

**Evaluating International Collaborations in
Science and Engineering:
Key Findings from an NSF/Sigma Xi Workshop**

Rajika Bhandari

Institute of International Education (IIE)

Globalizing Graduate Education and Research

April 20, 2009

Purpose of evaluation workshop

- **What are some broad approaches to evaluating the impact of programs that involve U.S. students, researchers and educators in international scientific and engineering collaborations, such as those funded by NSF's OISE?**
- **What are some specific evaluation criteria that can be developed?**
- **What is the value-added of an international experience or collaboration?**

Challenges in evaluating international collaborations

- **Complexity of the international collaboration (distance, time zone and currency differences)**
- **Language and cultural differences**
- **Variable contribution of foreign partners**
- **Foreign administrative and legal differences**
- **Availability of (sustainable) foreign support**

Level of impact & outcomes

- **Individual: developing the globally competent scientist or engineer**
- **Institutional: capability of institutions to participate in cutting-edge global research**
- **Advancing science and engineering knowledge**

Individual-level outcomes: Discussion

- **Technical and professional competency**
- **Global competency involves applying professional and technical competencies to a broader and more complex international environment**
- **Knowledge, skills and behaviors that distinguish international collaboration**
- **Other issues: individual differences; types of collaboration**

Institutional-level outcomes: Discussion

- **Global engagement**
- **Disentangling the effects of existing vs. new programs**
- **Level of impact within an institution**
- **Domains for measurement:**
 - **Institutional practices and policies**
 - **Outreach**
 - **Monitoring and evaluation**

Knowledge-level outcomes: Discussion

- **Impact of international engagement on the quality of science and engineering research is difficult to measure**
- **Science and engineering are inherently global issues**

Summary & Conclusions

- **No single approach to evaluating outcomes at all three levels**
- **Few, if any, proven qualitative and quantitative metrics that can be used to assess the effects of international collaboration at all three levels**
- **First focus on short-term metrics**
- **NSF programs cannot be studied in a vacuum, especially at the institutional level**

Summary & Conclusions (Cont.)

- **Important to study the successes and failures of international collaboration**
- **Impact of international collaborations will vary due to certain factors**
- **Differences between industry and academia: how to integrate varying agendas.**

Next steps: proposed methods & approaches

- **What is the purpose of the evaluation: building capacity? Facilitating good programs? Predicting success?**
- **Primary investigators need to be well-equipped with evaluation tools**
- **Use a logic model or theory-of-change approach**
- **Review evaluations of other NSF and non-NSF programs**

Next steps: proposed methods & approaches

- **Compare NSF programs with an international component with domestic ones**
- **How have other governmental agencies (NIH, NASA, USAID, etc.) evaluated their programs?**
- **How have other countries and non-U.S. governmental agencies (EU, International Council for Science) evaluated similar programs?**