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## **AC 2011-898: CURRICULUM GLOBALIZATION: INTERNATIONAL EX-CHANGES BETWEEN AMERICAN AND CHINESE UNIVERSITIES**

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# Curriculum Globalization: International Exchanges Between American and Chinese Universities

## Introduction

Universities in the U.S. must expand their efforts in globalization. In 2006, the School of Engineering Technology at Eastern Michigan University signed an academic exchange agreement with the Tianjin Institute of Urban Construction. The main provisions of the agreement between the two universities include the exchange of graduate students and faculty, collaboration in research, and the establishment of a Visiting Scholar program. Eastern Michigan University (EMU) is located in Ypsilanti, some 40 miles west of Detroit, and has long been a favored destination for international engineering students attracted by the proximity to the auto engineering and production facilities in southeast Michigan. Tianjin, China has a population of some 12 million, is located on the Yellow Sea and is the port city closest to Beijing. The Tianjin agreement is one of several undertaken by the School to further globalize its students, faculty, and programs.

## Why exchange agreements?

In an increasingly globalized world, U.S. universities have an obligation to their students to initiate and nurture international exchanges. There are numerous advantages to students, faculty, department, and the university. In the excellent article *Internationalization and Exchanges in a Globalized University: Criteria for Success* by Altbach and Teichler, many of the major issues of international university exchanges are articulated. There is considerable literature beyond the purview of this paper articulating many of the issues, problems, and potential solutions involved with academic exchanges.

Succinctly, Altbach and Teichler state their position: "Internationalization is absolutely inevitable. It is a necessary concomitant of a global economy, a growing worldwide labor market for highly skilled personnel, and a knowledge communications system based on the Internet. Academic institutions, researchers and scholars, and policy makers are just beginning to consider the ramifications of the new global realities."<sup>1</sup>

Graduates of U.S. universities will spend their working careers in an increasingly globalized economy.<sup>2</sup> This is particularly true for engineering and engineering technology students in school now who will function in a workplace flooded with products, standards, technologies, and quality systems with origins outside the U.S. Growth and economic opportunity will be associated with countries like India and China with expanding populations and rapid growth rates. It is common now for companies to have engineering centers in several countries so that the work proceeds 24 hours a day and communication via the internet is constant and instantaneous. It is incumbent on U.S. universities to continue to internationalize their students' educational experience.

## Why China?

According to the U.S. Census, in 2010 China accounted for 14% of all trade with the US and is our leading trading partner excluding our North American NAFTA neighbors, Canada and Mexico. Trade with China is 2-4 times the trade with other traditional trading partners Japan and Germany. Only 5 billion dollars in 1980, U.S. trade with China is now about 400 billion dollars. China's population is over 1 billion and its current increase in wealth will generate many new potential consumers of American goods and service.<sup>3</sup>

In the automotive industry, Chinese companies have recently purchased Volvo, Hummer, and a number of parts companies located in the U.S. General Motors, rescued by American taxpayers now expects more production and profits in China than in the U.S.<sup>4</sup> For Eastern Michigan University, this is an important development as our graduates will largely seek employment in southeast Michigan. Despite the catastrophic reduction in the U.S. car companies, designing car parts and managing international supply chains remains big business in the region.

## Why India?

Similarly, India has over 1 billion people and one of the fastest economic growth rates in the world. Both China and India recovered from the recent 2008-2009 recession much faster than the U.S., Canada and Western Europe. "Its (India's) economy is expected to expand by 8.5% this year. It has a long way to go before it is as rich as China—the Chinese economy is four times bigger—but its growth rate could overtake China's by 2013, if not before. Some economists think India will grow faster than any other large country over the next 25 years. Rapid growth in a country of 1.2 billion people is exciting, to put it mildly."<sup>4</sup>

Traditionally, many engineering students from India have come to EMU for graduate study and remained to work in the U.S. auto industry. There are strong linkages between this region and Indian industries with contacts for further inter-institutional agreements.

## Why EMU??

Eastern Michigan University is located 40 miles from Detroit, and despite the recent downsizing of the U.S. auto industry, Detroit remains the "Motor City" housing the headquarters including technical centers of Ford, GM, Chrysler and also major technical centers of Toyota, Hyundai, Mercedes Benz and others. All vehicles sold in the U.S. must submit vehicles for emissions testing at the EPA National Vehicle and Fuel Emissions Laboratory in Ann Arbor, 7 miles from EMU. All U.S. vehicle manufacturers have a presence in the expanding markets of China and India while the US market is mature and stagnant in terms of volume growth. As stated in a recent Economist magazine online. "More vehicles will be sold in China than anywhere else in 2011."<sup>5</sup> Also, EMU contributes significantly to the industrial, commercial and heavy/highway construction business in southeast Michigan with strong ties to internationally active construction firms. EMU is located close to Detroit Metro airport and the Willow Run airport

complex, both with easy and frequent flights all over the world. The busiest trade crossing in the U.S. lies between Detroit and Windsor, Ontario - only 50 miles away.

Why the School of Engineering Technology (SET)?

The SET at EMU is comfortably international. The School Director and most of the faculty are foreign born and multilingual. Most US-born faculty have overseas experience and several speak a language in addition to English. Online curricula in Quality Management and Engineering Management are offered all over the world – only an internet connection is required to participate in classes. For many years, foreign graduate students have come to SET as a stepping stone to work in the U.S. auto industry. EMU has an active and experienced staff in international admissions and programs abroad. Geographically and organizationally, SET is well situated to expand international programs.

What are the opportunities and challenges of internationalization: Case study, Tianjin, PSU, and lessons learned

In addition to the Tianjin agreement, Eastern Michigan University as a whole has intensified its efforts to further internationalize the campus and academic programs. The Director of the School of Engineering Technology has taken the initiative to establish this relationship through trips to Tianjin where negotiations for the agreement took place. During two trips to Tianjin, the SET Director has been able to interview Chinese students vying for the one graduate assistantship set aside for Tianjin students at EMU. The original Tianjin agreement was signed in 2006 and the assistantship allocation in the School of Engineering Technology took place in fall semester, 2007. One student has completed the degree, the MS in Construction Management. Chinese students at Tianjin are attracted by the paid tuition and the stipend which allows them to complete the degree over a two year period. Chinese students must compete for the position through their academic achievement as undergraduates and their level of accomplishment in the English language. A second student was selected earlier in 2010 and is now enrolled in her first semester at EMU. Also, the Chinese central government funds Visiting Scholars for six month stays in the U.S. EMU provides access to faculty with similar interests, office space, computer access, and library privileges.

The Tianjin Institute of Urban Construction has supported these efforts by granting travel expenses and housing to the SET Director; recruiting students and faculty applying for the exchange; and facilitating the documentation including exit visas for exchange participant. Eastern Michigan University has allocated a graduate assistantship including tuition waiver, provided a faculty sponsor who will advise and employ the Chinese student, assisted with immigration and visa issues, and mentorship plus office space to Visiting Scholars.

There are some aspects of the agreement which have not come to fruition. Tianjin Institute of Urban Construction has offered similar assistantships for U.S. students. However, no U.S. students have reached the Chinese language competency required to

apply for the position. While Chinese faculty have great interest in coming and doing research in the U.S., no EMU faculty member has yet expressed interest in going to China to do research.

Many benefits have already accrued from this exchange. We are now receiving applications from Chinese students from Tianjin who wish to fund their own master's degrees in the U.S. One EMU faculty made a short visit to Tianjin and now has contacts to further internationalize his course and the curriculum. This exchange has generated interest from other Chinese institutions and EMU has hosted a Visiting Scholar and another will arrive soon. The Chinese exchange student from Tianjin has been employed in the School of Engineering Technology as a graduate assistant and formed friendships with other graduate assistants including American and other international students, as well as making many forays into the U.S. professional world through field trips to local industry.

The current economic crisis, in Michigan especially, has put a hold on new agreements but we expect that the Tianjin agreement has significant potential for expansion over the next several years.

What are the key challenges emerging from the Tianjin agreement and other international initiatives?

Between 2005 and 2007 much work was done by SET faculty to create a working agreement with an (unnamed) state university in the greater Shanghai area. The Chinese university pseudonym will be Pudong State University (PSU). No agreement was reached with PSU. Also, SET at EMU has entered into agreements with two Indian universities with minimal resulting activity. The authors believe that articulating the lessons learned with PSU, Tianjin, and the Indian universities may reveal many common problems encountered in negotiating international exchanges.

PSU is located in the richest and fastest moving section of China – the lower Yangtze River encompassing greater Shanghai – China's biggest port, a major commercial center, and one of the world's largest cities. Contact with PSU came through an EMU colleague with a family connection to the area and the university. In 2006, the authors were invited to PSU to meet the leadership and make a presentation to the faculty and students of the engineering school. SET faculty met in formal sessions with the PSU President, the Dean of Overseas Education, and the Department Head of Industrial Engineering. A SET faculty member presented "Quality Problems in the Global Supply Chain" to the School of Engineering faculty and students. He emphasized the need for highly competent quality professionals in the global supply chain and articulated why the EMU Master of Science in Quality Management program is appropriate to prepare such individuals. An animated question-and-answer period followed with the SET faculty fielding intelligent questions (in English) from clearly interested undergraduate engineering students. A similar presentation was given at two local companies involved in auto parts manufacture for the Chinese and U.S. markets. Again, the presentation was very well received by the managers and engineers.

The SET faculty proposed a cooperative PSU-EMU Masters Degree in Quality Management (MSQM) to be co-located at the PSU campus and in local manufacturing companies. The program would have classes in English with staffing by both PSU and EMU faculty augmented by EMU's capability to deliver online classes in China. The target population would be engineers working in local, Chinese run industry and pursuing the MSQM part-time. Capstone student research would be done by students with faculty oversight in the actual industrial workplace. EMU has successfully run similar programs in Michigan for the past twenty years. Additionally, some Chinese students could come to the U.S., continue to work for their companies in the Detroit area while completing their degrees. And, faculty exchanges could have been facilitated, especially with the possibility of research on the China-U.S. automotive supply chain.

For three days we were feted and fed in a variety of venues by the PSU leadership. However, no substantive discussion or draft agreements resulted prior to returning to the U.S. Subsequent efforts at negotiating an agreement were also unsuccessful. Doing a "post-mortem" analysis was very difficult: what had gone wrong with the promise of an EMU-PSU agreement? After many e-mail exchanges and conversations with colleagues, a number of problems emerged; some were logical and practical, and some were clearly cultural.

1. PSU is located in essentially the center one of the world's fastest growing economies, is rapidly expanding and cannot meet the demand for undergraduate engineering education. EMU is located in a state with a shrinking population and is seeking ways to attract high quality students including international agreements. Simply put – PSU does not need new mechanisms to attract students.

2. SET at EMU has been involved directly with industry since its inception in 1980. This involvement has included on-site academic classes and programs, cooperative education placements, industry - based faculty and student research, non-academic workforce training by faculty, and faculty consulting. At PSU, the idea of extending the university into the industrial workplace was a completely foreign concept. Apparently there are no rewards for faculty to do applied research in industry. Faculty consulting to industry not common and perhaps lacks status.

3. In the US, most graduate students in the MS Quality management and the MS Engineering Management received all or most of their tuition reimbursed by employers. There are, of course caveats – in the U.S., the classes and program must be related to their work and the students must receive good grades. EMU SET corporate on-site programs have been almost completely dependent on tuition reimbursement. In the companies we visited (even at big US and Canadian-Chinese joint ventures) and at PSU, no one had even heard of tuition reimbursement. Also, the pursuit of a graduate degree part-time while being employed full time seems very uncommon.

4. At joint venture companies with partners from Japan, Europe, the U.S., and Canada, English was the official language. However, having employed graduate students pass an

English competency exam such as TOEFL represents a large challenge at PSU and Tianjin.

5. Tuition for EMU SET online classes is in-state. Even at this reduced level, PSU faculty and potential graduates from China balked at the amount. The difference in actual income and the exchange rate makes U.S. education expensive in China. This is especially true when compared to the low levels of tuition charged at state run schools for full time undergraduate students. This has been a problem Tianjin also for Chinese students without assistantships.

6. International agreements at EMU must be approved through the normal chain of command from department to dean to provost to president. It is unclear how this process works and each foreign university has a distinct method which may include municipal, state, provincial, or national level approval.

7. Immigration at both ends may be complex. It is mandatory that each campus have professionals familiar with their own and partner government policies on student and visiting scholar visas. This is not a trivial problem and must be anticipated long before visits or exchanges are scheduled.

## Conclusion

Sponsored by NSF, a meeting was held in 2009 to prepare recommendations for the integration of global experiences in engineering education<sup>6</sup>. At the conference, engineering educators were chided by industry executives for their slowness in preparing engineers for a career in an increasingly globalized workplace. The summit resulted in recommending a number of strategies such as mandatory language competence, student and faculty exchanges, as well as students working a semester abroad.<sup>7</sup>

U.S. universities must become more involved in international exchanges. We owe it to all our stakeholders and especially to our students. The process is arduous but highly rewarding. Anticipating problems and planning can prevent or diminish roadblocks to successful exchanges. The authors hope this paper may prove useful to our colleagues wishing to expand their horizons and participate in international university exchanges.

Wealth will be created and countries will prosper largely by the intelligent work of their citizens. Since the colonial era, the strength of the U.S. economy has been an international focus and the resilience and adaptability of its workers. The future is no different. Globalization will continue apace and we must ensure that our students are prepared to prosper in a world and economy with few borders and stiff competition. Exchange programs are an excellent mechanism to internationalize engineering curricula.

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