

**2006-1297: DEVELOPING EFFECTIVE, SUSTAINABLE, MUTUALLY
BENEFICIAL INTERNATIONAL COLLABORATIONS IN ENGINEERING AND
TECHNOLOGY**

Michael Dyrenfurth, Purdue University

Dr. Michael Dyrenfurth is responsible for International Programs involving the College of Technology at Purdue University.

Michael Murphy, Dublin Institute of Technology

Developing Effective, Sustainable, Mutually Beneficial International Collaborations in Engineering and Technology

This paper shares the experience and effective practices involved in building a systematic set of international collaborations between two leading technology-focused institutions – in this case the College of Technology at Purdue University and the Dublin Institute of Technology in Ireland. The intent is to present a process that will enable both engineering and technology colleagues at other institutions **design** and **accelerate the implementation** of their own sustainable links that genuinely impact students and faculty. We highlight how to secure buy-in at all levels of the institutions; how to navigate the differential terminology, calendar, legal requirements and organizational schemes; as well as how to evaluate and fund such initiatives.

We begin by providing an overview of the range of possibilities for such linkages; including but not limited to Student Exchange, Faculty Exchange, and Faculty Collaboration – both instruction and research and development. We then share some of the key characteristics that make each possible and successful. Key factors, such as timetable matching and course equivalency mapping for accreditation and time-to-degree considerations, will be described and example procedures and documents to these ends will be shared.

This paper provides, not a conceptual exploration of what might be, but rather a practical, reality-based sharing of best practices that derive from our two institutions' more than two year effort to evolve sustainable linkages. We are reporting on lessons learned from the real experience of administrators, faculty and students, not only exchanging but also collaborating. Specific example documents, memoranda of understanding, visa documentation and more will be provided in a handout. Faculty and administrators from both institutions will participate and we will also encourage students to do so.

Why collaborate internationally

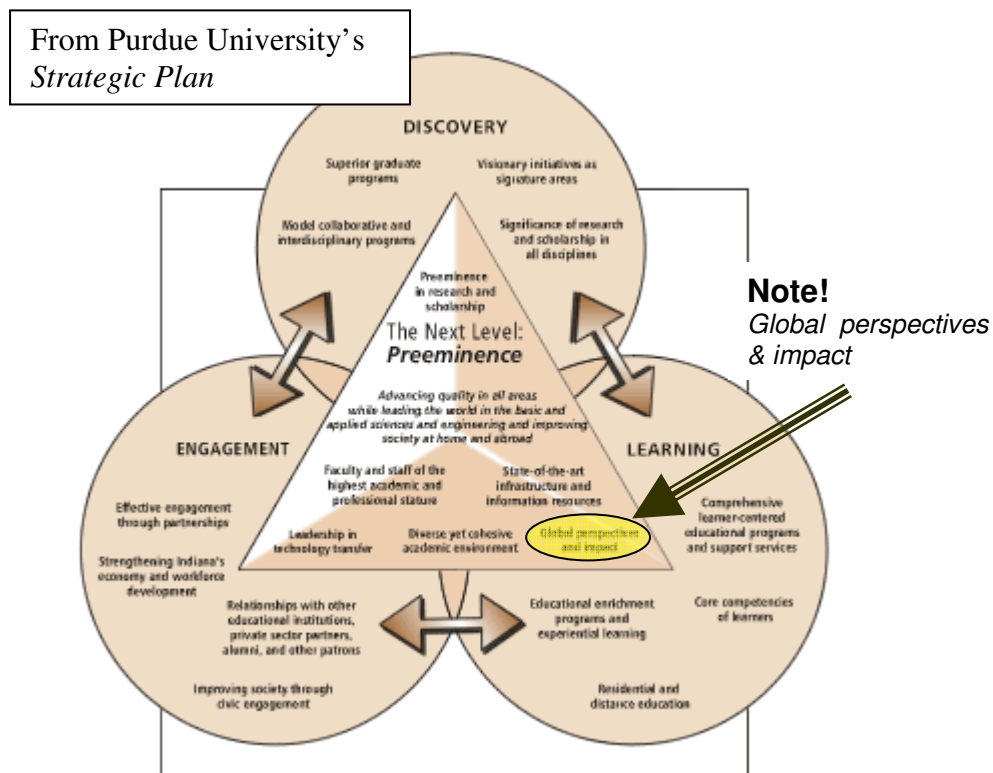
Given the multitude of objectives that higher education must address, it is entirely reasonable to ask why the academy should even attend to international collaboration. Is it important enough? Clearly, the authors' contend that it is -- but why? One prime reason is the increasing awareness of and dissatisfaction with the international knowledge base and sensitivities of American students as documented by Ashwill¹ and Hunter².

It turns out that the answer as to why depends in large part on who is asking. Different people at the university may well have different reasons to pursue (or not) international collaboration. Hunter² reported on American efforts and Knight & deWitt³ shared international perspectives on both such reasons and the condition of internationalization.

Perspectives matter

• Institutional (President)

The position promulgated by institution Presidents and senior leadership is usually readily discernable in documents such as a *Strategic Plan*. Additionally, these positions are often reflected in the comments made by such leaders when addressing senate meetings, convocations and other gatherings of faculty and students. Note that, in the case of Purdue University, the position is clear. Beginning with the concept of the *Strategic Plan*, which has “global perspectives” built right in, President Martin Jischke, in numerous meetings with faculty has communicated the goal of increasing the number of Purdue students with a significant international experience while they study at the university. Faculty have heard this goal and are working hard to double the number of students we send abroad.



Similarly, the Dublin Institute of Technology's (DIT) *Strategic Plan* states:

...The competition and related opportunities will arise, not only in a national context, but internationally in an era of globalisation, where distance is no longer a barrier to face-to-face communication. (pg 4)

This theme is continued in the DIT's *Mission Statement*:

The Institute is a comprehensive higher education institution, fulfilling a national and international role in providing full-time and part-time

programmes across the whole spectrum of higher education, supported by research and scholarship in areas reflective of the Institute's mission. (page 7)

But why do institutional leaders incorporate global/international objectives in their planning? Numerous reasons exist. For example, clearly many institutions provide service to constituencies and even nations beyond their immediate home environment. Leading technological institutions, such as those listed in the *Sunday Educational Times*, rankings of the world's top 100 universities, can count numerous successful international placements among their graduates. Such successes contribute to the world wide reputation of the institution and when a critical mass of such placements exist, genuine momentum can develop. But, even beyond service and reputation-related goals, there are other reasons for internationalization. As visionary and analytical people, today's thoughtful university leaders recognize that they simply cannot provide a quality education for their students without that experience increasing the *weltanschauung* (world perspective) of their charges.

• **Major Administrative Unit (Dean)**

Typically the operation of higher education institutions creates opportunities for specific major institutional units such as colleges or faculties to create their individual strategic plans within the context of their overall institution's plan. Analogous to the signal sent by the institutional leaders (presidents or chancellors), the directions espoused by deans is **often even more powerful** – because of proximity – to faculty and students. This means it is important for deans to, not only call for international collaboration and activity, but to also back such calls with visible investments and other commitments that provide tangible demonstration of the importance of international activity to their department heads, faculty and students.

Purdue University's College of Technology (COT) *Mission Statement* provides an example of a major unit plan with international dimensions:

... In fulfilling its mission, the School [now College (author)] of Technology strives to: Provide a student-centered learning environment maintained to ensure that graduates are accomplished in technical expertise, leadership, and teaming skills necessary to excel in the global technological economy. (p. 7)

But, why would the head of a major institutional unit make such investments and commitments? Several reasons could explain such actions:

- To be consistent with institutional leadership
- To help accomplish key unit goals such as increase research productivity
- To assist unit faculty with their scholarly efforts
- To reward performing faculty and/or students
- To enhance unit reputation
- To improve the unit's ability to recruit strong faculty and/or students

- **Department (Department Head)**

Ultimately much of the action in universities resides in departments or other equivalent first level organizational units. Here is where instruction is planned and delivered; where students are recruited; and where quality assurance is vested. Here is where innovation either begins or takes root and where values are transmitted by caring faculty. Given this, and because of the close, frequent and often intense contact between departmental faculty and students, the values communicated regarding international activity represent probably the single most important influence other than perhaps the students' family.

But, again the question arises, why would a department head commit scarce resources and personal effort to the goal of internationalizing the experience of their faculty and students? Again, our view is that most of the same reasons that exist for deans also apply at the departmental level. These are:

- To be consistent with institutional leadership
- To help accomplish key unit goals such as increase research productivity
- To assist unit faculty with their scholarly efforts
- To reward performing faculty and/or students
- To enhance unit reputation
- To improve the unit's ability to recruit strong faculty and/or students

- **Course (Faculty)**

Within each course they teach, faculty have a multitude of opportunities to telegraph the importance of international activity and experience. Even without outright promotion of study abroad and other direct international experience, faculty can demonstrate that students will be living and working in an increasingly international/global environment. Examples from around the world can be injected into course materials and differing points of view/approaches from around the world can be used to broaden the perspectives of students more used to their home culture than others.

The reasons for faculty to attend to internationalization only mirror in part those of their leaders. In addition, faculty often seek to internationalize their experience, and that of their students, in order to:

- Increase the motivation of their students
- Increase the competitiveness of their graduates with respect to placement
- Expand the competency profile of their students
- Create opportunities for themselves for summer employment and/or interesting activity
- Contribute to more favorable student evaluations of teaching
- Gain access to facilities not locally available

- **Participant (Student)**

Students themselves constitute a powerful force and resource available to promote international perspectives. With the increased emphasis on diversity found at most universities today, students from various countries can, if their faculty establish a

conducive environment, contribute much to the world understandings and perspectives of their indigenous classmates.

Students would be most likely to do this if they knew that such contributions are valued by their faculty and that in fact they would enhance their grades. But other reasons could also exist for such activity. For example, if students could secure paid employment internationally they would gain valuable international perspectives in addition to work experience. If this could be secured through an internship or coop mechanism then college credit could even be an additional plus.

- **Constituent (Business, Industry & Government)**

Notably, when reviewing the strategic plans and pronouncements of many universities, the word “partnership” is increasingly prevalent. Frequently called for are partnerships with industry, business and government. The leaders of such partnering organizations can also make significant contributions to increase the internationalization of student and faculty experience. They can, for example, provide international scholarships, opportunities for international internships and work experience, international executives on loan, case studies, and training materials from other countries.

Educators need to be mindful as to why corporations might consider such assistance. The case is obviously most compelling for multinational corporations where cultural sensitivities, international awareness, experience and even multi-language capability are valuable and often too rare a commodity. Clearly such corporations have a vested interest in helping educate the kinds of future employees that they need most. But is there more to this than just self interest? The authors would suggest that enlightened corporate leadership, like that of governments and higher education institutions, understands that much of our hope for a better world in the future will be rooted in increased understandings across cultural and national boundaries. How better to engender this than with powerful international learning experiences during a student’s formative years.

Range of possibilities

Fortunately, there are numerous opportunities for international activity available to institutions of higher education and their partners. The range of possibilities can include:

- **Student Exchange**

A variety of mechanisms exist to provide students international experience. These include, but are not limited to:

- Enrollment in classes or study abroad. Here students take classes delivered by faculty of other /overseas institutions delivered at their campus.
- International study tours lead by faculty from the students’ home institution.
- International content/activities infused into existing courses delivered at the student’s home institutions.
- International internships or cooperative learning experiences (credit or non-credit) in business or industry.

- Research project activity, undergraduate or graduate, conducted at an overseas institution and guided by a faculty member other than one from the student's home institution.
- International work experience

● **Faculty Exchange**

International experience and/or collaboration is not only desirable for students. Faculty can also benefit considerably from such activity. In fact, it is the authors' belief that effective international faculty experience and collaboration constitutes an essential precursor building block necessary before any widespread international student experience can occur.

Such faculty exchange can begin with as simple an experience as merely traveling and spending some time at the exchange institution, preferably while the counterpart faculty member is there as well. During this time some guest teaching may occur or it might just be restricted to observation and learning. The most important part of such experience is that sufficient time is provided to go beyond merely "popping in and sightseeing". Our experience suggests a two week minimum for such experiences. The exchange between Professors Matthew Stephens and Donal McHale provides insight into to impact of exchanges that involve reciprocal teaching of units of instructions in compatible classes.

But, faculty exchange can also be extended to even more powerful experiences such as semester long exchanges and sabbaticals. These could involve full instructional responsibility for a course and more. Alternatively specific project focused exchanges, e.g., accreditation or facility planning, can also be valuable.

● **Faculty Collaboration**

Faculty exchanges are not the only mechanism available to promote internationalization. Faculty collaboration is a descriptor that covers a wide range of such other possibilities. Some of these are readily apparent, such as research collaboration. Others, however, are not so obvious. For example, the increasing availability of powerful and affordable distance learning technology, including video-conferencing, makes faculty and student collaboration on course instruction a distinct possibility. Students at two institutions, even though separated by an ocean and numerous time zones, can realistically jointly enroll in and share learning activities in a single course. Team teaching, with faculty from internationally separated institutions is clearly feasible and has been demonstrated by the COT's and DIT's Prof. Dr. Mileta Tomovic and Prof. Michael Ring.

Beyond such collaborative instruction, however, there are other opportunities as well. For example:

- Writing a collaborative grant/funding proposal
- Joint research and/or development activity
- Collaborative book authorship
- Sponsorship/leadership of a collaborative student club/organization activity
- Serving as external program/course examiner
- Membership on collaborating program advisory committees

Case study-identified factors

The authors have used the existing and evolving Dublin Institute of Technology -- Purdue University collaboration as a case study to identify factors that need to be considered in order for the establishment of successful, ongoing international collaborations.

- **Institutional calendar matching**

One of the critical issues that emerges when seriously pursuing international collaboration and/or exchanges is identification of windows of opportunity (time) that are created by the overlap of differing institutional calendars and duration of semester/academic years. Appendix 1 provides an example of such an analysis.

- **Course equivalency mapping**

Sooner or later, when trying to encourage students to enroll in one or more courses at an overseas institution, the issue of course equivalency arises. For many students it is not sufficient merely to earn credit overseas but they also wish that credit to be useable for meeting the requirements of the degree program they are pursuing at their home institution. This necessarily requires that the faculty of the home program have approved the international courses to be taken as equivalents of the home program's requirements, selectives or electives. Furthermore it is also important that such courses not be considered as transfer courses because many programs employ restrictions to the number of transfer courses allowed. Typically, to establish such equivalencies, the faculty governance mechanisms for curricula need to be consulted and approval secured from them.

- **Accreditation**

All programs at leading institutions incorporate some form of quality assurance. External examiners, for example, are typically used by Irish and British institutions and accreditation reviews, such as those conducted by ABET, are widely used by American institutions. In order for international student exchanges to become an integral part of a program it is essential that the requirements of such quality assurance mechanisms are considered and carefully documented.

- **Time-to-degree considerations**

All international exchange configurations need to be carefully examined to ascertain their potential impact on participating students' time-to-degree. In order to do this properly, not only must the actual time required for such experiences be taken into account but also the effect of such experience on course sequencing (prerequisite), scheduling, preregistration, and the like.

- **Example procedures**

Beyond the preceding, planners for international collaboration need to give careful consideration to the promotion of such opportunities. How will students and faculty become aware of them and be encouraged to consider them? Have the student counselors/program advisors been made aware of the opportunities and have they been provided with the necessary information to answer the questions from potentially interested students?

Additionally, how will the selection of students be made when only limited numbers of such opportunities exist and there are more applicants than slots? Procedures have to be evolved for even things far outside the purview of the higher education institutions themselves, such as visa and immigration regulations.

Institutions also bear some responsibility for exercising due diligence for the safety of their students. Careful orientation procedures need to be in place to insure this is accomplished. Typically this is provided by a central international programs office at each institution.

Key characteristics

Reflection upon more than two years of experience in evolving the collaborative relationship between DIT and Purdue University's COT has identified several characteristics that the authors believe as being essential to success. Foremost among these is a long-term and serious perspective that systematically builds the linkage. Successful collaboration cannot be rushed – instead it is built upon in-depth understanding of the collaborator's situation, at and by each participating level. A three to five year planning time frame seems most appropriate for the initial phase. Commensurate investment of time and money is a concomitant necessity.

Given that a significant investment of time and effort is necessary for an extended period of time, it becomes clear that such a commitment of resources must be strategic. Otherwise, it will not be made. To the authors this means that the partner(s) must be carefully selected for a high level of “goodness of fit”. Essentially, the authors' position is that success depends on establishing a few very effective, and in-depth/extensive collaborations as contrasted to pursuing numerous shallow, more casual and not well developed relationships. While the latter can be fun and interesting, typically they will not lead to extensive student and faculty exchanges – the ultimate performance metric.

Our experience was one which began with strong and consistent signals by institutional and unit leaders. Together with seed funding, this established a context that evidenced commitment by our leaders. Complementing the long term perspective referred to in the above paragraphs, was an approach that systematically enlarged the circle of people involved with the international collaborative. This collaboration was not a “perk” for administrators. Instead once the strategic selection of partner institutions was established, it was validated by both department heads and faculty. The plan is to continue the enlargement of such linkage until all departments of both institutions major unit have had the opportunity to explore the potential benefits.

Finally, as with so many effective programs and activities, the support systems need to be considered. Without adequate infrastructure, complicated interactions such as large-scale international collaborations simply cannot be nurtured and operated. This means that factors such as student housing, cost-subsidization, visas, insurance, health coverage, and more need to be addressed effectively. Memoranda of Agreement, such as the one presented in Appendix 2 need to be in place.

References

1. Ashwill, M.A. (2004, Spring). Developing intercultural competence for the masses. *International Educator*. Vol. 13, Iss.2; pg. 16, 10 pgs.
2. Hunter, W.D. (2004, Spring). Got global competency? *International Educator*. Vol. 13, Iss. 2; pg. 6, 7 pgs.
3. Knight, J., & de Witt, H. (Eds.). (1999). *Quality and internationalization in higher education*. Paris. France: OECD Publications.

Appendix 1: Comparative Institutional Calendars

Purdue University – Dublin Institute of Technology Comparison of Academic Calendars

Month		Purdue University		Dublin Institute of Technology
August	Fall Semester	First 10 days typically holiday Week before classes start reserved for orientation Fall Semester Classes start circa 20th		
September				Sept 19 th classes begin
October				
November				
December		Fall Semester Classes end circa 18th		Classes end circa December 15th
January	Spring Semester	Spring Semester Classes start circa 8th	Fall Semester	January 9-16 Exam week
				January 30 Classes begin
February				
March				
April				Spring Semester
May	Spring Semester Classes end circa 7 th		Spring Semester	May 15 th exams begin May 22 classes end
		Maymester classes start circa 14 th Module 1		
June		Summer Semester Module 2		
July		Summer Semester Module 3		

Appendix 2: Sample Memorandum of Agreement

MEMORANDUM OF UNDERSTANDING

THIS AGREEMENT, entered into this _____ day of _____, 2004, by and between Purdue University, West Lafayette, Indiana, U.S.A. and _____

WITNESSETH THAT:

WHEREAS, Purdue University and _____ desire to promote the enrichment of their teaching and learning, research and discovery, and engagement missions; and

WHEREAS, Purdue University and _____ desire to strengthen and expand the mutual contacts between the two universities; and

WHEREAS, Purdue University and _____ desire to provide for an exchange of faculty and students and other collaboration between the two universities on the terms and conditions hereinafter set forth;

NOW THEREFORE, it is mutually agreed as follows:

I. Scope of Agreement - The Agreement, together with Faculty and Student Exchange Agreements, shall include, but not be limited to, the following types of collaboration:

- A. Short and Long-term Faculty Exchange
- B. Undergraduate and Graduate Student Exchange
- C. Collaborative Research and Discovery, Learning and Teaching, and Engagement
- D. Other mutually agreed educational programs

II. Definitions - As used herein the terms "host university" and "home university" shall have the following meanings:

A. Host University - the university accepting the exchanged faculty member or student.

B. Home University - the university providing the exchanged faculty member or student.

III. Period of Agreement - This Agreement shall be effective _____, 2004, and will remain in force for a period of five years. Prior to the expiration date, the agreement may be reviewed for possible renewal for a further five-year period. In addition, either university may terminate the agreement in advance of its normal expiration date by providing the other university with one year prior notice. In this case, personnel already participating in the exchange shall serve out their terms under the conditions specified at the time of their appointment.

IV. Activities Under This Agreement - It is expected that activities taking place under this Agreement will be initiated primarily by academic units within each university, and in coordination with their respective administrative units concerned with international activities. All activities undertaken must conform to the policies and procedures in place at each institution. For Purdue University, faculty and student exchanges will follow university guidelines for faculty and student exchange.

V. Planning and Management of Activities – Each distinct collaboration program or activity will be described in a separate Activity Agreement drawn up jointly by the collaborating units, and signed by the heads of these units. Such agreements will specify the names of those individuals on each campus responsible for the implementation of the program. Activity Agreements will also be approved by the Dean of International Programs at Purdue University and the _____ of _____.

VI. Funding of Activities – Activity Agreements should make financial costs and obligations explicit. Collaborating units are encouraged to work together to identify and secure any outside funding which may be needed. Projects requiring funding must be approved by both institutions.

VII. Nondiscrimination - Purdue University and _____ agree that no person shall on the grounds of race, color, national origin, gender, sexual orientation, or creed be excluded from participation under the terms of this Agreement.

VIII. Modification - The terms of this Agreement may be changed or modified only by written amendment signed by authorized agents of the parties hereto.

IN WITNESS WHEREOF, Purdue University and _____ have executed this Agreement as of the date first above written.

Purdue University _____

Date _____ Date _____

By _____ By _____

Dr. Sally Mason _____

Provost _____