential or service programs vis-a-vis the goals of fostering international interaction, and purposefully create more and better structured opportunities for both groups of students to engage in substantive interaction. To stimulate student interest, institutions may proactively promote the potentially mutual benefits of substantial international interaction to both groups of students and communicate evidence for meaningful links with their educational and professional goals. Also, providing both groups of students with essential intercultural communication skills will likely reduce their stress, increase their self-confidence in interacting across cultures, and promote more active involvement in these and other campus activities. Doing so will not only assist international students in acquiring higher levels of proficiency in the English language, gain deeper understanding of the unwritten codes of the host culture, and better handle social, psychological, and academic challenges, but it will also help U.S. students reinforce their language skills, strengthen their intercultural communicative competence, and enable them to function more effectively in an increasingly globalized world.

Conclusion

Through the analysis of alumni survey data from three graduating cohorts, this study examined the influence of interaction with international students on U.S. students’ college outcomes and explored factors that helped to promote international interaction on college campuses. The findings indicate that international interaction was consistently and positively correlated with college outcomes and that U.S. students who interacted extensively with international students reported higher levels of engagement in college activities, such as coursework outside the major, contact with faculty outside class, ethnic or cultural clubs or organizations, and visiting speakers. The consistent patterns this study has identified about the effects of international interaction across three cohorts provide clear and strong evidence of the educational benefits of international interaction. To maximize the gains in international diversity institutions have achieved in recent years, institutions should intentionally implement new initiatives to foster greater interaction across cultures.

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