

## On the Internationalization of Iowa State University's College of Engineering

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### Introduction

The importance of providing meaningful international experiences to engineering students will no longer be merely self-revealing within the global economy in which they ultimately interact. In fact, US educational programs leading to degrees in engineering will soon be subject to the Accreditation Board for Engineering and Technology's (ABET) new criteria known as the *Engineering Criteria ABET 2000*<sup>[1]</sup>, which under Section II (Basic Level Accreditation Criteria), Criterion 3 (Program Outcomes and Assessment), Item (h), states:

*“Engineering programs must demonstrate that their graduates have the broad education necessary to understand the impact of engineering solutions in a global and societal context.”*

Furthermore, for accreditation purposes, institutions will have to demonstrate (and document) that an outcome assessment program is in place to effectively “measure” the extent to which objectives, such as that noted above, are being fulfilled. Finally, amidst the many clues, Criterion 5 of the *Engineering Criteria ABET 2000*<sup>[1]</sup> makes it very clear that the faculty is indeed “the heart” of the overall process.

### Re-Engineering of Engineering Education at Iowa State University

In response to the rapid changes in engineering practices and to the new ABET accreditation guidelines, Dr. James L. Melsa, Dean of the College of Engineering (COE) at Iowa State University (ISU), strongly advocates the ongoing development of a new educational model. Specifically, a model that is *learning based, practice-oriented*, and one that demands *active involvement* of the student<sup>[2]</sup>. Accordingly, Dean Melsa has put forth a “blueprint for the future<sup>[3]</sup>” defining the new educational model and outlining some key organizational leadership principles, one of which reads:

*“...we must embrace diversity and global perspectives. Our students will only fully understand these concepts through our role models; we must walk the talk in this area everyday.”*

The above statement by Dean Melsa sets the stage for this writing on issues revolving around the enhancement of internationalization within the COE. In fact, among the “Performance Objectives for the Year 2000” outlined within the above-noted blueprint<sup>[3]</sup>

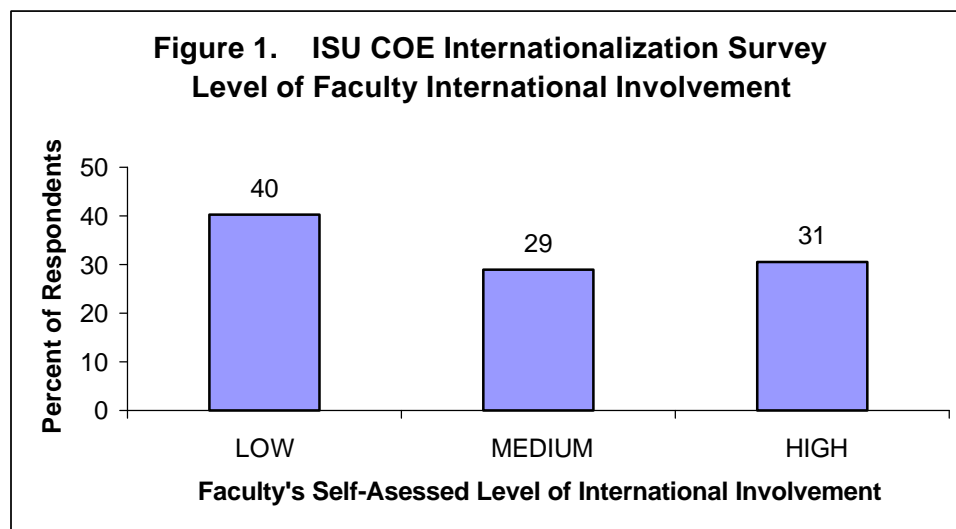
are some very specific --and aggressive-- objectives by the COE regarding internationalization. Most notably:

- At least 25 percent of bachelors graduates will have an international, engineering-related work or educational experience of at least two months
- At least 60 percent of the faculty will have significant international, engineering-related experience of at least three months
- At least 10 percent of the faculty members in the college will server in major leadership positions in national and international professional societies

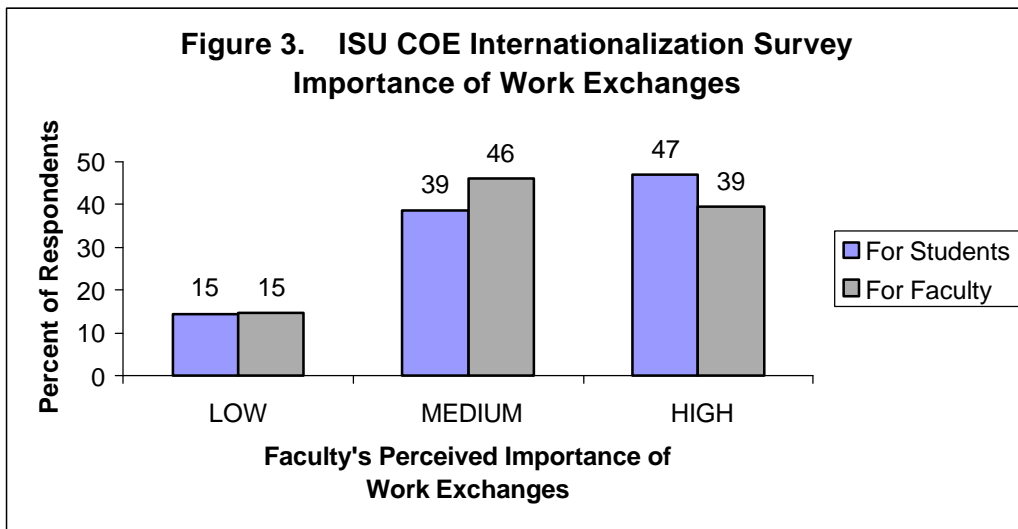
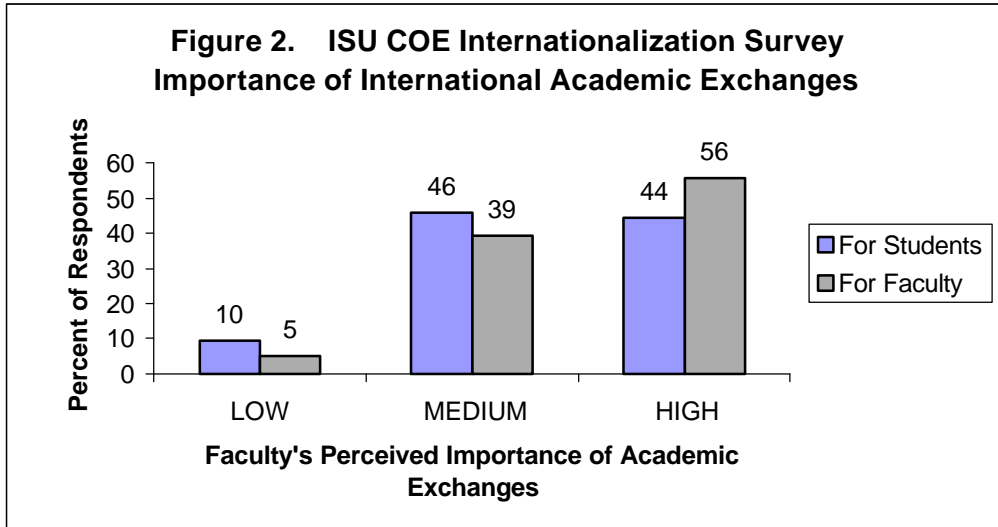
### ISU COE Faculty Internationalization Survey

Realizing the crucial role that the faculty will play in achieving the above-noted college internationalization goals, one of the preliminary steps taken recently at ISU included preparing and conducting a college-wide survey of the engineering faculty<sup>[4]</sup>. One of the primary goals of the survey was to construct a database of up-to-date international contacts and activities within the college. Furthermore, the survey was used to assess faculty perceptions and to identify *champions* within departmental units. Likewise, the feedback provided by the faculty was employed to provide further insight into regions of the world where past associations should likely be sustained, as well as regions that could constitute new focal points for exchange agreements. A total of 63 surveys were collected, corresponding to approximately 28% of the tenured and tenure track faculty in the college. A partial analysis and main highlights of the results from this survey are presented herein. It should be noted that the survey data set is *autoselected* in that respondents chose to complete the survey (or not), thus a bias exists.

Figure 1 displays the faculty's self-assessed level of international involvement which indicates that roughly 60% of the respondents consider themselves as having a medium to high level of international involvement. Clearly, a self-assessment is quite subjective. Nevertheless, the results of Figure 1 do --at the very least-- suggest that the majority of the respondents must have *some* interest in international involvement. Thus, these results can be interpreted as a positive indicator in favor of future efforts within the college to enhance its internationalization.



Figures 2 and 3 present the faculty's perceived importance of international academic and work exchanges, respectively. Note that the bar charts treat student and faculty exchanges separately.



In general, the results shown in Figures 2 and 3 both lean positively in favor of academic and work exchanges, respectively, with most of the respondents assigning a medium or high level of importance to them. An interesting subtlety can be noted within the *high* responses, namely, that the faculty respondents tend to favor academic over work exchanges for themselves, while they seem to favor work exchanges for the students. Finally, Figure 4 highlights the respondent's overall willingness to get involved in assisting their college and/or their departmental unit in promoting internationalization endeavors. Again, these results show that strong support exists within the college, and this survey has also led to an enhanced pool of internationalization advocates within each departmental unit.

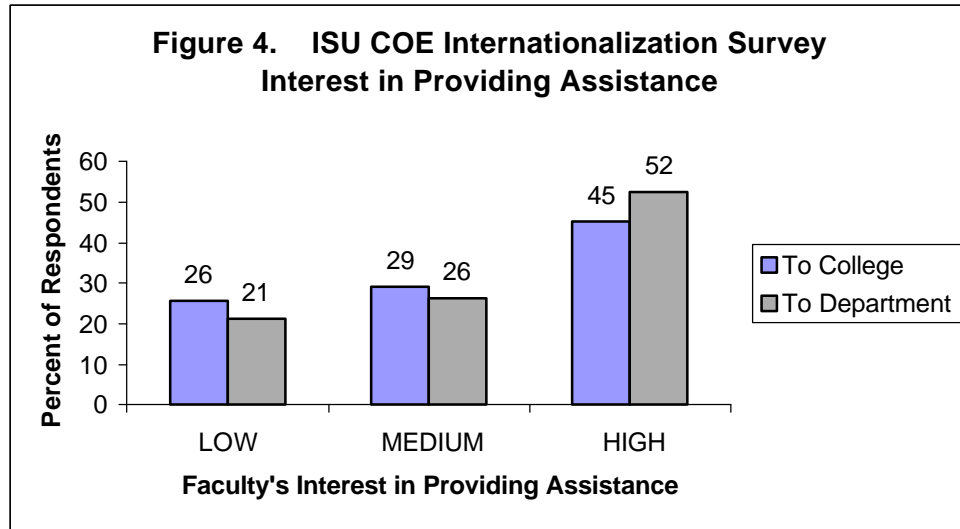


Table 1 below tabulates the top dozen or so countries in which the respondents claim to have had their most significant past activities. Likewise, Table 1 presents those countries in which the respondents have a specific interest to pursue future activities. In both columns, the countries were ranked from top to bottom in terms of the percentage of respondents who selected a given country, with a low cutoff value of 5%. This information should be useful as the college scopes potential future venues for international exchange agreements.

**Table 1. ISU COE Internationalization Survey  
Countries of Past Activity and of Future Interest**

<b>Significant Past Activity</b> (ranked by % of respondents)		<b>Future Focal Interest</b> (ranked by % of respondents)	
United Kingdom	20%	Australia	21%
China	13%	United Kingdom	14%
Germany	11%	Germany	8%
India	11%	Norway	8%
Australia	10%	China	6%
France	10%	New Zealand	6%
Japan	10%	India	5%
Mexico	8%	Japan	5%
Switzerland	8%	Korea	5%
Canada	5%	Mexico	5%
Czech Republic	5%	Switzerland	5%
Korea	5%	Ukraine	5%
Taiwan	5%		

## **Faculty Feedback on Achieving Internationalization Goals**

A few open-ended questions were presented to the ISU engineering faculty within the survey, the purpose being to brainstorm for specific faculty-generated ideas regarding how the college should go about achieving its internationalization goals. The essay responses were categorized within the following general suggestions, listed in no specific order or preference:

- Develop more contacts and establish communication links with international universities and companies (i.e., create a dynamic database)
- Provide internal support for international activities directly via faculty reward system
- Integrate internationalization within the engineering curriculum (not add to)
- Provide substantial financial support for faculty and students
- Develop co-operative/internship programs that include foreign employment
- Provide college-wide centralized coordination
- Provide information of available opportunities to faculty and students
- Provide more opportunities for language training for faculty and students

These suggestions correlate well with input provided by the ISU Engineering College Industrial Advisory Council (ECIAC).

## **Current International Programs Infrastructure**

With the new *ABET Engineering Criteria 2000* and Dean Melsa's Blueprint for the Future in mind, the ISU College of Engineering is taking decisive steps with regard to achieving its internationalization goals. The following items highlight the infrastructure currently in place:

- New full-time staff position created to lead college's internationalization efforts
  - Central location and repository for all international-related material, memoranda of understanding/agreement, databases, etc.
  - Responsible for marketing programs to students
  - Reports to the Assistant Dean for Undergraduate Programs
- The International Programs Task Group
  - Faculty representation from across departmental units
  - Chaired by the Assistant Dean for Undergraduate Programs
  - Decision and policy making group
- University-wide Infrastructure and Programs
  - Council for International Programs -- Engineering represented by the Assistant Dean for Undergraduate Programs

- One-year Provost's office internship on international activities -- Engineering faculty member was last year's intern
  - Collaboration with university's Office of International Students and Scholars and the Study Abroad Center as well as other colleges across university
  - Close association with Engineering Career Services, in particular with Assistant Director for Experiential Education
  - Collaboration with Foreign Languages Department recently led to faculty-oriented offering of language courses (Spanish course started this Fall semester)
  - All university region-specific workshops sponsored by the Provost's Office (China and Russia/Ukraine)
- Collaboration with industrial partners
    - Build and strengthen relationships for mutual benefit (i.e., research; faculty exchanges with engineering staff; student summer, co-op/intern and full time employment)
    - Potential funding for new program initiatives
    - College Industrial Advisory Board component focusing on internationalization
    - Link faculty improvement leaves at foreign universities with international industrial partners to enhance faculty experience

## Conclusions

It is with the above-noted infrastructure that the ISU College of Engineering plans to achieve its goals of enhancing internationalization among its faculty and students. The preliminary survey results demonstrate that strong support by the faculty exists for internationalization efforts in the college. Also, the survey has provided some valuable data for strategic and administrative planning.

## Bibliography

- [1] ABET Engineering Criteria 2000, 3<sup>rd</sup> Edition, <http://www.abet.org/eac/eac2000.htm>
- [2] James L. Melsa, "Trends in engineering education in the USA," *Computing & Control Engineering Journal*, October 1997, p.209-214.
- [3] A Blueprint for the Future, The College of Engineering, Iowa State University, by Dr. James L. Melsa, Dean
- [4] G. Ivan Maldonado and E. Jaselskis, ISU College of Engineering Internationalization Survey, December 1997, Iowa State University.

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**Anne M. Ahrens**

Dr. Anne M. Ahrens is the International Programs Director for the Iowa State University's College of Engineering. She is in charge of organizing and promoting International Exchange and Study/Work Abroad opportunities, and the related support network for engineering students at Iowa State University.