

AC 2009-2351: GLOBALIZING THE COMPUTER GRAPHICS TECHNOLOGY CURRICULUM

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Globalizing a Computer Graphics Technology Curriculum

Abstract

Globalization is becoming a key element within undergraduate curricula at many institutions. Administrators and faculty alike are realizing the importance of exposing students to the similarities and differences between people of various cultures and backgrounds. In the past, efforts to provide a global viewpoint to students was primarily provided via traditional textbooks and teaching approaches or by exposing students to a speaker from another culture. The new approach, however, is about immersion and experience within the culture; the fruits of such experiences go beyond “book knowledge” of similarities and differences to a true practical and experiential knowledge. Within one major Midwestern university globalization has been identified as a signature area. This contribution acknowledges how a computer graphics technology program within a college at this university has made strides to globalize its curriculum through study abroad, faculty exchange, and other international endeavors. This paper will acknowledge the challenges that administrators and faculty have encountered in their efforts to provide international experiences for faculty and students.

Background

Partnerships between academic institutions and industries abroad have historically proven to be highly beneficial and productive relationships. Given the relative youth of the United States as a country and its foundational population of immigrant citizens, there has been a longstanding and natural affinity between U.S. higher education and its ancestral nations overseas. In addition to countless research projects and other cooperative endeavors, many U.S. schools have maintained healthy exchange programs and study-abroad initiatives for the majority of their existence.²

These types of programs enjoyed somewhat of a renaissance following World War II, as the experience of that event brought into light the need for the U.S. and its citizens to adopt a global mindset. As a result, a variety of sponsored educational initiatives were implemented such as the 1946 Fulbright Act, which provided legislation to promote funding for international education and research through the sale of surplus military equipment.¹ The Cold War served to promote similar programs in later years such as the Mutual Educational and Cultural Exchange Act of 1961.³

However, interest in these types of programs faded in the early '90s with the collapse of the Soviet Union as U.S. domestic problems began to steadily supersede international affairs.⁵ Although international efforts by no means vanished during this period, an argument could be made that these efforts became increasingly narrow and Eurocentric, ignoring the immediate future and the inevitable rise of developing nations. While this thinking did not eliminate international collaborative programs, it certainly seemed to reduce their effectiveness from a broader perspective.

A Need for Globalization

In recent years there has been renewed interest in global awareness, particularly in developing nations outside of Europe. Reasons for this interest include the events of September 11th and other international conflicts, which have highlighted a variety of political and security issues that must be addressed in the 21st century. The rise of emerging-market nations such as India, Indonesia, and China has also contributed to this interest, as the potential for development and exchange offers exciting prospects for both industry and academia. Not surprisingly, the tremendous growth in these countries has given the academic community a general sense of urgency to take advantage of these opportunities and lay the appropriate groundwork for fostering new relationships and research partnerships.

The latest, and perhaps most stunning, example of the potential of developing nations lies in China. With one-fifth of the world's population and one of the fastest growing economies on the planet, the Chinese seem poised to play a major role in the events of the next century. With an average annual GDP growth rate of more than 10% for the last quarter century, and currently possessing the second largest economy in the world after the United States², this potential seems well on the way to being realized. Developments in Chinese research and academic programs are equally impressive, thus adding to the appeal of this country as a potential collaborative partner.

Re-establishing a Global Priority

The reduced emphasis on international education in the years following the Cold War has left the United States in an unenviable situation as students increasingly fail to establish a global context for their education. A recent report issued by the Committee for Economic Development dramatically highlights how the American educational system has failed to produce graduates who can compete on a global stage.⁵ When compared to other nations, U.S. students are typically unilingual and are generally unaware of global issues, events, and cultures. Without these skills and many others essential for the success of the modern graduate, it is reasonable to assume that American students will continue to fall behind the curve. In order to prevent continued failure on these academic fronts, new efforts and resources must be directed to provide U.S. students with the tools needed to compete in the global economy.

Merging Cultural Exposure with Industrial Experiences

Study-abroad programs and industrial internships are reliable mechanisms for integrating global concepts into higher education. The widespread use of such programs by educational institutions, international corporations, and governments around the world is of no surprise as their benefits are well-documented.⁶ The hands-on and immersive experience they provide allows students to fast-track their global education in unique and affective settings that provide many opportunities that cannot be attained in the States.

From the perspective of education, the impact of global immersion on learning objectives and course competencies can be striking. International technologies, standards, and content must now be included when developing and implementing curricula and the corresponding student outcomes. While in the past it has been acceptable practice for students to adopt a primarily U.S.

paradigm, today's students must pursue their objectives within the larger global context in order to remain competitive. This is especially true considering the advent of the information age, where communication over vast distances now occurs at the click of a button.

International Programs

The computer graphics technology department described in this paper has created a number of study-abroad programs to countries such as Poland, Russia, and China; with plans to extend similar programs to Ireland and Scotland. Its Chinese cultural exchange program has been established since 2007, and continues to function in partnership with another department at the university. Like many study-abroad programs, students and faculty learn and teach at several peer institutions in the select countries for anywhere from two weeks to one month depending on the individual program. While these programs are somewhat traditional in that they heavily focus on cultural aspects of international exchange, they have nonetheless provided invaluable exposure for students and faculty.

However, most of these programs failed to address the industrial aspects of cultural exchange, an important component of an applied field such as computer graphics technology. These aspects include a familiarity with industrial methods, processes, and protocols as well as experience with these areas in international settings. To address this deficiency with the traditional exchange programs, the China Industrial Outreach and Exchange Program (CIOEP) was initiated in 2008. Originally funded by a Study Abroad and International Learning (SAIL) seed grant at the authors' home institution, the program was designed to focus primarily on industrial aspects of education and collaboration rather than solely targeting cultural exchanges. While cultural exchange is obviously an important element of any globalization initiative, the authors determined that similar programs focusing on cultural education already existed at their university and that developing another would be redundant. Given the importance of industrial research partnerships within the College of Technology and the tremendous growth in the Chinese industrial sector, an industrial exchange program provided the next logical step.

The primary mission of the CIOEP is to explore and foster collaborative relationships between students, faculty, and targeted industrial partners in China. In addition to the overarching mission of industrial exchange, other goals of the CIOEP include:

- Investigating the possibility of placing student interns in China-based corporations
- Assessing the needs of Chinese companies and how those needs might be filled
- Establishing common ground in learning, discovery, and engagement both with Chinese corporations and academic institutions involved in industrial collaborations
- Better understanding the Chinese educational environment and associated peer institutions
- Establishing a financially sustainable program through strategic marketing, identification of funding institutions, and adoption of corporate and academic partners

Evaluation of Needs:

Prior to beginning any international program, both the needs of the participating institution and the partners abroad must be assessed. In the case of the CIOEP, two faculty representatives from the university visited a variety of industrial and academic institutions in the city of Beijing, China for ten days. Although observations from a single city in a country as large as China may be limited to some degree, the authors determined that a more thorough investigation of a single target city would be more beneficial to the assessment. One of the reasons for this conclusion was the fact that other faculty within the college had already performed similar fact-finding missions within China. As one of the largest cities within China and its reputation as the central hub for commerce and industry, Beijing was determined to be the ideal location for assessment of the CIOEP program.

The primary point of contact for this assessment visitation was Dr. Jane Liedtke, a former U.S. Technology faculty member and CEO of the company *Our Chinese Daughters Foundation* (OCDF). Originally founded as an organization that facilitated the adoption of Chinese children, OCDF has since expanded its mission to include cultural exchange and Chinese contact facilitations for academic and industrial partners. From the standpoint of facilitating the program assessment, OCDF proved to be an invaluable resource not only in terms of navigating the complex channels of Chinese culture but also in initiating contact with target institutions and individuals within greater Beijing. Dr. Liedtke's familiarity with the university educational system was similarly advantageous.

Working in concert with OCDF, the authors met with representatives and officials from a variety of corporations and academic institutions over the 10-day period. These entities were selected on the basis of commonalities with the computer graphics department and its home college within the university. Larger companies included Boeing, IBM, and Caterpillar. Faculty members also met with representatives from smaller companies such as United Technologies, Universal Idea Consultants, ChinaBeat Design Studios, Better Chinese Design Studios, and the MAD Architectural Studio.

As previously mentioned, academic institutions were also targeted for assessment and were similarly identified on the basis of commonalities with the computer graphics department and its home college. These programs consisted of the Institute of Digital Design, Beijing Institute of Graphic Communication, and the Department of Information Design at Tsinghua University. Other meetings included interviews with representatives from the American Chamber of Commerce in China, the U.S. Information Technology Office, and the Pacific Islands Forum Trade Office.

Insights from China

Preliminary discussions with industry representatives were initially discouraging, especially when discussing the possibility of placing U.S.-based students in Chinese internships. According to many of the representatives interviewed, the inherent limitations in placing U.S. students outweighed the potential benefits, with the language barrier being the most frequently cited obstacle. Speaking Mandarin or some other Chinese dialect is not only critical to functioning

within most China-based corporations, but also to the day-to-day living conditions in a city as dynamic and unique as Beijing. This culture shock combined with the considerable communication difficulties most American students would face led to the consensus that placing interns would be difficult at best.

Another obstacle included the proposed duration of the internships in question. According to industry representatives, 3-6-month internships would not be a cost-effective solution for Chinese corporations. Those interviewed shared the opinion that only those students with long-term aspirations for living in China would be worth the cost and investment. This is especially true considering that the tremendous expansion of Chinese economy, industry, and academia in the last 25 years. Chinese post-secondary educational institutions can now provide countless numbers of qualified local student co-op and internship candidates. As such, the question is often boiled down to the practicality of recruiting students from thousands of miles away versus those that were quite literally “in their own backyard.”

The third obstacle that was most often cited referred to cost-of-living differences between China and the U.S. Most representatives expressed the concern that few U.S.-based students would be willing to go through the considerable trouble and expense of relocating (even temporarily) to China in order to earn far less in terms of payment they expect based on what can be earned in the States. Given the current status of the U.S. economy and the expenses those students would incur, this argument appears to have some merit.

One additional obstacle was most companies’ inability or unwillingness to provide support for U.S. interns (items such as housing, city transportation, and the needed handholding for strangers in another’s land). Most companies visited became more open to discuss possible connections when they learned the OCDF would be contracted by the university to provide such needed student support.

However, while the obstacles to placing interns cited were indeed daunting, most representatives stated that accommodations could be made in placing U.S. interns if they met many or all of following criteria:

- Student is of Chinese descent
- Student has previously lived in China for an extended period
- Student speaks Chinese (Mandarin or whatever dialect is required)
- Student has long-term aspirations for living in China
- Student had a U.S.-based internship with the company and a China-based internship adds value to the company’s global personnel development plans

Given that the authors’ school already has a strong population of Chinese students, these accommodations were encouraging to a certain degree. Although the prospects for those students lacking any prior connection to China would certainly be limited, the door for potential future internship placement was still open. Combined with the generally positive reception to the idea of other forms of exchange between U.S. academic institutions such as collaborative research and engagement projects, the prospect of future partnerships with Chinese corporations seemed hopeful.

Globalization Strategies

Experiences such as the Chinese assessment visitation and the formulation of international programs such as the CIOEP have provided invaluable insight into the formulation of global initiatives. These strategies include:

- Reducing the importance of placing interns and enhancing the focus of creating new collaborative research partnerships that can be conducted via distance
- Actively recruiting students and faculty of international descent or who possess global experience (multilingual, living abroad, etc.)
- Identifying companies with strong ties to both the U.S. and foreign countries who would be willing to place U.S. students
- Encouraging exchange visitations between faculty in the U.S. and peer institutions abroad
- Identifying support mechanisms for students and faculty who wish to study abroad or present their work at international venues (grants, fellowships, etc.)
- Eliminating redundant efforts amongst faculty and finding common ground in which to consolidate similar exchange programs
- Encouraging and mentoring U.S. students in taking elective courses in foreign languages and other classes that adopt global paradigms
- Identifying areas in the existing curriculum where globalization can be effectively integrated
- Actively working to modify or enhance course competencies and student outcomes in order to provide a better fit with the global paradigms

Progress and Recent Developments

In an effort to implement these strategies and expand the international influence within the department, several milestones have been achieved in recent months. A network of faculty from participating peer institutions in countries abroad has been established, with several of these partners having actively participated in either the CIOEP or one of the study-abroad programs. Recently the department has established visiting professor relationships with Harbin University and includes the recent hosting of a visiting faculty member on temporary assignment from Dalian University, who was recruited to conduct collaborative research with peers in the computer graphics department. These global initiatives complement two recently hired CGT faculty members of international descent within the department, both of whom constitute half of the most recent additions to the faculty.

Through administrative encouragement, faculty initiative, and the identification of funding sources and other resources, the number of international research partnerships and presentations at international venues has increased. Student intern placement with foreign companies has met with some degree of success to date, as partners in countries like China have identified a surprising number of companies abroad willing to place U.S. students. However, given the recent downturn in the U.S. economy that accelerated in the fall of 2009, students have been somewhat reluctant to commit to the expenses associated with the program. This has led to several departments taking the action to merge their study-abroad programs and a lower-than-expected number of qualified student applicants to the CIOEP. It is the hope of the program leaders that the continued growth of both programs and the eventual turnaround in the U.S. economy will lead to increased participation by the student body and decreased individual expenses for traveling abroad.

Summary

The tremendous potential benefits of international exchange with global partners will continue to be critical for the development of students and faculty in the United States. As the world becomes more flat and emerging nations play a larger role on the world stage, increasing importance will be placed on understanding the global perspective and the role we play in it. Although there are several deficiencies that must still be addressed in order to obtain this understanding, these problems are not yet insurmountable.

Curricula, student outcomes, and competencies must be modified to encourage and support these international programs and initiatives. By making appropriate changes to the looking glass with which students view their academic careers and the methods by which faculty facilitate the development of those careers, the outlook should be encouraging. By understanding the strengths and limitations inherent to the exchange of ideas and practices between two countries of such broad distinctions, U.S. institutions of higher education can make the appropriate changes to ensure that American education adapts to the 21st century model.

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