



Center for Innovation and
Research in Graduate Education

Investigating the International Experiences in STEM Graduate Education and Beyond: Report from the February 2011 Workshop to Develop a Research Agenda

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1. INTRODUCTION¹

The purpose of this workshop was to develop a research agenda to produce the knowledge needed to support effective engagement in international scientific education and research collaboration and exchanges at the graduate and post-doctoral periods of science careers. Bringing together education researchers and those actively engaged in international collaborations, including graduate students and faculty in STEM (Science, Technology, Engineering, and Mathematics) fields, helped identify important research questions about the ways international collaborations contribute both to the vitality of U.S. science and to the people who engage in the international collaborations.

Internationalization in science means an intensification of international communication and exchange among scientists. It also means that no one country can claim a monopoly on the best “cutting edge” science in every field and that some projects for reasons of cost (such as ITER²) or geopolitical considerations (such as research in space or in Antarctica) require multi-national, possibly even what could be called truly global, collaboration. Furthermore, some scientific and engineering problems are place-bound. Thus, U.S.-based scientists increasingly need to work with scientists outside the U.S. in order to pursue cutting-edge inquiry in particular fields. Indeed, Lynn and Salzman (2006) argue that developing a ‘collaborative advantage,’ rather than a ‘competitive advantage,’ will help U.S. to remain a center of innovation as centers of academic production spread throughout the world.

Already, international collaborative research is becoming the norm. The National Science Foundation (NSF) *Science Indicators 2010* reports that articles with authors in two or more countries have increased in number faster than any other segment of the science and engineering literature, with 8% of the world’s science and engineering articles having international co-authors in 1988 and 22% in 2007 (pp. O-10 to O-11). A study by the UK-based Royal Society further underscores this trend, finding that by 2011, 35% of articles published in international journals had co-authors from at least two countries (Royal Society 2011: 6). According to that study, collaboration “enhances the quality of scientific research [and] improves the efficacy and efficiency of that research” (The Royal Society 2011: 6).

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² ITER is a “large-scale scientific experiment intended to prove the viability of fusion as an energy source,” developed as a collaboration among scientists from 6 countries and the European Union. Source: <http://www.iter.org/proj>, accessed 4 May, 2011.

Over the last two decades knowledge production has changed from Mode 1 research in which scientists solve disciplinary puzzles individually to Mode 2 production where research occurs in multi-disciplinary, team-based groups who tackle real world problems, working effectively in international contexts, at the interfaces of academy/industry and academy/society, as well as in academia, industry, government, and non-profit sectors (Adams et al., 2007; Gibbons et al., 1994; Hicks et al., 2001; Nerad 2010, Stokes, 1997). At the same time, the internationalization of higher education in general is increasingly important and complex (see de Wit, 2011 and Knight, 2008 for analytical reviews).

Because of changes in science and in higher education, it has become very important that doctoral students gain the skills they will need to engage in cross- and multi-national collaborations in the future. Therefore, in recent years, international experiences for doctoral students have become sought after for both their general educational and career preparation values. For instance, the U.S. National Science Foundation (NSF) program, Partnership for International Research and Education (PIRE), emphasizes international exchange experiences for U.S. PhD students. The NSF funded IGERT (Innovation in Graduate Education, Research and Training) program also encourages international experience. In Europe the ERASMUS Mundi and the Madame Curie program support inter-European international education and career development. Departments are also establishing international collaborations with programs or laboratories from other nations to work on global problems and in the process help their students and postdocs develop cultural expertise. In some cases, universities are developing collaborations as a form of altruism (Holm & Malette, 2010b) or a form of 'science diplomacy' (The Royal Society, 2011: 62).

1.1 Workshop Rationale

Knight (2008) discusses "the unprecedented increase in the internationalization of higher education:"

The number of multilateral university networks for research, teaching and contract project work has exploded; new regional international education organisations have been established; countries are reviewing their national internationalisation strategies and programmes; and new policy actors such as immigration, industry, trade are engaged and collaborating with education, foreign affairs, science and technology. The increase in volume, scope and scale of crossborder movement of education programmes (franchise, twinning, branch campus, etc.), and providers (commercial companies, non-government organisations, traditional universities), is unprecedented. (Knight 2008, p. 10)

In his presentation during this workshop, "The Graduate Collaborations Project: Some Findings that Suggest Directions for Outcomes Measurement" (February 8, 2011), Daniel Denecke of the Council of Graduate Schools discussed one of these rapidly growing forms of academic internationalization: joint and dual degrees at large U.S. research universities. Not only are the programs growing quickly, but the interest in developing these programs is also growing quickly. From 2007 to 2008, the percentage of universities with dual/double degree programs rose from 32% to 52%. Meanwhile, universities planning new dual/double degree programs rose from 3%

to 33% (“The Graduate Collaborations Project: Some Findings that Suggest Directions for Outcomes Measurement,” presented February 8, 2011; see also Berka, 2011 and Kuder & Obst, 2009 for further discussion of these degree types).

It is hoped that these international experiences enhance students’ knowledge acquisition and contribution to research, prepare them for an increasingly international employment market, and also establish a cosmopolitan mind set and revive awareness and obligation of civic engagement. This includes the notion of a citizen who crosses national boundaries without seeking to assimilate and to homogenize, but instead to accept differences and embrace diversity (Guerin & Green 2009, Nerad 2009). But do and can these experiences fulfill the great expectations that we have for them?

Amidst the rush to establish international partnerships, not everyone shares the same fervor for universities that transcend old borders and boundaries. In a May 1, 2011 article in the *Chronicle of Higher Education* that earned ‘most emailed article’ status within three days, Yale professor Christopher L. Miller expressed reservations over the planned construction of a second Yale University campus in Singapore (Miller, 2011). The campus, built in a nation that had prosecuted a British resident for criticizing its judiciary (<http://www.hrw.org/node/98621>), elicited contradictory statements from university administrators depending on their audiences, alternately assuaging Singaporean leaders and reassuring faculty that they would enjoy the same privileges as in their home campus of New Haven. Miller cited concerns over academic freedom and discriminatory laws towards, among other things, homosexuality, that could interfere with the new joint campus of what he called ‘Yale in Singapore: Lost in Translation.’ He is far from the only critic of internationalization efforts.

Another U.S.-based academic, Alexander Flecker of Cornell University, wrote the following response to a newsletter report by Cornell graduate students about international research (K. A. Capps et al., 2008):

For a researcher from a high-income country, working in the developing world is almost always a greater hassle than doing so in your home country...for many developing countries, everything takes more time, for a variety of reasons, including a lack of resources, inefficient bureaucracies, your own cultural inexperience, and so on. Be prepared for what can feel like wasted time, and ask yourself whether you are going to be able to adapt to working in the context of different cultural norms and expectations.

Flecker made these comments to warn students of the potential hardships of international work, but supported the premise overall. Nonetheless, his words call the value of international research into question (K. A. Capps et al., 2008).

Given these criticisms and the additional costs of international research, an increasing push to demonstrate value is giving new urgency to outcomes-based research on international

educational experiences. This is particularly true from STEM fields, in which competition for funding, limited time to degree, and concerns about the intangible costs of international experiences (e.g., distraction from primary research projects and delays to degree caused by ‘cultural’ pursuits) force students and internationally engaged faculty alike to clearly demonstrate the value of their international engagement.

Despite the importance—especially in the context of shrinking national and state budgets—of showing accountability for expenditures, evidence about the value of international experiences in STEM fields remains largely anecdotal (Kirk, 2008). After considering whether universities are becoming new incarnations of multinational corporations, Denecke concludes, “Value propositions underlying strategic decisions are not backed by evidence, [pointing to] a vital need for real outcomes data on the efficacy and value of international collaboration for students, research faculty, and institutions.” Similarly, the Royal Society report on international scientific collaboration emphasized that while collaborations are vital and lead to many positive outcomes, “Little is understood about the dynamics of networking and the mobility of scientists, how these affect global science and how best to harness these networks to catalyse international collaboration.” (The Royal Society 2011: 6). While international partnerships are vital, significant questions remain. This workshop was designed to begin a conversation toward creating outcomes data and framing answers to these questions.

1.2 Literature Review

Existing literature about international collaborations and exchanges includes research on the correlates of intercultural competence and the outcomes of study abroad programs, as well as assessments of specific programs. Guerin and Green (2009) describe how the global academy has become a cosmopolitan ‘imagined community,’ while Stearns (2008) and Taylor (2009) discuss the challenges and opportunities in globalizing education. Douglass and Edelstein (2009) focus on the role of international students, urging policymakers in the United States to pay more attention to the strategic importance of international students. Studies that take the perspectives of these students in the United States are well established, e.g., Trice & Yoo, 2007 and Finley et al., 2007. Other studies look at more homogenous groups, for example, Japanese female students (Mayuzumi et al., 2007, Yamamoto, 1994) or Chinese women (D. Qin & M.B. Lykes, 2006) at U.S. universities.

Among studies of international exchanges among doctoral students and postdocs, some focus simply on mobility (L. Ackers et al., 2008, S. Avveduto, 2002, L. Verbik and V. Lasanowski 2007), others examine postdocs as skilled migrants (B. Cantwell, 2009), and only a few examine productivity of international exchanges and the impact on scientific careers (Jöns 2007). Hans de Wit has discussed broader aspects of internationalization in higher education, taking a historical and comparative perspective, in two wide-ranging books (2002, 2010).

Intercultural competence broadly deals with effective and appropriate interactions with those from different backgrounds (Deardorff, D., 2009; Spitzberg, B. and Changnon, D., 2009). This capacity has long been understood as critical in business. Efforts to design more effective international exchanges at the doctoral and postdoctoral level may benefit from findings in this research area. Pedagogical tools and assessment instruments that draw on intercultural competence might be adapted to purposes of evaluating the impacts of international exchanges for doctoral and postdoctoral students. It also offers a diverse set of research approaches and findings, which should be synthesized where relevant to the particular types of exchanges undertaken among early career researchers (e.g., Altshuler, L., Sussman, N. M. & Kachur, E., 2003; Bennett, M. J., 1986; Greenholz, J., 2000; Maddox, W.W. and Galinskuy, A.D., 2009; Paige, R. M., Jacobs-Cassuto, M., Yershova, Y.A., & DeJaeghere, J., 2003).

Research on the impact of study abroad programs for undergraduate students offers insight into factors important in international exchange experiences for doctoral and postdoctoral students (Dwyer, M. & Peters, C., 2004; Martin, J.N., Bradford, L., Rohrich, B., 1995; Norris, E. M. and Gillespie, J., 2009), including possible negative impacts of international exchange (Ryan, M.E. and R. S. Twivel, 2000). Gullahorn & Gullahorn (1966) offers an especially useful starting point for characterizing the specificity of the international exchange experience for graduate students because it compares outcomes in terms of professional and personal development among a sample including both graduate and undergraduate students. Undergraduates tend to experience more personal development gain, while doctoral students report direct career benefits. A key lesson of this research is that it is possible and useful to prepare for going abroad and for returning home, itself a difficult transition referred to as “reverse culture shock” (Storti, 1997).

Assessments of specific programs in terms of success in training, research, and faculty exchange offer useful starting points for research questions leading to generalizable results. The study of aspects of the scientific process specific to international collaborations and exchanges as well as their scientific impacts is still an emerging area of inquiry. Sisco and Reinhard (2007) focus their study on faculty exchange, although from a business education context. The Stanford Research Institute (2002) conducts research on the outcomes of Fulbright Scholar exchanges, and Universities UK (2009) offers a more general overview of researcher mobility, although their scope is limited to Europe.

Several studies raise critical questions and offer promising launch pads for further research. Jöns’ (2007) study of academic mobility to Germany argues that there are typical cultures of academic mobility and collaboration and that these can be partly explained by spatial relations specific to particular research practices. This study suggests a way to conceptualize what kind of research would benefit most from international exchange. It specifically addresses different kinds of international interactions and the impacts of these on publication. Glänzel (2000) seeks to quantify the types and impacts of international scientific co-authorship relations in a multi-national comparison. Cantwell (2009) reveals the increasing reliance on international postdocs in academic production and examines the role of international mobility in careers of postdoctoral scientists. This kind of research provides an

empirically based starting point for thinking about how to maximize the career and scientific impact for U.S. scientists of international collaborations.

Existing literature offers several models for studying the outcomes of international educational and research collaborations for doctoral and postdoctoral students. One source of information is rooted in subjectivity, including first-person accounts of experiences as well as scholarly investigations of identity, attitudes, and subjective evaluations. Researchers and practitioners in the area of intercultural sensitivity and competence offer examples of widely used and tested training techniques, including the Intercultural Development Inventory (IDI) which has been tested for reliability and validity (Paige, R. M., Jacobs-Cassuto, M., Yershova, Y.A., & DeJaegehere, J., 2003). Thus, one method of studying the impact of international exchanges is to examine outcomes in terms of intercultural competence; well developed instruments for doing so exist already. Darla Deardorff, editor of the Sage Handbook of Intercultural Competence (2009), has urged the application of these tools and of logic program models to international STEM educational experiences.

Another approach is to document the career outcomes of students participating in international exchanges and collaborations. This can be done by means of retrospective surveys as the Center for Innovation and Research in Graduate Education (CIRGE) has done (Nerad 2009, Nerad et al. 2007). The existing US Survey of Earned Doctorates (SED) does not collect data on international experiences. The US Survey of Doctorate Recipients (SDR), a subset of the SED, tracks career mobility, but does not allow linking careers to international experiences during doctoral education. The SDR, however, allows for analyses of numbers of international collaborations as well as co-authorship with international researchers (Frehill, presentation at NSF Workshop, 3 June 2010). The Organization for Economic Co-operation and Development (OECD) in collaboration with the Eurostat project on Careers of Doctorate Holders and the UNESCO Institute for Statistics completed in 2007 (and repeated in 2010) the first survey on international career mobility of doctorates holder and reasons for mobility in seven countries in Europe (www.oecd.org/sti/working-papers). This study is only available for selected European countries.

Methods for measuring the contribution of international exchanges to the vitality of the U.S. scientific enterprise and the quality of PhD graduates in STEM fields need to be developed and refined. Starting points are offered by evaluation research of NSF IGERT programs with strong international components (Heg and Nerad 2004) and by studies in the sociology of science and studies of innovation that use indicators such as publications and citations and examine scientific networks, such as the analyses of data from the SDR mentioned above. Evaluations and assessments of particular programs offer potential frameworks, methods, and instruments: for instance, Sadrozinski (2005) develops a framework for evaluating the educational outcomes of international collaborations among doctoral students. This framework uses participant observation, interviews, focus groups, and materials analysis to evaluate international collaborations. The report (Sadrozinski, 2005: 21-29) also includes interview protocols for faculty and students over three phases and an online survey in the appendix, making it a

useful resource. Closely related to the 2011 workshop aims, Kirk (2008) reports on a NSF workshop intended to develop approaches for evaluating international STEM collaborations, beginning with an analysis of those funded by NSF. The workshop suggested examining effects of these collaborations on individuals, on institutions, and on what the author termed the ‘knowledge environment level,’ or quality of innovation and research (Kirk, 2008: 4). Several specific research studies were outlined and research priorities suggested—primarily building models and creating taxonomies that would help develop a common language of analysis—but it is not clear whether these studies have been initiated. More specific measures of scientific and technological skill acquisition, the area 2008 workshop participants struggled to define for assessment purposes, still await creation.

2. THE WORKSHOP

2.1 Workshop Goals

This workshop was motivated by CIRGE emphasis on the research of institutional and educational challenges faced by interdisciplinary and increasingly international doctoral programs and their evaluations, as well as our commitment to contribute to the preparation of the next generation of researchers for leadership in a global and knowledge-based world. On the practical side, we were inspired by our experience of establishing effective research communities of international experts in doctoral education and subsequent publications through the CIRGE series of international research synthesis workshops (CIRGE website).

The program has been designed to (a) increase our mutual understanding of essential topics relevant to investigate the impact of international collaborations at the (post) graduate level and beyond, (b) gather information on what we know and should know about assessing international experiences and programs, and (c) move collectively towards charting research directions for the next years. A series of short talks (10 minutes) will help “ignite” ideas about relevant research topics, will “fuel” awareness of important assessment aspects in international collaborations, and “keep our flames burning” so we may identify potential collaborators for future research on international programs and experiences.

2.2 Explaining the Workshop Design: Guided by a Pre-survey

Responses to a pre-survey emailed to participants in autumn 2010 were posted on a password-protected blog and used to develop the workshop format and agenda. The following themes and questions emerged in respondent’s answers:

- How can we maximize and measure global/intercultural competence (as we train students to be researchers)?
- What are the best ways to prepare students for international experiences?

- What are the most effective international experiences...to students? To institutions? To international partners? What value do international experiences bring?
- How can we measure effectiveness of international experiences?
- How do international experiences affect 'science'? Do they improve it, given the existence of different cultures of science and approaches to problem solving?
- How can we maintain a focus on broader equity issues in all places – gender, ethnicity, class, nationality, and so on?

These themes guided the workshop design. Ten-minute igniting talks examined existing research and shared participant experiences. 'Perception lenses' were introduced to challenge participants to take unfamiliar perspectives. Early career researchers presented skits to open conversations about the uneven aspects of international collaborations and interdisciplinary encounters (Breslow and Blumenfield, 2011, Graybill and Shandas, 2011). And working groups developed responses to key questions articulated above, often by posing specific questions or sets of questions for further investigation. The framework of identifying elements of research needed to understand aspects of international experiences at several stages—before, during, and after these experiences took place—was explored.

2.3 Agenda



Investigating the International Experiences in STEM Graduate Education and Beyond: From Anecdotal to Empirical Evidence. February 6-8, 2011, **National Science Foundation, Arlington, VA** (grant proposal #105029).

AGENDA

Theme: *Research Challenges / Opportunities*

- Welcome: Opening Remarks, Prof. Maresi Nerad, CIRGE
- Igniting Talk #1: "International Experiences of a Postdoc: US, Germany, China." Dr. Andrea Stith, Research Fellow, Graduate School of Education, Shanghai Jiao Tong University, China.
- Igniting Talk #2: "International Collaborative University Programs: The MIT – Portugal Program." Dr. Sebastian Pfotenhauer, Research Fellow, Massachusetts Institute of Technology, MIT-Portugal Program, MIT Technology & Policy Program.
- Igniting Talk #3: "Knowledge and Research at the World Bank: A New Strategy". Dr. Jean-Jacques Dethier, Research Manager, Development Economics, The World Bank.
- Igniting Talk #4: "From Brain Drain to Diasporas". Prof. Renato Ribeiro, Professor, Ethics and Political Philosophy, University of Sao Paulo, Brazil.

Overview of Workshop, Prof. Nerad

Welcome by Joan Ferrini-Mundy, NSF Assistant Director for Education and Human Resources

Theme: *Examining the Field Collaboratively*

Using Perception Lenses: Student, Faculty, Researcher, Administrator/Policy Maker, and Community Partner.

Skit: "Navigating Cross-Cultural Experiences in International Fieldwork." Assistant Prof. Jessica Graybill, Department of Geography, Colgate University, New York; and Associate Prof. Vivek Shandas, Urban Studies and Planning, Portland State University

How do we determine the outcomes of international experiences in STEM graduate education and assess their impacts?

Igniting Talks:

1. *What factors define the types of exchanges?*

Context & the Production of Knowledge

- “Cultural Differences and Values of Science Research Professor.” Prof. Rajendra Bordia, Material Sciences, University of Washington.

Principles of Partnerships

- “Key Issues in Establishing Student Exchange Programs and Dual Degrees.” Pro Vice-Chancellor (International), John Taplin, the University of Adelaide, Australia.

Regional/Country Approaches of International Collaborations

- “A UK/European Perspective on International Experiences in STEM Subjects.” Prof. John Chapman, Dean, School of Physics & Astronomy, University of Glasgow.

2. What do we know about the effectiveness of international collaborations?

Program Types, Structures and Inclusiveness

- “Preliminary Findings from Research on Inclusiveness in International Research Collaborations.” Associate Prof. Kathrin Zippel, Department of Sociology and Anthropology, Northeastern University, Boston, MA.

3. What conceptual frameworks, methods and tools exist?

- “Developing Global Competency: Problem Solving with People.” Assistant Prof. Brent Jesiek, School of Electrical and Computer Engineering, Purdue University.

Concurrent Working Groups:

- 1. Context & the Production of Science Knowledge***
- 2. Program Types, Structures and Inclusiveness***
- 3. Principles of Partnership/Dual Degrees***
- 4. Regional/Country Approaches of International Collaborations***
- 5. Frameworks and Methods of Evaluating International Experiences***

- “Telling stories in creating international communities as a method in media for international collaborations”. Video viewing, Scott Macklin, Associate Director – UW Digital Media Masters, University of Washington.

“Lens” Discussion Groups:

- Student
- Faculty
- Administrators/policy makers
- Researchers

Concurrent Igniting Talks

- **1: *Principle of Partnerships/Inclusiveness*:** Prof. Susan Henry, Molecular Biology and Genetics, Cornell University, New York.
- **2: *Other Approaches-Importance of Language*:** Dr. Bruno Della-Chiesa, Senior Analyst/Project Manager, CERI/OECD.
- **3: *Methods/Framing*:** Prof. Jiro Takai, Chair, Department of Educational Psychology, Nagoya University, Japan
- **4. *Dual Degree Assessment/Methods*:** “Experiences in Assessment of Dual Degree Programs.” Dr. Sigrid Berka, Executive Director, International Engineering Program, Director, German and Chinese IEP, University of Rhode Island.

Welcome and Overview of Day, NSF Building,

Theme: *Moving Forward*

Skit: “Challenges to International Inter-Disciplinary Research During Doctoral Education.” Dr. Sara Breslow, Environmental Anthropologist, University of Washington and Dr. Tami Blumenfield, Visiting Assistant Prof. of Asian Studies; International Studies Program, Portland State University.

“Fueling” Talks: *Research Frameworks, Methods, Principles of Partnerships*

- “The Integrated Bridging Program-Research: Enhancing Experiences for International STEM Graduates.” Michelle Picard, Director, Researcher Education and Development, The University of Adelaide, Australia
- “Quality Outcomes Assessment in International Exchanges.” Darla Deardorff, Executive Director, Association of International Education Administrators, Duke University.
- “Evaluation –E Project: A Brief Overview.” Steve Culver, Associate Director, Office of Academic Assessment, Virginia Tech.

Formulating the Next Steps for Moving from Anecdotal to Empirical Evidence
Concurrent groups: <i>1. How can we determine the outcomes of international exchanges?</i> <i>2. What factors define the types of exchanges and shape the outcomes?</i> <i>3. What conceptual frameworks and methods do we have? Do we need new ones?</i> <i>4. How can we identify which program types/structures are most successful in inclusiveness, and how can we assess these promising programs?</i> <i>5. What kind of impact research has the most strategic leverage that can provide the most useful empirical evidence on international collaborations?</i>
NSF Potential Funding Opportunities • Jennifer Pearl, Program Officer and John Tsapogas, Program Coordinator, Office of International Science and Engineering (OISE); • Janice Earl, Directorate of Education and Human Resources (REESE).
Summary and Closing Remarks, Evaluation, Prof. Nerad

2.4 The Blog

As noted above, responses to a pre-survey emailed to participants in autumn 2010 were posted on a password-protected blog and used to develop the workshop format and agenda. Participants were also asked to share relevant literature or other information that other participants could benefit from reading. One participant offered a link to his program website; another sent in her summary of a focus group on international anthropological encounters. Following the workshop, ‘igniting talk’ participants shared their presentation slides, and others who did not present to the entire group offered their contributions. The blog thus served as a site for preparation and a forum for post-workshop communication.³ The information currently housed on the blog, especially the formal materials, will later be transferred to the CIRGE website (with the permission of the contributors).

³ Although Blogspot hosted this blog, the term ‘blog’ may be somewhat of a misnomer here. Information could only be posted to the blog by the CIRGE staff. Future efforts may benefit from a blog or other interactive online forum that includes space for comments by workshop participants.

2.5 Workshop Summary

With an interactive format aimed at maximizing conversation and minimizing one-way presentation, workshop participants quickly learned of each other's work and of varied approaches to knowledge production and international work. Participants shared widespread interest in designing effective assessments and learning more about outcomes of international experiences. Sharing of different practices bridged divides: for example, the field of inter-cultural competence was new and of great interest to many from STEM fields, many of whom had developed international programs without explicit professional training in international education. Conversely, cross-cultural education experts learned from STEM researchers what they valued and sought to measure in international experiences. The role of effective international research experiences for early career researchers (ECRs) was of particular interest, with Andrea Stith providing her perspective from postdoctoral research in China and Germany as a way to understand international scientific encounters.

One frequently voiced frustration by participants was the challenge of obtaining funding for international collaborators, and the dangerous imbalance of research relationships that could result from a U.S. Congress-funded agency that restricted funding for foreign researchers. Another persistent problem voiced by participants was the timeline for international collaborative work and the structure of doctoral student funding. From one side, grants that limited the time to degree funded through the grant discouraged international ventures. For example, students funded for three years faced a ticking clock: adding an international component to their research could lengthen their doctoral study period and potentially extend this stage past the allowable funding period. From another angle, the outcomes of international experiences should be studied over a longer term than most grant evaluations allowed for. Structurally, then, existing strict doctoral program length in many fields poses barriers to international work.

In addition, racial and gender disparities were often magnified by international doctoral education opportunities. Although research on these trends has begun to be collected (Ackers et al., 2008, Hogan et al., 2010) it had not reached most workshop participants. Thus this area presented a particularly important area of research focus. The precarious situation of early career researchers received significant attention from workshop participants, and models for expanding access to international opportunities without increasing inequalities demanded further attention. Kathrin Zippel noted how graduate advisers themselves steered students from diverse cultural backgrounds and female students away from certain opportunities based on perceived fears, even when these perceptions were not matched by actual experiences. For example, advisers discouraged some female students from going to Middle Eastern countries where women could face discrimination in public. These pervasive forms of discrimination should be carefully studied as the role of the graduate adviser continues to be a crucial one in the formation of students.

Joint degree and dual degree options represented one intriguing form of institutionalized international training for doctoral students (cf. Berka 2011, Council of Graduate Schools, 2010, Kuder & Obst 2009, and Yopp 2009). In his workshop presentation, John Taplin discussed dual degrees with student exchange programs. He gave the example of the Cotutelle Doctorates in Europe that require students to have doctoral advisers at two universities. While the specifics and the logistics varied substantially, examples from European and Asian countries whose efforts had reached a maturity less frequently seen in North American universities presented promising examples of building international experiences into programs, rather than offering them as add-ons. The value of this experience to students and universities seemed clear, but additional studies of their efficacy and of ways around inevitable barriers were sought. On a different level, John Chapman offered several existing measures of international collaboration effects at the University of Glasgow used by the European Union in his presentation: numbers of placement days, total number of inter-lab visits, joint publications, joint conference presentations, transfer of techniques between labs, and prizes. However, he pointed out, these measures ignore any cultural effects or changes.

Conversations also addressed the definitions of science and the role of research relationships. Participants' varied backgrounds, with a strong contingent of engineers and a vocal group of junior scholars trained in interdisciplinary methods, illuminated how different academic upbringings could both enrich and challenge relationships of diverse participants. Bruno della Chiesa from OECD (Organisation for Economic Co-operation and Development) discussed the role of language in intercultural and international engagement (cf. B. della Chiesa, 2010). Language barriers were also addressed through skits developed by early career researchers who had engaged in interdisciplinary doctoral training (Breslow and Blumenfield, 2011, Graybill and Shandas, 2011).

One of the most successful aspects of the workshop was its truly global reach. Participants from Brazil, South Africa, Japan, Australia, and Spain joined participants from North America, including many with extensive experience researching, working and studying in other countries. (For example, one North American flew in from her post-doctoral fellowship in China, and several U.S.-based scholars had been born and educated in other countries.) The gender balance and the generational mix of early career and senior scholars were also very important.

Photos from the workshop



Myan Baker facilitates a working group report session while Maresi Nerad points out a contributor.



Susan Henry shares the frameworks developed by her working group with the workshop participants.



Workshop participants traveled from China, South Africa, Brazil, and other sites around the world to contribute to the development of a research agenda for international STEM experiences.

2.6 Workshop Evaluation: Feedback from Workshop Participants

Through survey responses, participants affirmed that the workshop met their expectations (25 of 25 respondents), encompassed relevant content (25 of 25), generated useful research questions (23 of 25), and clarified the challenges related to assessing the impact of international experiences (23 of 25). The workshop offered diverse perspectives from a “wide range of disciplines, nationalities, genders, ages and ideas,” although that diversity sometimes challenged disciplinary and epistemic assumptions. As one participant commented, “Diversity of participants was benefit and disadvantage.” One participant commented on the global competence present in the workshop that enabled participants to work together smoothly.

Several participants hoped to hear from even more international perspectives or have greater representation from government / industry stakeholders. Taking on lenses of different roles was a helpful exercise for most, but not all. Many participants wished for more time and more targeted

opportunities to develop future collaborations. Continuing to accumulate resources through building the blog and/or a website, through developing a bibliography, and through targeted NSF funding were all mentioned as desired outcomes: “[It] would be nice if NSF were flexible to react to outcomes of the workshop and solicited proposals from us going forward.”

Participants reported emerging with new conceptual frameworks and assessment tools. Several mentioned acquiring new ideas about intersections between ideas of science and international, regional, and disciplinary variations. Some sought more specific strategies and deliverables or hoped for a more thorough integration of ideas.

Overall, participants appreciated the workshop’s organization. When surveyed, participants agreed that the structure and processes of the workshop helped address the workshop goals (24 of 25) and that the workshop helped extend their networks for future collaborations (23 of 25). Many appreciated the interactive workshop format combining break-out groups with presentations. Participants expressed enthusiasm overall and gratitude for an engaging workshop. As one wrote, “The event was well organized, and I think your team did a nice job using innovative facilitation strategies.”

3. WORKSHOP OUTCOMES

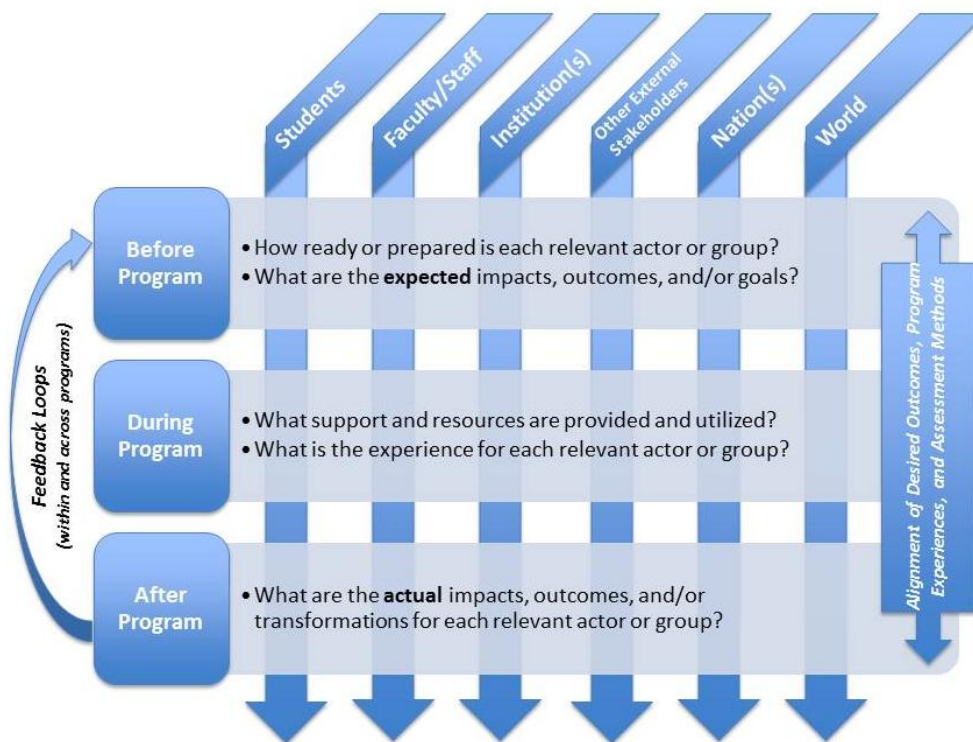
3.1 Five Research Questions

One important result of the workshop was coming to a consensus over key questions as priorities for further empirical research. During breakout group discussions and through discussions on the blog prior to the workshop in Washington, D.C., participants identified the following central research questions by the end of day one:

1. Does international collaboration lead to better science/scientists?
2. Do current institutional and funding structures lead to missed opportunities for international collaboration? If so, how?
3. How can we assess institutional preparedness for international collaborations/experiences?
4. What are the expected outcomes and goals of international experiences/collaborations? How are they established?
5. What are the actual impacts, outcomes, and transformation of the international experiences/collaborations?

Participants then chose the topic that most interested them and, in smaller working groups, discussed the five central research questions.⁴

The workshop designers asked the groups to approach these topics by using a simple conceptual framework within their discussions, prior to the international experiences, during the international experiences, and after individuals engaged in international experiences. One group challenged this temporal framework, suggesting that international engagements take many forms, especially with improved global telecommunications technologies enhancing communications between lengthy stays in other countries. Nonetheless, this simple framework helped divide areas for investigation in a useful way. Conversations also circled back to the core question of the workshop: how can we develop effective outcomes assessments?



Above: Illustration of working group discussion framework (questions 4 and 5 above). Graphic developed by Brent K. Jesiek.

⁴ With many interested in discussing both expected and actual outcomes, Questions 4 and 5 were addressed by a single group.

3.2 Before the International Experience

3.2.1 Preparation for International Experiences: Can Reinventing the Wheel be Reduced or Eliminated?

The Sage Handbook for Intercultural Competence has useful general suggestions, but some preparations may be disciplinary specific. Can discipline-specific pre-departure preparation modules be developed and hosted online? Brent Jesiek offered the example of engineering + engineering orientation + global experience = global engineering experience, with online modules and built-in assessment processes preparing students for their global engineering experiences. This could be expanded to other disciplines and geographic areas as well, while being careful to avoid essentializing places and cultures. Resources are necessary to develop these materials.

As noted above, Kathrin Zippel stressed the importance of looking at the gender and under-represented minority gap in international research collaborations. She shared results from studies that identified gendered trends in international exchange initiations: more men were invited by a host university or picked from faculty, while women abroad had largely gone through their individual pursuits (Hogan et al., 2010). She suggested that developing an application process for women to research abroad rather than requiring them to be selected by a mentor or a faculty person would encourage their international participation.

Participants emphasized that using lenses to take the perspective of different stakeholders is important. Students, faculty, staff, policy makers, administrators, community partners, and international collaborators all have different, though overlapping, needs and interests. Tenure and promotion are major concerns: how have internationally oriented people dealt with them? How can this be addressed more effectively in the future?

3.2.2 Thinking through Reciprocity and Partnerships

Sustainability and mutual benefit are important elements of any international collaborative relationship. They can also address problems of brain drain (cf. Renato Ribeiro, “From Brain Drain to Diasporas”) and scientific marginalization. For example, Christoff Pauw discussed diminishing research output in Africa relative to other parts of the world. He cited the definition of marginalization given by Schmaus (2008): “to be less well-integrated into the social network of scientists, to have fewer colleagues to whom to turn for feedback, or to have one’s potential contributions ignored.” Conversely, networks & collaboration are “important not only for receiving criticism of one’s work, but also ... for having access to the most recent, unpublished work of other scientists in one’s field,” which in turn helped promote access to funding and other resources (Wray, K.B., 2002; see also The Royal Society 2011 and Tijssen 2007). In their listing of nine problems hindering partnerships in Africa, which they had encountered as administrators at the University of Botswana, Holm & Malete (2010b) describe

imperial researchers from other countries and efforts by foreign university staff to develop curricula without seeking meaningful feedback from University of Botswana faculty. They conclude:

African professors need to start a frank discussion with their counterparts about the conditions for cooperation. We have repeatedly heard our University of Botswana colleagues grumble that they receive no respect in partnerships. Yet they do not speak up when they have an opportunity....The challenges can be overcome, but not over a one- or two-day visit. They require the development of a relationship that stems from friendship, trust, and mutual respect, a relationship that comes with shared experiences, disagreements, conversations, and solving problems together. All of that is demanding, but not impossible.

(Holm & Malete, 2010b)

As their words make clear, careful consideration of reciprocity in developing relationships is crucial.

Working group participants focusing on inclusivity and reciprocity developed the following research questions:

- How can information about projects be shared to lessen marginalization? (Christoff Pauw's presentation introduced the Stellenbosch University Collaborations Database, which strives to share information about projects within Africa to encourage collaborations there.)
- What are the expectations of all stakeholders? What are their motivations?
- What level of institutional buy-in and support exists, at both/all participating institutions?

Portland State University's "Guide to Reciprocal Campus-Community Partnerships" identifies essential elements of a reciprocal, collaborative relationship between partners:

- *Asset (resources, strengths, and interests) identification and recognition for all partners*
- *Dialogue within partners and between partners*
- *Creation of common language*
- *Relationship-building strategies*
- *Describing and understanding each other's culture*
- *Learning together*
- *Collaborative problem posing and solving*
- *Collaborative agenda setting*
- *Identification and recognition of each partner's needs, issues and challenges*
- *Self assessment and reflection within each partner group and between partners*
- *Constant negotiation and modification*
- *Supporting infrastructure in each partner's organization*

(A Guide to Reciprocal Community-Campus Partnerships, 2008, pp. 3-4)

Many of these processes can also be usefully applied to international, inter-university partnerships. Unfortunately, funding does not always permit or facilitate the development and exploration of these relationships. For example, Jessica Graybill described an experience while participating on an IGERT trip that laid the groundwork for effective future encounters: “We had the luxury of taking an advance trip to find out what community members wanted, and talking about what knowledge we sought, and establishing common ground. To what extent can that be replicated? Or: what complementary knowledge can be sought, researched and shared?” Other participants wondered what information sharing can be built into collaborative research grants so that research does not become extractive, but is truly complementary or additive. What provisions exist for repatriating knowledge and intellectual property?

To address some of these concerns, Christoff Pauw (2010) suggested adapting components from Jacques Gaillard’s “Charter of North-South Partners” (1994: 58):

- *The collaboration should be based on a strong mutual interest and both partners should have something to gain from it.*
- *Project proposals should... be drafted jointly...*
- *In particular, decisions on specific instrument purchases should be made jointly...*
- *Provision should be made in the budget for a training component...*
- *Salaries should be sufficient to ensure full-time commitment, or completed by supplementary means (e.g. research honorarium) secured in the budget.*
- *Transparency should be a golden rule between the partners...*
- *Each cooperating group should include a substantial number of researchers (at least three).*
- *Both parties should meet regularly to review ongoing work and plan future activities.*
- *Communication channels... must be available to secure efficient interaction between partners.*
- *Scientific papers should be written jointly, with the names of the authors from both sides appearing on the published articles.*
- *Collaborative programmes should be evaluated on a regular basis... Monitoring should emphasize project outputs, rather than inputs.*
- *Mechanisms should be established so that the collaboration can continue after the collaborative program is terminated to ensure a long lifetime to the collaborative partnership.*

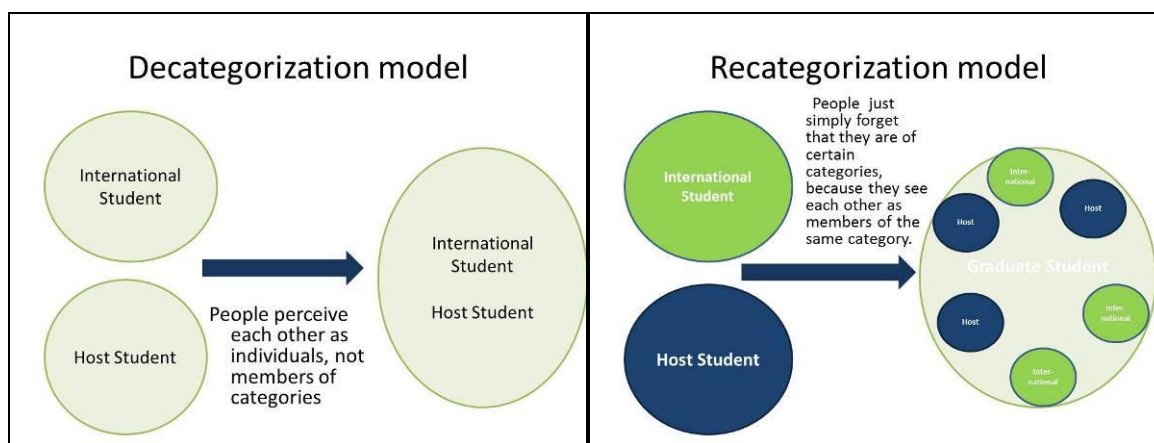
Although this charter has been in existence for nearly fifteen years, many of its components still describe an ideal situation that has yet to be realized, particularly in the funding domain (cf. National Research Council, 2008, 34-34). As countries evolve and universities evolve, conditions may change. Kay Holekamp noted that Kenyan labs are under-equipped, yet rewarding exchanges occur. The suggestion from Gaillard’s charter that decisions to purchase materials be made jointly and that funding training components is essential echoes a question raised by a working group member: can there be built into a

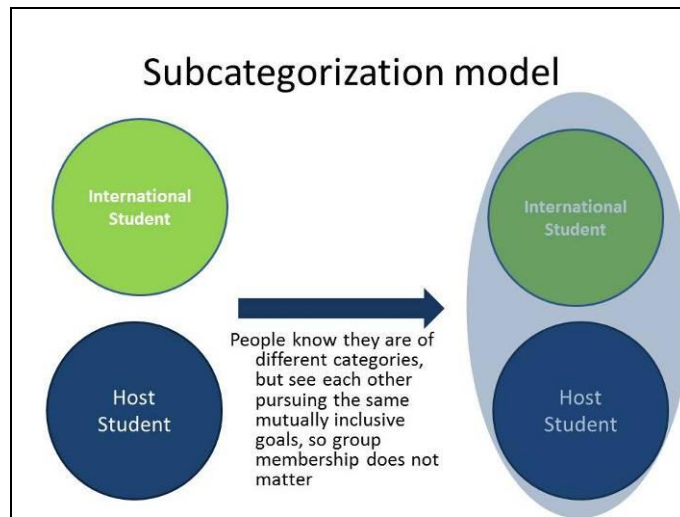
grant application a provision for capacity building? Capacity building seems to be a critical component of international experiences, yet one that is often overlooked.

3.2.3 Examining Length, Timing, and Characteristics of International Experiences

What length of international experience is most effective, and when should the experience occur? Can multiple experiences occur, as preferred by Avedduto's (1998) subjects (although they lacked the funding for multiple experiences)? Students have preferences; six months is frequently discussed as an optimal length of stay, but preferences vary. As Rajendra Bordia offered, "The greater the culture gap, the longer it may take for meaningful understanding to develop." Most likely, the answers to questions about duration will vary based on the goals and context of the particular situation. There may be no single determinant of an ideal, one-size-fits-all, length of an international experience. Maintaining flexibility in the types and lengths of international experiences may help make them more accessible to individuals with place-based obligations, including family commitments and other career needs. Furthermore, how do various types of international experiences affect the outcomes? It will be important to distinguish in evaluation research between individual student exchanges and more complex research collaborations.

In his presentation, "Cross-cultural Exchange: Intergroup or Intragroup?," Jiro Takai offered an overview of several different models for cross-cultural exchange. After explaining that merely bringing groups into contact with each other has been largely discredited as an effective tool for cross-cultural understanding, he drew from social identity theory (Tajfel and Turner, 1979) to suggest that optimal results would occur from changing the ways in which students identified (cf. Wylie, 2006 for a further exploration of the role of difference). Since social identity theorists have established that groups (ingroups) work hard to assert their superiority over others (outgroups), the key to integrating diverse participants may be to redraw the lines of established groups.





Diagrams from "Cross-cultural Exchange: Intergroup or Intragroup?," created by Jiro Takai (2011).

Through recategorization, decategorization, and subcategorization, educational institutions, programs/departments, and staff could manipulate whether students identified as international students or whether new identities could be forged. These examples show that not merely the length of international experiences, but also the depth of integration into another research community, should be considered as assessments are developed.

3.2.4 International Differences in Approaching Science

The field of Science and Technology Studies (STS) questions assumptions that only Western science is valid, and it offers multiple paradigms and perspectives on scientific knowledge production (see Hackett et al., eds., 2007, Merton 1973, and Wylie 2006). The term 'science' is broad enough to encompass fields of research with very different methods and practices, with working sites including laboratory, computational, and outdoor environments. Collaborating across these disciplinary and national variations can pose challenges and offer important training opportunities.

Questions related to this topic included:

- How do we identify and learn from differences in posing questions, applying theory and choosing methods of investigation and analysis of findings?
- What are the necessary skills / aptitudes for producing scientific knowledge? How does international experience help in developing those skills?
- Do international experiences make better scientists, if not better science? How do we define 'better scientist'?

- How do different modes of academic production, including team- or individual-based, influence outcomes?

Brent Jesiek identified global competency as the ability to work with people who define and solve problems differently (cf. Downey et al. 2006, Grandin & Hedderich 2009, Olson & Kroeger 2001). He suggested teaching participant-observation as an intercultural learning technique that could help bridge different working styles and traditions. The question of how to assess acquisition of scientific and technical skills, including problem-solving skills, remained of significant interest among participants.

3.3 During the International Experience

3.3.1 Elements of the International Experience

Rajendra Bordia explained that “effective collaborations have a scientific basis, complementary expertise, and appropriate facilities.” He also emphasized that for students, having an assigned host is essential.

Questions identified by working group members included:

- What are the effects of increased Internet access on international collaborations – will this prevent students from fully immersing themselves? (Or, conversely, will this alleviate some problems of loneliness, etc., and family separation?)
- What role can student support services play? Who will advise the student in a partner university?
- How well are students integrated into the research community?
- What is the role of the individual researcher vs. the institution?
- What funding is available locally?
- Are the communication channels between the institution, departments, and individuals fit for the purpose of the collaboration?
- How much flexibility is allowable?

Many of these questions were directly related to inclusivity (or lack thereof—exclusivity). Mentorship opportunities and structured programs enhance inclusivity for under-represented minorities and for women.

3.3.2 Researching Barriers and Looking for Alternatives

U.S. institutions have significant barriers to international collaborative work. What models from other places can be adapted, or have been adapted, to overcome these barriers? Some examples include:

- Institutional barriers to reciprocity: in U.S. universities, there is educational support, but limited administrative support for international collaboration and research. Hosting international collaborators is usually done on an ad-hoc basis, with PIs scrambling to find housing, office space, orientation, (funding, visas) etc. for visitors. Could universities develop and maintain standing housing for these purposes? Do some universities offer better models? (In Germany, there is a Welcome Center system).
- In Europe, tenure and promotion reward international work. The EU has dual career considerations, extensive collaborations, and many opportunities. In the United States, as one participant emphasized, “red tape really impedes collaborations.” Tenure considerations often influence decisions about international collaborations (cf. Stohl, M., 2007).
- Persistent funding challenges mean that an umbrella system for submitting grant applications would be extremely helpful. Without this, two proposals submitted to different national boards rarely get funded at the same time.

Similarly, the inclusivity working group created a ‘wish list’ to improve international collaboration opportunities. Ideally, they should:

- Be *constraint free*: explore joint funding possibilities;
- Include increased program support, funding travel, personnel, associated research and stipends
- Fund supplies for offices and laboratory expenses;
- Initiate reactivation transitions earlier: support return back and job search; overall, provide support resources for post doc to return for careers, conferences, travel funds (e.g., one trip a year could be funded);
- Stem from institutional transformation grants: women, and limitless funding
- Address institutional level-challenges: these challenges are particularly acute in institutions facing a budget crunch, where more support staff are needed, where submitting multiple grants is not facilitated, and where more fluid funding streams would facilitate collaborative research.
- Consider missed opportunities: issues of reciprocity relate to problems of under-funding. One person gave an example of being picked up in a limo in China and generally being treated like a ‘star’ in other countries. The reception of international visitors to the U.S. is often less resplendent.

3.4 After the International Experience

Thinking through Inclusivity: Considerations for Before, During and After International Encounters

Before:

Inclusiveness can be defined through six terms: gender, ethnicity, geography networks, backgrounds, discipline, institution, bilateral and multilateral programs, and structure (partnerships and exchanges).

How accessible are programs? Who applies? What is the number of students? Are programs individual-based, or group-based? What are the potential missed opportunities? Are the programs transparent? How can IGERT programs become more inclusive?

During:

How structured is the program? Are there mentorship programs?

An effective program will offer support services for all participants; its infrastructure will encourage integration and provide a community base.

After:

Questions about inclusivity must be posed: Did it break apart biases? For whom? At what level?

3.4.1 Assessing Outcomes Following International Experiences

Participants began discussing the following questions:

- What are the impacts on participating institutions?
- What are the benefits to society?
- How is success defined? (Who is it measured against?) Long-term measurement is essential; some suggest longitudinal studies lasting up to 20 years. Some measures of success include joint publications, presentations, prizes; transfer of techniques; cultural benefits.

- How can intangible benefits, like relationships, be measured? What are the longer-term benefits? (The EU has already been measuring effective and ineffective factors, and may offer useful models.)
- What are the costs (both financial and otherwise) of international experiences?

Participants suggested several strategies for assessment. Stefan Pfotenhauer emphasized that real-time program assessment is crucial; this should not wait until the end of a collaboration (cf. Pfotenhauer 2010). This kind of assessment is commonly referred to as “formative assessment” as compared to “summative assessment”. He described collaborations as “one-of-a-kind experiments,” explaining that there are cultural differences in innovation. Taking a different approach, Scott Macklin presented data-driven storytelling as a visual assessment technique or a message platform as a powerful tool. He suggested that media users are less concerned now with objectivity, and more interested in transparency. They want relational, rigorous, relevant, results. Trust, then, becomes paramount. Finally, Darla Deardorff suggested using a multi-perspective approach to gain insight into how well individuals achieved intercultural competence outcomes.

Participants raised the following questions about assessing outcomes on an *institutional* level:

- Are there feedback loops to incorporate lessons into preparations for future collaborations?
- How do you identify what worked and what didn’t work?
- How are best practices and outcomes disseminated?
- On the other hand, why do we learn from best practice? Aren’t we learning from mistakes?
- Is the collaboration sustainable? How could it be enriched?

Participants raised different questions about assessing outcomes on an *individual* level:

- What is the value of individual interdisciplinary skills compared with interdisciplinary team skills?
- To what extent does international experience keep students in science?
- Is the international experience considered and valued during career planning and job searches?
- Is there a bias toward people who have engaged in collaborative work?
- Job opportunities, funding, and reward systems all influence potential outcomes. What forms of recognition result, if any?

These questions focused on both short-term and long-term outcomes, focusing consideration on the skills built through the international experiences and on the degree of inclusivity.

3.5 Conceptual Frameworks

The workshop resulted in the development of several conceptual frameworks and opened a discussion about possible ways to expand these or create new ones. Certainly, no single framework can be identified as the single most effective or appropriate one applicable to all situations, but in the literature we canvassed, several frameworks emerged as particularly useful starting points.

3.5.1 Interpersonal Relationships Influence Research Results

Assessing relationships resulting from international research experiences can provide a helpful tool for assessment. Shawn Wilson, author of *Research Is Ceremony: Indigenous Research Methods* (2009), emphasizes that relationships resulting from the research process, in addition to research results themselves, should be highly valued. Writing from the perspective of an indigenous researcher, he notes that many attempts at cross-border research fail or falter because insufficient attention is paid to interpersonal relationships. Examples of failed international experiences in China and New Zealand because of failed relationships and assumptions by U.S.-based collaborators provide telling examples. In one circumstance, an American university sent several cohorts of doctoral students to collaborate with community organizations in another country. However, they lacked linguistic competence necessary to pursue research independently, and overlooked the necessary aspects of nurturing a mutually beneficial long-term relationship, leading to an earlier-than-anticipated end to productive collaboration. One university administrator in South Africa described U.S. universities knocking on her door and assessed them as interested in “exotic plants, exotic minerals, and exotic people.” But, she added, “we are not exotic, and we are increasingly not interested.”⁵

It is not a revelation to the anthropologist co-authoring this report that developing, maintaining and strengthening relationships is a crucial task for someone working internationally, regardless of their other intended purposes. However, developing global and intercultural competence remains a complex task and one frequently overlooked in international scientific engagements that emphasize research results over relationships. Hall (1976) describes cultures as icebergs whose visible surfaces reveal only a small fragment of their essence. Those who cannot see the portion of the iceberg that remains submerged face many potential obstacles in their work that could influence scientific as well as interpersonal outcomes.

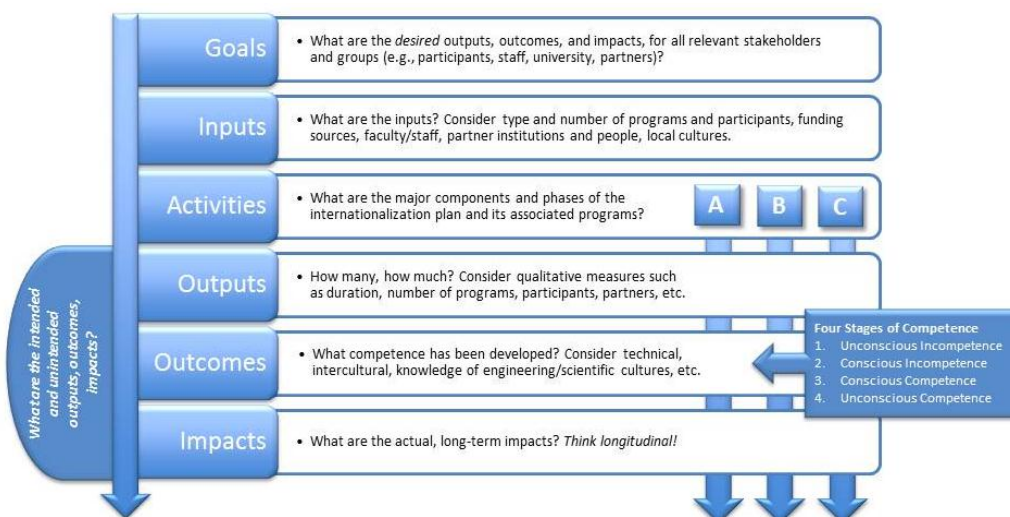
⁵ The examples described in this paragraph are based on personal communications with the authors. Individuals describing these situations requested anonymity.

3.5.2 Intercultural Competencies Are Also Outcome Results

In her presentation, “Quality Outcomes Assessment in International Exchanges,” Darla K. Deardorff, editor of the *Sage Handbook for Intercultural Competence* (2009), offered the lens of intercultural competence and lessons from fifty years of research on that topic. She pointed out that evaluation of outcomes must be based on clearly stated goals and objectives. To the disappointment of those seeking a one-size-fits-all assessment strategy for international experiences, Deardorff reminded participants that assessments should be developed in accordance with these objectives (although certain common questions or categories might be used often). As she wrote on one slide, “It’s important to measure what is valued and not value what is measured....” Deardorff emphasized that multi-method, multi-perspective assessment tools offered more nuanced portrayals of students’ success at reaching their goals and the programs’ goals. She suggested assessing relationships as measure of intercultural competence, rather than assessing individuals. Building on her message, each program and international project must begin by clearly defining—with input and participation from each set of stakeholders—its own objectives and goals. Whether these involve the development of specific scientific skills or the acquisition of a more flexible, creative approach to problem solving must be determined on a case-by-case basis. Only then can effective assessments of STEM-related skills, beyond intercultural outlooks, be carried out.

Participants suggested a set of resources for developing evaluative frameworks. These included the Intercultural Development Inventory (IDI) (<http://www.idiinventory.com/>), the Forum on Education Abroad (2009), Deardorff (2006), Hesse, J. G. & Gobel, K. (2003), Landis et al. (2004), Paige (2004), and Sadrozinski (2005). Some participants expressed frustrations with existing frameworks that emphasized intercultural competence over technical skill acquisition and science-oriented outcomes assessment. Based in part on presentations and discussions at the workshop, Brent Jesiek developed the following logic model for evaluating international experiences:

3.5.3 An Outcomes-Oriented Logic Model for International Programs and Initiatives



Aspects adapted by Brent Jesiek from Deardorff, Darla K. (2005). "A Matter of Logic?" International Educator, May-June 2005: 26-31.

Renate Sadrozinski identified several successful elements of international experiences (cf. Breslow and Flores 2010): annual workshops and conferences with a small group of people and carefully developed theme, intensive preparatory workshops (possibly including language instruction), and scholar exchange. As for research visits, their benefits depended on the stage of education of the visitor, suggested that timing must be carefully considered. Discussing a primarily bilateral exchange between Germany and U.S. urban ecologists, she found:

The answer to the question: 'Who benefits from these [3-12 week research] visits' depended on the visitors' stage in his/her education. A beginning student usually benefited more than his/her hosts who invested often considerable time to integrate the guest without gaining much. In the case of a more accomplished student, the hosts would often benefit as much if the visitor was able to transfer program specific knowledge to the host program and to participate actively in their research. In some cases these visits have resulted in joint publications.
(Sadrozinski 2005)

3.5.4 Different Doctoral Education Models: Program Model vs. Dissertation/Research-Only Model

Distinctions also emerged from differing models for training doctoral students. Many universities follow a program-based model for doctoral students, scaffolding their transition from knowledge consumers to knowledge producers with coursework and general examinations. In contrast, the British model for doctoral education prepares students to become independent scholars without the same structure, leading to strong contrasts in academic preparation for the two groups (Austin and Wulff, 2004). This can pose problems for international collaborations, with both faculty and students anticipating roles based on these programmatic differences. Partly to resolve these national educational differences, Michelle Picard and Christoff Pauw both discussed programs at their home institutions aimed at training international graduate students through flexible, pan-disciplinary modules. Picard described the University of Adelaide Bridging Program. Pauw introduced the African Doctoral Academy, part of the Partnership for Africa's Next Generation of Academics (PANGeA). These programs combine practical training on general academic issues like writing with workshops on research practices and grant writing for students. They also include training opportunities for faculty supervising students, both

international and domestic. Likewise, Brent Jesiek presented on Purdue's efforts to develop Global Engineering Training modules for U.S.-based engineering students heading to summer internships in China (<http://globalhub.org>, Jesiek & Beddoes, 2010). These modules also offered flexible, yet intensive, ways to prepare students for international experiences, although they came at the pre-departure phase rather than during the international study.

4. POSTSURVEY: CATALYZING INTERNATIONAL COLLABORATIONS

Three months after the workshop, participants received an email questionnaire asking about steps taken after the workshop in Washington, D.C. Selected responses to three questions are included below.

Did you come up with further thoughts on conceptual frameworks or methods for assessing international collaborations? Please describe.

- It became even clearer to me than before that what is out there right now are assessment tools for cross-cultural skills (e.g. IDI [Intercultural Development Inventory]; MGUDS [Miville-Guzman Universality-Diversity Scale]; *The SAGE Handbook for Intercultural Competence*, etc.) Those provide useful frameworks for international education but they need to be complimented by tools assessing the specificity of STEM learning abroad. Science and engineering learning/skills are not captured by those tools; hence the chance and responsibility of international science and engineering programs to develop them.
- Prior to the workshop, I was not familiar with the logic model of program evaluation and assessment. Darla Deardorff's discussion of this model was helpful and useful.
- Our focus has been to develop metrics for assessing the institutional impact of international activities. Very little has been done in this area, but federal agencies as well and universities are expanding international activities.
- I have realized that longitudinal and comparative work evaluating the effects of international experiences both on the host and sending institutions are required.

- One needs to develop a comprehensive, multi-level approach (“assessment package?”), as these collaboration[s] have effects on students, faculty, institutions, and possibly whole systems....Develop methods that include both quantitative and qualitative elements.
- The complexities of evaluating educational systems across countries became much more obvious through this workshop. The purposes of education in different countries varies and so using cross-country comparison data becomes problematic. My methods have therefore become more qualitative, encouraging communities at the local level, in part, because I am less sure of what summative quantitative data can really tell us.
- My primary purpose was to learn from other colleagues regarding the features of successful international collaborations. In this respect, I gained from both the assessment results that were presented and more from informal discussions.
- The most important thing is to define what really matters for each side. In developing countries we have a tradition of following agendas devised by developed countries, which is usually not helpful for our both scientific and social development. I think every player in science and in doctoral education (a player might be more than 1 country, it could be an association of countries) should be very aware of its interests and aims first of all. This could mean that international cooperation would really work for the benefit of all involved.

What would be helpful to you in order to move to the next step in your collaborations?

- At present I need to identify appropriate NSF programs and units to support some projects I am now formulating, and I especially need to find support for larger projects through multiple NSF divisions.
- Would be helpful if the NSF folks who were there would take a more active role in post-workshop discussions...
- I'm happy to work with others in terms of assessment/evaluation, given my expertise in this area... (not many have connected w/ me on this though)
- If colleagues from engineering or science fields which have international programs running for their students were considering sharing their tools, and cooperated on our new project. The next opportunity is the Colloquium on International Engineering Education at BYU in Provo, Nov. 3-5, 2011, where we have planned in an assessment workshop.

- It would be useful to bring the discussion of our graduate workshop to the attention of undergrad programs since most of what we discussed is relevant for them as well.
- We would like to seek out a small set of institutions from the ones that attended the workshop and validate the metrics developed.
- Obtaining a list of participants' current and planned work on international experiences in order to develop partnerships.
- I already plan to incorporate some of the things I learned in designing future international collaborations. Further improvements in the way international research collaboration proposals are reviewed would help.
- To work on the topic above: how to define the interests and aims of each player.
- Building up international networks on a subject, e.g. sustainability.
- [Suggestions for] re-integration programs for people from abroad.

Have you begun further collaborations? If so, what?

- Collaborating on assessment tools specifically for global engineering programs and on funding ideas for building an online archive of resources & tools for global engineering education and assessment.
- I am now in contact with X who I did not know prior to the workshop, regarding a number of possible collaborative directions, including at least one idea for an NSF grant proposal.
- I have started talking to X and Y about scientifically investigating the impact of mechanisms like Humboldt awards (for Junior and Senior researchers) on the quality and the trajectory of their academic careers.
- X has begun an exchange of letters with me; he wants us to co-operate in order to study environmental policies. Y has also sent me a letter and we should begin to discuss ideas of common interest.
- I followed up with a number of persons from the workshop and had some email exchanges.
- I will be contacting the AAAS fellow I met at the workshop.

- X and Y will support two upcoming programs at our university related to careers and to connecting doctoral students from different countries. I am working with Z on a Common Research and Education Project.

To summarize, participants became convinced of the need for longitudinal assessment ‘packages’ that combined qualitative and quantitative approaches at multiple levels. They also realized the urgency of developing specific tools for assessing not just cross-cultural or intercultural learning, but the acquisition of scientific and technical skills. Clarifying and defining goals and the respective interests of all parties to a collaboration were also identified as important. Discussions of concrete collaboration are still in the early stages, but may lead to increased joint efforts or sharing of methods and information. Not surprisingly, further funding support, as well as organizational support to help coordinate across institutions, was also sought.

One of the workshop’s goals was to come to a consensus on the most important research questions that need to be addressed at this point in time. In the course of the workshop discussions, a few participants eluded to evaluation frameworks. Two of the respondents indicated that they had emerged from the workshop with new evaluative frameworks. Developing frameworks should be the topic of future research and discussions.

5. TANGIBLE OUTCOMES

5.1 Report

This report, which details potential strategies toward developing empirical research assessing international collaborations in STEM fields, will be broadly disseminated in the hopes of moving the conversation beyond the workshop participants and obtaining wider feedback.

5.2 Communicating Existing Research and Efforts: the CIRGE Website

A dedicated area of the CIRGE website, will house the workshop report, summaries of igniting talks, and a selected bibliography. Links will also be included to other CIRGE research on career outcomes of doctoral students and strategies for assessing international and interdisciplinary higher education.

5.3 Selected bibliography

See appendix for a bibliography.

5.4 Journal Publication

The authors have published a first article based on this report in a special issue of the *Australian Universities' Review*, volume 54, number 1: "Assessing International (Post)graduate Education: A Research Agenda."

6. OUTLOOK

6.1 NSF Research Funding

Additional study is necessary, and additional forums for information and resource sharing will be important as international education for doctoral students becomes more commonplace. Building in studies of ethnicity, gender and socioeconomic diversity will be vital for building up longer-term knowledge. And obtaining high-level support from universities and funding agencies will smooth the way. As The Royal Society report (2011) indicates, international collaboration can be a highly effective way to leverage scientific partnerships without the costs of duplication.

Staff from the National Science Foundation attended much of the workshop and expressed appreciation for the dynamic workshop format and the ideas shared. Joan Ferrini-Mundy, NSF Assistant Director for Education and Human Resources, suggested that finding ways to measure the impact of NSF investments in international collaborations would be crucial to maintaining support from the U.S. Congress. NSF staff presented several funding opportunities and strategies aimed at expanding the role of international research collaborators and other funding opportunities designed for studying the international education experiences themselves. For example, case-by-case match-ups of NSF and partner agencies in other countries were one potential solution to the challenges of obtaining funding for international work. In a promising step, in 2010 the G8 countries issued a joint call for proposals designed to ease the way for international collaborative work (The G8 Research Councils Initiative on Multilateral Research Funding, http://www.dfg.de/en/research_funding/international_cooperation/research_collaboration/index.html).

While investigating international scientific exchange and education has been identified as a key strategic priority, new and dedicated funding sources may not be immediately available in the United States. Leveraging existing funding and optimizing supplements will be an important way to begin carrying out this work. For example, Jennifer Pearl and John Tsapogas, program staff in the NSF Office of International Science and Engineering (OISE), and Janice Earle, Directorate of Education and Human Resources for Research and Evaluation on Engineering and Science Education (REESE) at NSF, described potential funding opportunities within the existing NSF framework. In particular, they encouraged

proposals for the Promoting Research and Innovation in Methodologies for Evaluation (PRIME) program. The program announcement carries the following information:

The overarching goal of the PRIME program is to support the development, demonstration, and validation of innovative new methodologies and approaches in STEM evaluation. To address this goal, the program is interested in proposals that:

1. Explore innovative new approaches for determining the impact and usefulness of evaluations of STEM education projects or programs, with appropriate rigor.
2. Expand the theoretical foundations for evaluating STEM education and human resource initiatives, including translating approaches from other fields.
3. Increase the capacity of and infrastructure for researchers and evaluators by increasing the number of individuals who can produce conceptually sound and methodologically appropriate evaluations of STEM education and workforce projects, portfolios, and programs.

(Source: <http://www.nsf.gov/pubs/2010/nsf10615/nsf10615.htm>, accessed May 15, 2011)

The authors hope as well that the information sharing begun by the CIRGE / NSF workshop will continue and lead to stronger future collaborations drawing on evidence-based approaches and other creative research strategies. Although no one assessment tool can apply to every international experience, developing a common bank of assessment questions seems like a good starting point toward creating generalizable, scalable, conclusions about preparing and reintegrating students and postdocs undertaking international experiences.

6.2 Future Workshops

The February 2011 invitation-only workshop provided an important opportunity to begin developing a research agenda for assessing international experiences within STEM fields. Future workshops building on these agendas should be developed as follow-ups. In particular, promising practices for integrating intercultural knowledge into international collaborations attracted significant interest from workshop participants. This could be a useful topic to pursue in the future in a workshop or conference for a broader audience.

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- Ackers, L., Gill, B. & Guth, J. (2008). *Doctoral mobility in the social sciences: Report to the NORFACE ERA-NET*. European Law and Policy Research Group: University of Liverpool, UK. Retrieved from http://www.norface.org/files/Doctoral_Mobility.pdf.
- Adams, J., Gurney, K., & Marshall, S. (2007, June). *Patterns of international collaboration for the UK and leading partners: Summary report*. (Report commissioned by the UK Office of Science and Innovation). Leeds, UK: Evidence Ltd. Retrieved from <http://image.guardian.co.uk/sys-files/Education/documents/2007/07/13/OSICollaborationSummaryRepo.pdf>.
- Adams, J., King, C. & Hook, D. (2010). *Global research report Africa*. Leeds, UK. Retrieved from <http://thomsonreuters.com/content/corporate/docs/globalresearchreport-africa.pdf>.
- Akande, Y. & Slawson, C. (2000). *Exploring the long-term impact of study abroad: A case study of 50 years of study abroad alumni*. Paper presented at the NAFSA 52nd Annual Conference and Expo, San Diego, CA.
- Alabama University College of Education. (1969). *Improved teacher training through dimensions of international education*. U. S. Department of Health, Education and Welfare. Retrieved from <http://www.eric.ed.gov/PDFS/ED038336.pdf>.
- Alberti, M., Marzluff, J. M., Shulenberger, E., Bradley, G., Ryan, C., & Zumbrunnen, C. (2003). Integrating humans into ecology: Opportunities and challenges for studying urban ecosystems. *BioScience*, 53(12), 1169-1179. doi:10.1641/0006-3568(2003)053[1169:IHIEOA]2.0.CO;2
- Allport, G. W. (1954). *The nature of prejudice*. Cambridge, MA: Addison-Wesley.
- Altshuler, L., Sussman, N.M., & Kachur, E. (2003). Assessing changes in intercultural sensitivity among physician trainees using the Intercultural Development Inventory. in R. M. Paige (Ed.), *Intercultural Development [Special issue]*. *International Journal of Intercultural Relations*, 27(4), 387-401. doi:10.1016/S0147-1767(03)00029-4
- Altbach, P. G. (2010, November 11). *The State of the Rankings*. Retrieved from <http://www.insidehighereducation.com/views/2010/11/11/altbach>.
- American Council on Education. (2008). *Assessing international learning outcomes*. Retrieved from <http://www.acenet.edu/Content/NavigationMenu/ProgramsServices/cii/res/assess/>.
- Amir, Y. (1976). The role of intergroup contact in change of prejudice and ethnic relations. In P. A. Katz (Ed.), *Towards the elimination of racism* (pp. 73-123). New York: Plenum Press.
- Anderson, L. C. (2009). *Science, technology, engineering, and math (STEM) students and education abroad*. San Diego: University of California Press.
- Ashmore, W., & Knapp, A. B. (1999). Archaeological landscapes: constructed, conceptualized, ideational. In W. Ashmore and A. B. Knapp (Eds.), *Archaeologies of landscape: contemporary perspectives* (pp. 1-32). Malden, MA: Blackwell.
- Ashwill, M. A. (2004). Developing intercultural competence for the masses. *International Education*, 13(2), 16-25.
- Austin, A., & Wulff, D. (Eds.). (2004). *Paths to the Professoriate: strategies for enriching the preparation of future faculty*. San Francisco, CA: Jossey-Bass.
- Avveduto, S. (2002). *International mobility of PhDs*. Rome, Italy: National Research Council, Institute for Studies on Scientific Research and Documentation. Retrieved from <http://www.oecd.org/dataoecd/33/49/2096794.pdf>.

- Banks, J. (Ed.). (2004). *Diversity and citizenship education: Global perspectives*. San Francisco, CA: Jossey-Bass.
- Beamish, P. W. (2006). Publishing international (joint venture) research for impact. *Asia Pacific Journal of Management*, 23(1), 29-46.
- Beddoes, K., Jesiek, B. K., & Borrego, M. (2010). Identifying opportunities for collaborations in international engineering education research on problem- and project-based learning. *Interdisciplinary Journal of Problem-based Learning*, 4(2), 7-34.
- Bennett, J. M. (2009). Cultivating intercultural competence: A process perspective. in D. K. Deardorff (Ed.), *The SAGE book of intercultural competence* (pp. 121-140). Thousand Oaks, CA: SAGE Publications, Inc.
- Bennett, J. M. (2004). Turning frogs into interculturalists: A student-centered developmental approach to teaching intercultural competence. In R. A. Goodman, M.E. Phillips, and N. Boyacigiller (Eds.), *Crossing cultures: Insights from master teachers* (pp. 312-342). London: Routledge.
- Bennett, J. M. (1993). Cultural marginality: Identity issues in intercultural training. In R. M. Paige (Ed.), *Education for the intercultural experience* (pp. 109-135). Yarmouth, ME: Intercultural Press.
- Bennett, M. J. (2004). Becoming interculturally competent. In J. Wurzel (Ed.), *Toward multiculturalism: A reader in multicultural education* (2nd ed.) (pp. 62-77). Newton, MA: Intercultural Resource Corporation.
- Bennett, M. J. (2002). In the wake of September 11. In W. R. Leenen (Ed.), *Enhancing intercultural competence in police organizations* (pp.23-41). Münster, Germany: Waxmann.
- Bennett, M. J. (2001). Developing intercultural competence for global leadership. In R. D. Reineke & C. Fussinger (Eds.), *Interkulturelles Management: Konzeption-Beratung-Training* (pp. 207-226). Wiesbaden, Germany: Gabler.
- Bennett, M. J. (2000). High profile: Dr. Bennett revitalizes the model for intercultural sensitivity. *Cultural Diversity at Work*, 12(3).
- Bennett, M. J. (1994). A developmental model of intercultural sensitivity. *Perry Network Newsletter*, 16(1), 6-7.
- Bennett, M. J. (1993). Towards ethnorelativism: A developmental model of intercultural sensitivity. In R. M. Paige (Ed.), *Education for the intercultural experience* (pp. 21-71). Yarmouth, ME: Intercultural Press.
- Bennett, M. J. (1992). *Les stades de développement de la sensibilité interculturelle*. Paper presented at the Seminaire Point Ameriques. (Available through the Intercultural Communication Institute).
- Bennett, M. J. (1991a). Developing intercultural sensitivity. *Training and Culture Newsletter* 3(5), 4.
- Bennett, M. J. (1991b). New insights for "intercultural sensitivity" model. *Training and Culture Newsletter*, 3(5), 5.
- Bennett, M. J. (1986). A developmental approach to training for intercultural sensitivity. *International Journal of Intercultural Relations*, 10(2), 179-196. doi:10.1016/0147-1767(86)90005-2.
- Bennett, J. M., & Bennett, M. J. (2004a). *Developing intercultural competence: A reader*. Portland, OR: Intercultural Communication Institute.
- Bennett, J. M., & Bennett, M. J. (2004b). Developing intercultural sensitivity: An integrative approach to global and domestic diversity. In D. Landis, J. M. Bennett and M. J. Bennett (Eds.), *Handbook of intercultural training* (3rd ed.) (pp. 147-165). Thousand Oaks, CA: Sage.

- Bennett, J. M., Bennett, M. J., & Allen, W. (2003). Developing intercultural competence in the language classroom. In D. L. Lange and R. M. Paige (Eds.), *Culture as the core; Perspectives on culture in second language learning*. Greenwich, CT: Information Age Publishing.
- Bennett, M. J. & Deane, B. R. (1994). A model for personal change: Developing intercultural sensitivity. In E.Y. Cross, J. H. Katz, F. A. Miller, and E. W. Seashore (Eds.), *The promise of diversity: Over 40 voices discuss strategies for eliminating discrimination in organizations* (pp. 286-293). Burr Ridge, IL: Irwin.
- Berka, S. (2009). Institutional strategies: Seven cases. In J. M. Grandin and E. D. Hirleman (Eds.), *Educating engineers as global citizens: A call for action*. (A report of the national summit meeting on the globalization of engineering education). Retrieved from <http://www.uri.edu/iiep/documents/GlobalEdBook11.pdf>.
- Berka, S. (2011). The University of Rhode Island graduate dual degree program with the Technical University of Braunschweig – Its added value, synergies, and gains for engineering students. *Online Journal for Global Engineering Education*, 6(1), Article 5. Retrieved from <http://digitalcommons.uri.edu/ojgee/vol6/iss1/5>.
- Berkes, F. (1999). *Sacred ecology: traditional ecological knowledge and resource management*. Philadelphia, PA: Taylor & Francis.
- Berry, J. W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review*, 46, 5-34. doi:10.1111/j.1464-0597.1997.tb01087.x.
- Binka, F. (2005, March). Editorial: North-south research collaborations: A move towards a true partnership?. *Tropical Medicine & International Health*, 10(3), 207-209. doi:10.1111/j.1365-3156.2004.01373.x.
- Blumenfield, T. & Nerad, M. (2012). Assessing international (post)graduate education: A research agenda. *Australian Universities' Review*, 54(1), 72-82.
- Böhmer, S., Hornbostel, S., & Meuser, M. (2008). *Postdocs in Deutschland: Evaluation des emmy noether-programms* (iFQ Working Paper No. 3). Bonn, Germany: Institut für Forschungsinformation und Qualitätssicherung. Retrieved from http://www.forschungsinfo.de/Publikationen/Download/working_paper_3_2008.pdf.
- Boshoff, N. (2009, April). Neo-colonialism and research collaboration in Central Africa. *Scientometrics*, 81(2), 413-434. doi:10.1007/s11192-008-2211-8.
- Bournois, F., & Chevalier, F. (1998). Doing research with foreign colleagues: A project-life cycle approach. *Journal of Managerial Psychology*, 13(3-4), 206-213. doi:10.1108/02683949810215011.
- Breslow, S., & Blumenfield, T. (2011, February 8). *Studying pandas: Challenges to interdisciplinary international research during doctoral education*. Skit presented to the National Science Foundation and Center for Innovation and Research in Graduate Education workshop "Investigating the International Experiences in STEM Graduate Education and Beyond: A Workshop to Develop a Research Agenda," Washington, D. C.
- Breslow, S., & Flores, E. (2010). *Preparing doctoral students for interdisciplinary and international environmental research: Lessons from teaching an IGERT core course*. Paper presented at Enhancing Communication in Cross-Disciplinary Research Conference, Coeur d'Alene, ID.
- Brinkmann, U., & van der Zee, K. (1999). Benchmarking intercultural training: Is experience its biggest competitor? *Language and Intercultural Training*, 17, 9-11.
- Britz, J., Lor, P., Coetzee, I., & Bester, B. (2006, March). Africa as a knowledge society: A reality check. *The International Information & Library Review*, 38(2), 25-40. doi:10.1016/j.iilr.2005.12.001.

- Brooks, R., & Waters, J. (2010). Social networks and educational mobility: the experiences of UK students. *Globalization, Societies and Education*, 8(1), 143–157. doi:10.1080/14767720903574132.
- Brown, L. (2009). International education: a force for peace and cross-cultural understanding? *Journal of Peace Education*, 6(2): 209-224. doi:10.1080/17400200903086672.
- Burke, M. (2001). *Befriending difference: Intercultural sensitivity training for ministers* (Doctoral dissertation). Catholic Theological Union, Chicago, IL.
- Cadman, K. (2000). 'Voices in the air': Evaluations of the learning experiences of international postgraduates and their supervisors. *Teaching in Higher Education*, 5(4), 475-491. doi:10.1080/13562510050196042.
- Campbell, R. A. (2003). Preparing the next generation of scientists. *Social Studies of Science*, 33(6), 897-927. doi: 10.1177/0306312703336004.
- Carlin, D. B. (2007, November). Campus internationalization and the expanding role of the graduate dean. *CGS Communicator*, 40(9). Retrieved from http://www.cgsnet.org/portals/0/pdf/comm_2007_11.pdf
- Cantwell, B. (2009). *International postdocs: Educational migration and academic production in a global market* (Doctoral dissertation). Center for the Study of Higher Education: University of Arizona, USA.
- Capps, K. A., Davidson, M. A., Kapentanakos, Y. A., Moslemi, J. M., & Wagner, C. E. (2008). Crossing borders: Promoting graduate research in the developing world. *Fresh Perspectives*. Ithaca, NY: Department of Ecology and Evolutionary Biology, Cornell University. doi:10.1890/1540-9295-7.6.333.
- Cargill, M., & Cadman, K. (2005). Revisiting quality for international research education: Towards an engagement model. in *Proceedings of the 2005 Australian universities quality forum: Engaging communities* (pp. 45-49). Melbourne: Australian Universities Quality Agency.
- Chang, Y., Atkinson, D., & Hirleman, E. D. (2009). International research and engineering education: Impacts and best practices, *Online Journal for Global Engineering Education*, 4(2), Article 1. Retrieved from <http://digitalcommons.uri.edu/ojgee/vol4/iss2/1>.
- Chapel, W. B. (1998). Advising graduate students for successful international internships. *Business Communication Quarterly*, 61(4), 92-102. doi:10.1177/108056999806100411.
- Christensen, L. L. (2002). *Writing in the contact zone: Three portraits of reflexivity and transformation* (Master's thesis). Portland State University, Portland, OR.
- Cole, M. (1990). Cultural psychology: A once and future discipline? In J. J. Berman (Ed.), *Cross-Cultural Perspectives, Nebraska Symposium on Motivation 1989*. Lincoln, NE: University of Nebraska Press.
- Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B.,...Van Den Belt, M. (1997). The value of the world's ecosystem services and natural capital. *Nature*, 387(6630), 253. doi:10.1038/387253a0.
- Costick, D. E. (2002). *Intercultural communication and consciousness studies: Theory into practice—Bridging the empirical-phenomenal divide* (Master's thesis). Intercultural Communication Institute (ICI)/McGregor School of Antioch University, Portland, OR.
- Cronin, B. (2008, April). On the epistemic significance of place. *Journal of the American Society for Information Science and Technology*, 59(6), 1002-1006. doi:10.1002/asi.20774.
- Cronon, W. (1996). The trouble with wilderness; or, Getting back to the wrong nature. in W. Cronon (Ed.), *Uncommon ground: Rethinking the human place in nature*. New York: W.W. Norton & Co.

- Davidson, D. E. (2010). Study abroad: When, how long, and with what results? New data from the Russian front. *Foreign Language Annals*, 43(1), 6-26. doi:10.1111/j.1944-9720.2010.01057.x.
- Deardorff, D. K. (2005). A matter of logic? *International Educator*, May-June, 26-31.
- Deardorff, D. K. (2006). The identification and assessment of intercultural competence as a student outcome of internationalization at institutions of higher education in the United States. *Journal of Studies in International Education*, 10, 241-266. doi: 10.1177/1028315306287002.
- Deardorff, D. K. (2007, Spring). Principles of international education assessment. *IIE Networker*, 51-52.
- Deardorff, D. K. (2009). *The Sage Handbook of Intercultural Competence*. Thousand Oaks, CA: Sage Publication.
- De Wit, H. (2002). *Internationalization of higher education in the United States of America and Europe: A historical, comparative, and conceptual analysis*. Westport, CT: Greenwood Publishing.
- De Wit, H. (2011). *Trends, issues and challenges in internationalization of higher education*. Amsterdam: Centre for Applied Research on Economics and Management, Hogeschool van Amsterdam.
- DeDee, L. S., & Stewart, S. (2003). The effect of student participation in international study. *Journal of Professional Nursing*, 19(4), 237-242. doi:10.1016/S8755-7223(03)00086-3.
- Deem, R. (2001). Globalisation, new managerialism, academic capitalism and entrepreneurialism in universities: Is the local dimension still important? *Comparative Education*, 37(1), 7-20. doi:10.1080/03050060020020408.
- Deem, R., Mok, K. H., & Lucas, L. (2008). Transforming higher education in whose image? Exploring the concept of the 'world-class' university in Europe and Asia. *Higher Education Policy* 21(1), 83-97. doi:10.1057/palgrave.hep.8300179.
- della Chiesa, B. (2010). Wanted: Tesseract. One hypothesis on languages, cultures, and ethics for mind, brain, and education. *Mind, Brain, and Education*, 4(3), 135-148. doi: 10.1111/j.1751-228X.2010.01092.x.
- Denecke, D., & Kent, J. (2010). *Joint degrees, dual degrees, and international research collaborations: A report on the CGS Graduate International Collaborations Project*. Washington, DC: Council of Graduate Schools.
- Deutch, J., Moniz, E. J., Ansolabehere, S., Driscoll, M., Gray, P. E., Holdren, P. L.,...Todreas, N. E. (2003). *The future of nuclear power: an interdisciplinary MIT study*. Cambridge, MA: Massachusetts Institute of Technology. Retrieved from <http://web.mit.edu/nuclearpower/>.
- Development Economics Senior Vice Presidency, (2010). *Research for development: A World Bank perspective on future directions for research*. Policy Research Working Paper Series 5437. Washington, D. C.: The World Bank. Retrieved from http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2010/09/29/000158349_20100929111750/Rendered/PDF/WPS5437.pdf.
- DeWind, J. (2011). *Funding agency support for the social sciences in countries with developing and transition economies*. Social Science Research Council: Brooklyn, NY.
- DiBiasio, D., & Mello, N. A. (2004). Multilevel assessment of program outcomes: Assessing a nontraditional study abroad program in the engineering disciplines. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 10, 237-252. Retrieved from <http://www.frontiersjournal.com/issues/vol10/vol10-14-DiBiasioMello.pdf>.
- Dolby, N. (2004) Encountering an American self: Study abroad and national identity. *Comparative Education Review*, 48(2), 150-173. doi:10.1086/382620.

- Dolby, N. (2005). Globalisation, identity, and nation: Australian and American undergraduates abroad. *Australian Educational Researcher*, 32(1), 101-118.
- Donahue, W. C. (2007). Reciprocal relationships and lifelong learning: Twenty years of Duke in Berlin. *Unterrichtspraxis/Teaching Germany*, 40(2), 133-142.
- Douglass, J. A., & Edelstein, R. (2009). *The global competition for talent: The rapidly changing market for international students and the need for a strategic approach in the US*. (Research and Occasional Paper Series: CSHE, 8.09). University of Berkeley, CA: Center for Studies in Higher Education.
- Downey, G., & Lucena, J. (2008). *Engineering cultures online 2.0*. Retrieved from <http://globalhub.org/resources/11>.
- Downey, G., Lucena, J. C., Moskal, B. M., Parkhurst, R., Bigley, T., Hays, C.,...Nichols-Belo, A. (2006). The globally competent engineer: Working effectively with people who define problems differently. *Journal of Engineering Education*, 95(2), 107-122.
- Duque, R. B. (2005). Collaboration paradox: Scientific productivity, the Internet, and problems of research in developing areas. *Social Studies of Science* 35(5), 755-785. doi:10.1177/0306312705053048.
- Dwyer, M., & Peters, C. (2004, March/April). The benefits of study abroad. *Transitions Abroad*. Retrieved from http://www.transitionsabroad.com/publications/magazine/0403/benefits_study_abroad.shtml.
- Eastman, W. A. (2006). A Fulbright scholar experience in FCS. *Journal of Family and Consumer Sciences*, 98(4), 47-48.
- Eggs, H. (2003). *Globalization and reform in higher education*. Berkshire, UK: Open University Press.
- Eigenbrode, S. D., O'Rourke, M., Wulfhorst, J. D., Althoff, D. M., Goldberg, C. S., Merrill, K.,...Bosque-Perez, N. A. (2007). Employing philosophical dialogue in collaborative science. *BioScience*, 57(1), 55-64. Doi: 10.1641/B570109.
- Enders, J., & Mugabushaka, A. M. (2004). *Wissenschaft und Karriere: Erfahrungen und werdegänge ehemaliger stipendiaten der DFG. Science and Careers: Experiences and Career Pathways of Former DFG Fellowship Holders*. Bonn, Germany: Deutsche Forschungsgemeinschaft.
- Endicott, L., Bock, T., & Narvaez, D. (2003). Moral reasoning, intercultural development and multicultural experiences: Relations and cognitive underpinnings. in R. M. Paige (Ed.), *Intercultural Development [Special issue]*. *International Journal of Intercultural Relations*, 27(4), 403-419. doi:10.1016/S0147-1767(03)00030-0.
- Engstrom, D., & Jones, L. (2007). A broadened horizon: The value of international social work internships. *Social Work Education*, 26(2), 136-150. doi: 10.1080/02615470601042631.
- Faghri, M. (2009). *PIRE: Microfluidic technology and applications: A collaboration with the Technical University of Braunschweig, Germany*. Annual Report about year 2008-2009 of NSF PIRE funding, Award ID: 0530203.
- Fahim, U. (2002). *Becoming a culturally sensitive person: An exploration into the development of cultural sensitivity* (Doctoral dissertation). California Institute of Integral Studies, San Francisco, CA.
- Fall, H., Thompson, J., & Walker, G. (2004). Belonging, identity and third culture kids: Life histories of former international school students. *Journal of Research in International Education*, 3, 319. doi:10.1177/1475240904047358.
- Fallis, D. (2006). The epistemic costs and benefits of collaboration. *The Southern Journal of Philosophy*, 44(S1), 197-208. doi:10.1111/j.2041-6962.2006.tb00039.x.

- Ferguson, J., Huysman, M. & Soekijad, M. (2010). Knowledge management in practice: Pitfalls and potentials for development. *World Development*, 38(12), 1797-1810. doi:10.1016/j.worlddev.2010.05.004.
- Finley, J. B., Taylor, S. L., & Warren, D. L. (2007). Investigating graduate business students' perceptions of the educational value provided by an international travel course experience. *Journal of Teaching in International Business*, 19(1), 57-82. doi:10.1300/J066v19n01_04.
- Finkelstein, M., Walker, E., & Chen, R. (2009, September). *The internationalization of the American faculty: Where are we? What drives or deters us?* Unpublished manuscript, Seton Hall University. South Orange, NJ.
- Fischer, K. (2008, March 21). American colleges see potential in Korean partnerships. *Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/American-Colleges-See/20377>.
- Flory, M. (1998). International team effectiveness. *Journal of Managerial Psychology*, 13(3-4), 225-229. Doi: 10.1108/02683949810215039.
- Fortmann, L. (2008). *Participatory research in conservation and rural livelihoods: Doing science together*. Chichester UK; Hoboken NJ: Wiley-Blackwell.
- Forum on Education Abroad. (2009). *A guide to outcomes assessment in education abroad*. Boston University International Programs: Institute for the International Education of Students (IES), Boston, MA; The Scholar Ship: University of California Education Abroad Program (UC-EAP), Goleta, CA.
- Fox, M F., & Stephan, P. E. (2001). Careers of young scientists: Preferences, prospects and realities by gender and field. *Social Studies of Science*, 31(1), 109-122. doi:10.1177/030631201031001006.
- Fry, G. W. (1984). The economic and political impact of study abroad. *Comparative Education Review*, 28(2), 203-220. <http://www.jstor.org/stable/1187348>.
- Fuller, T. L. (2007). Study abroad experiences and intercultural sensitivity among graduate theological students: A preliminary and exploratory investigation. *Christian Higher Education*, 6(4), 321-332. doi:10.1080/15363750701268319.
- Gaillard, J. F. (1994). North-south research partnership: Is collaboration possible between unequal partners?. *Knowledge and Policy*, 7(2), 31-63. doi:10.1007/BF02692761.
- Gaskins, F. E. (1997). *The development of intercultural sensitivity in students: A journal study* (Master's thesis). Intercultural Communication Institute (ICI)/McGregor School of Antioch University, Portland, OR.
- Ghosh, S., & Wang, L. (2003). Transnationalism and identity: a tale of two faces and multiple lives. *Canadian Geographer*, 47(3), 269-282. doi:10.1111/1541-0064.00022.
- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies*. Thousand Oaks, CA: Sage Publications.
- Gilin, B., & Young, T. (2009). Educational benefits of international experiential learning in an MSW program. *International Social Work*, 52(1): 36-47.
- Global Hub, Advanced Global Engineering. (2008). Purdue University: West Lafayette, IN. <http://globalhub.org/>
- Göbel, K., Hesse, H. G., & Jude, N. (2003, July). *The perception and interpretation of cultural difference: On the assessment of intercultural sensitivity in the EFL classroom*. Paper presented at the sixth European Regional Congress of the International Association for cross-Cultural Psychology, Budapest, Hungary.

- Grandin, J. M., & Hedderich, N. (2009). Intercultural competence in engineering: Global competence for engineers. in D. K. Deardorff (Ed.), *The SAGE Book of Intercultural Competence* (pp. 362-373). Thousand Oaks, CA: SAGE Publications, Inc.
- Grandin, J. M., & Hirleman, D. (Eds.). (2008, November 5-6). *Educating engineers as global citizens: A call for action*. (A report of the national summit meeting on the globalization of engineering education). Newport, Rhode Island. Retrieved from <http://www.uri.edu/iep/documents/GlobalEdBook11.pdf>.
- Graybill, J., & Shandas, V. (2011, February). *Navigating cross-cultural experiences in international fieldwork*. Skit presented to the National Science Foundation and Center for Innovation and Research in Graduate Education workshop, "Investigating the International Experiences in STEM Graduate Education and Beyond: A Workshop to Develop a Research Agenda," Washington, D. C.
- Great Lakes College Association, Associated Colleges of the Midwest, & Associated Colleges of the South. (2008). *Liberal education and study abroad: Assessing learning outcomes to improve program quality*. Ann Arbor, MI: Author. Retrieved from: http://www.teaglefoundation.org/learning/pdf/2008_liberal%20education%20and%20study%20abroad.pdf.
- Greenholz, J. (2000). Assessing cross-cultural competence in transnational education: The Intercultural Development Inventory. *Higher Education in Europe*, 25(3), 411-416. doi:10.1080/713669273.
- Grove, R. (1995). *Green imperialism: colonial expansion, tropical island Edens, and the origins of environmentalism, 1600-1860*. New York: Cambridge University Press.
- Guerin, C., & Green, I. (2009). The transcultural academic: Cosmopolitanism and the imagined community of the global academy. *Journal of the World Universities Forum*, 2(3): 17-24.
- Gullahorn, J. E., & Gullahorn, J. T. (1966). American students abroad: Professional versus personal development. *The ANNALS of the American Academy of Political and Social Science*, 368(1), 43-59. doi:10.1177/000271626636800106.
- Hackett, E. J. (2005). Introduction to the special guest-edited issue on scientific collaboration. *Social Studies of Science*, 35(5), 667-671. doi:10.1177/0306312705057569.
- Hackett, E. J., Amsterdamska, O., Lynch, M., & Wajcman, J. (2007). *The Handbook of science and technology studies* (3rd Edition). Cambridge, MA: MIT Press.
- Hall, E. T. (1976). *Beyond Culture*. Garden City, NY: Anchor Press.
- Hall, E. T., & Hall, M. R. (1997). *Understanding Cultural Differences*. Yarmouth, ME: Intercultural Press.
- Hammer, M. R. (1999a). Cross-cultural training: The research connection. In S.M. Fowler and M. G. Mumford (Eds.), *The intercultural sourcebook* (Vol. 2) (pp. 1-18). Yarmouth, ME: Intercultural Press.
- Hammer, M. R. (1999b). A measure of intercultural sensitivity: The Intercultural Development Inventory. In S.M. Fowler and M. G. Mumford (Eds.), *The intercultural sourcebook* (Vol. 2) (pp. 61-72). Yarmouth, ME: Intercultural Press.
- Hammer, M. R., Bennett, M. J., & Wiseman, R. (2003). Measuring intercultural sensitivity: The Intercultural Development Inventory. in R. M. Paige (Ed.), Intercultural Development [Special issue]. *International Journal of Intercultural Relations*, 27(4), 421-443. doi:10.1016/S0147-1767(03)00032-4.
- Hampden-Turner, C. (1995). *Stages in the development of intercultural sensitivity and the theory of dilemma reconciliation: Milton J. Bennett and Charles Hampden-Turner's approaches contrasted*

- and combined. Cambridge, UK: The Judge Institute of Management Studies, Cambridge University.
- Hassan, M. H. A. (2008). Collaboration begins at home. *TWAS Newsletter*, 20(2), 7-9. Retrieved from http://twas.ictp.it/publications/nl/2008-volume-20/twas-newsletter-vol-20-no-2/02-Collaboration_07-09.pdf.
- Hecht, S. (1985). Environment, development and politics: Capital accumulation and the livestock sector in Eastern Amazonia. *World Development*, 13(6), 663-684.
- Heg, D., & Nerad, M., with assistance from T. Blumenfield (2004). *Innovation in PhD training: An IGERT at the University of Washington mid-term program evaluation*. Center for Innovation and Research in Graduate Education, University of Washington, Seattle, WA. Retrieved from <http://depts.washington.edu/cirgeweb/c/wp-content/uploads/2008/07/innovation-in-phd-training.pdf>.
- Helmreich, R. L. (1998). *Building safety on the three cultures of aviation*. University of Texas Aerospace Crew Research Project. Retrieved from <http://homepage.psy.utexas.edu/homepage/group/HelmreichLAB/Publications/pubfiles/Pub236.pdf>.
- Hesse, J. G., & Göbel, K. (2003, March). *Evaluation and quantitative methods in global learning: A contribution from the field of intercultural sensitivity*. Paper presented at the Global Education Network Europe (GENE) expert meeting, London, UK.
- Hilborn, R., & Mangel, M. (1997). *The ecological detective: Confronting models with data*. Princeton, NJ: Princeton University Press.
- Hicks, D., Breitzman, T., Olivastro, D., & Hamilton, K. (2001). The changing composition of innovative activity in the US: A portrait based on patent analysis. *Research Policy*, 30(4), 681-703. doi:10.1016/S0048-7333(00)00147-5.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Thousand Oaks, CA: Sage Publications.
- Hogan, A., Zippel, K., Frehill, L., & Kramer, L. (2010). *Report of the International Workshop on International Research Collaboration*. (Report prepared with funding from the National Science Foundation OISE-0936970 and HRD-0811170). Retrieved from http://www.dac.neu.edu/zippel/nsf-workshop/docs/FinalReport_Oct22_2010.pdf.
- Holm, J. D., & Malete, L. (2010a). *The asymmetries of university partnerships between Africa and the developed world: Our experience in Botswana*. Paper presented to The British Council's International Education Conference "Going Global", London, England. Retrieved from <http://www.thet.org/wp-content/uploads/2010/04/Asymmetries-of-University-Links.pdf>.
- Holm, J.D. & L. Malete. (2010b, June 13). Nine problems that hinder partnerships in Africa. *The Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/Nine-Problems-That-Hinder/65892/>.
- House of Representatives Standing Committee on Industry, Science and Innovation (2010). *Australia's International Research Collaboration*. Parliament of the Commonwealth of Australia, Canberra.
- ICSU & UNESCO. (2001, February 20-23). Electronic Publishing in Science. *Second International Council for Science (ICSU)-UNESCO International Conference*. UNESCO Headquarters, Paris, France.
- Intercultural Development Inventory (IDI) website. (n.d.). <http://www.idiinventory.com/>
- Jesiek, B. K., & Beddoes, K. (2010). From diplomacy and development to competitiveness and globalization: Historical perspectives on the internationalization of engineering education. in G. L.

- Downey and K. Beddoes (Eds.), *What is global engineering education for?: The making of international educators* (pp. 45-76). San Rafael, CA: Morgan and Claypool.
- Jolly, Y. S., & Jolly, J. A. (2001, February). *Supplemental thoughts to Bennett's model: Characterization of a sojourner's initial experience* (Rep. No. 4). Japan: Aichi Shukutoku University, Intercultural Communication Institute.
- Jons, H. (2007). Transnational mobility and the spaces of knowledge production: a comparison of global patterns, motivations and collaborations in different academic fields. *Social Geography*, 2, 97-114. doi:10.5194/sg-2-97-2007.
- Karseras, A. (2004, Spring). The first IDI qualifying seminar in Asia. *SIETAR Japan Newsletter*, 10-28.
- Katz, J. S., & Martin, B. R. (1997). What is research collaboration?. *Research Policy*, 26(1), 1-18. doi:10.1016/S0048-7333(96)00917-1.
- Kehm, B. M. (2008). Germany. In M. Nerad & M. Heggelund, (Eds.), *Toward a global PhD? Forces & forms in doctoral education worldwide* (pp. 19-35). Seattle, WA: University of Washington Press.
- Kelly, B. (1994). Foundations of a new developmental model for intercultural sensitivity training. *Sanno Tanki Daigaky Kiyo*, 27, 1-13.
- Kenway, J., & Bullen, E. (2003). Self-representations of international women postgraduate students in the global university 'contact zone'. *Gender and Education*, 15(1), 5-20. doi:10.1080/0954025032000042112.
- Klak, T., & Martin, P. (2003). Do university-sponsored international cultural events help students appreciate "difference"? in R. M. Paige (Ed.), *Intercultural Development [Special issue]*. *International Journal of Intercultural Relations*, 27(4), 445-465. doi:10.1016/S0147-1767(03)00033-6.
- Kirk, E. (2008). *Developing evaluation approaches to international collaborative science and engineering activities*. Research Triangle Park, NC: Sigma Xi, the Scientific Research Society.
- Klein, J. (1990). *Interdisciplinarity: History, theory, and practice*. Detroit, MI: Wayne State University Press.
- Klein, J. (2004). Prospects for transdisciplinarity. *Futures*, 36(4), 515. doi:10.1016/j.futures.2003.10.007.
- Knight, J. (2008, September). Joint and double degree programmes: Vexing questions and issues. *The Observatory on Borderless Higher Education*. Retrieved from http://www.eahep.org/web/images/Malaysia/joint_and_double_degree_programmes_vexing_questions_and_issues_september_2008.pdf.
- Knight, J. & Madden, M. (2010). International mobility of Canadian social science and humanities doctoral students. *Canadian Journal of Higher Education/Revue Canadienne d'enseignement supérieur*, 40(2), 18-34. Retrieved from <http://ojs.library.ubc.ca/index.php/cjhe/article/view/1916/1936>.
- Kogan, M., Bauer, M., Bleiklie, I., & Henkel, M. (Eds.), (2006). *Transforming higher education: A comparative study*. New York, NY: Springer.
- Kuder, M., & Obst, D. (2009). *Joint and double degree programs in the transatlantic context: A survey report*. (Report to the EU-US Atlantis Program of the US Department of Education's Fund for the Improvement of Postsecondary Education (FIPSE) and the European Commission's Directorate General for Education and Culture).
- Landis, D., Bennett, J. M., & Bennett, M. J. (Eds.). (2004). *Handbook of intercultural training* (3rd Ed.). Thousand Oaks, CA: Sage.

- Lewin, R. (2009). *The handbook of practice and research in study abroad: Higher education and the quest for global citizenship*. New York, NY: Routledge Publishing.
- Lewontin, R. C. (2000). *The triple helix: Gene, organism, and environment*. Cambridge: Harvard University Press.
- Lieberwits, R. L. (2006, November). *Expanding global access to knowledge: The role of the university*. Paper presented to the Knowledge, Economy and Management Congress, Kocaeli, Turkey.
- Limacher, M. (1997). *Ethnocultural identity and intercultural sensitivity in the ESL classroom: Role expectations of adult students from the People's Republic of China and English language teachers from "the Canadian mainstream"* (Unpublished Master's thesis). Intercultural Communication Institute (ICI)/McGregor School of Antioch University, Portland, OR.
- Lin, N. (2008). A Network theory of social capital. In D. Castiglione, J. W. Van Deth, and G. Wolleb (Eds.), *The handbook of social capital* (pp. 50-69). Oxford: Oxford University Press.
- Louis, M. R. (1980). Surprise and sense making: What newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly*, 25(2), 226-251.
<http://www.jstor.org/stable/2392453>.
- Lowe, C. (2004). Making the monkey: How the Togean macaque went from "new form" to "endemic species" in Indonesians' conservation biology. *Cultural Anthropology*, 19(4), 491-516.
doi:10.1111/j.1548-1360.2010.01072.x.
- Lynn, L. H., & Salzman, H. (2006, Winter). Collaborative advantage: Globalization of innovation and engineering. *Issues in Science and Technology*, 74-82. Retrieved from
<http://www.issues.org/22.2/lynn.html>.
- Maddux, W., & Galinsky, A. D. (2009). Cultural borders and mental barriers: The relationship between living abroad and creativity. *Journal of Personality and Social Psychology*, 96(5), 1047-1061.
doi:10.1037/a0014861.
- Mahoney, S., & Schamber, J. (2003, November). *Exploring the application of a developmental model of intercultural sensitivity to a general education curriculum on diversity*. Paper presented at the meeting of the Association for the Study of Higher Education, Portland, OR.
- Marais, H. C., & Pienaar, M. (2009). The evolution of the South African science, technology and innovation system 1994-2009: An exploration. *Atlanta Conference on Science and Innovation Policy 2009*, 1-10. doi:10.1109/ACSIP.2009.5367851.
- Marginson, S., & van der Wende, M. (2007). To rank or to be ranked: The impact of global rankings in higher education. *Journal of Studies in International Education*, 11(3-4), 306-329.
doi:10.1177/1028315307303544.
- Martin, J. N., Bradford, L., & Rohrich, B. (1995). Comparing predeparture expectations and post-sojourn reports: A longitudinal study of U.S. students abroad. *International Journal of Intercultural Relations*, 19(1), 87-110. doi:10.1016/0147-1767(94)00026-T.
- Max-Neef, M. (2005). Foundations of transdisciplinarity. *Ecological Economics* 53(1), 5-16.
doi:10.1016/j.ecolecon.2005.01.014.
- Mayuzumi, K., Motobayashi, K., Nagayama, C., & Takeuchi, M. (2007). Transforming diversity in Canadian higher education: A dialogue of Japanese women graduate students. *Teaching in Higher Education*, 12(5-6), 581-92.
- McDonald, J. (2010, September 9). U.S. falls behind in competitiveness report. *Manufacturing.Net*. Retrieved from <http://www.manufacturing.net/News/2010/09/Global-manufacturing-US-Loses-ground-In-Competitiveness-Report>.

- McPhee, J. (1989). *The control of nature*. New York, NY: Farrar, Straus and Giroux.
- Mda, Z. (2002). *The heart of redness*. New York, NY: Farrar Straus and Giroux.
- Merton, R. K. (1973). *The sociology of science: Theoretical and empirical investigations*. Chicago: The University of Chicago Press.
- Mihelcic, J. R., Phillips, L. D., & Watkins, D. W., Jr. (2006). Integrating a global perspective into education and research: Engineering international sustainable development. *Environmental Engineering Science*, 23(3), 426-438. doi:10.1089/ees.2006.23.426.
- Miller, C. L. (2011, May 1). Yale in Singapore: Lost in translation. *Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/Yale-in-Singapore-Lost-in/127277/>.
- Milliman, J., & von Glinow, M. A. (1998). Research and publishing issues in large-scale cross-national studies. *Journal of Managerial Psychology*, 13(3-4), 137-142. doi:10.1108/02683949810214850.
- Mills, A. (2009, March 27). A new model for American colleges abroad: Quiet partner. *Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/A-New-Model-for-American/33651>.
- Mitchell, T. (2002). *Rule of experts: Egypt, techno-politics, modernity*. Berkeley, CA: University of California Press.
- Mohatt, G., Hazel, K. L., Allen, J., Stachelrodt, M., Hensel, C., & Fath, R. (2004). Unheard Alaska: culturally anchored participatory action research on sobriety with Alaska natives. *American Journal of Community Psychology*, 33(3), 263-273. doi:10.1023/B:AJCP.0000027011.12346.70.
- Müller, C. V. (1998). About differences and blind spots: A systemic view on an international interdisciplinary research team. *Journal of Managerial Psychology*, 13(3-4), 259-270. doi:10.1108/02683949810215066.
- Mungazi, D. A., (2008). *Knowledge and the search for understanding among nations*. Charlotte, NC: Information Age Publishing.
- NAFSA. (2003). *Securing America's future: Global education for a global age*. (Report of the Strategic Task Force on Education Abroad). Washington D. C.: Author. Retrieved from http://www.nafsa.org/uploadedFiles/NAFSA_Home/Resource_Library_Assets/Public_Policy/securing_america_s_future.pdf?n=3894.
- National Academy of Sciences. (1971). *Mobility of PhD's before and after the doctorate with associated economic and educational characteristics of states*. (Career Patterns Report Number Three). Washington D.C.: Author.
- National Science Board. (2010). *Science and engineering indicators, 2010*. Arlington, VA: National Science Foundation. Retrieved from <http://www.nsf.gov/statistics/seind10/pdfstart.htm>.
- Nerad, M. (2008). United States of America. in M. Nerad and M. Heggelund (Eds.), *Toward a global PhD? Forces and forms of change in doctoral education worldwide*. Seattle: University of Washington Press.
- Nerad, M. (2010). Globalization and the internationalization of graduate education: A macro and micro view. *Canadian Journal of Higher Education/Revue Canadienne d'enseignement supérieur*, 40(1), 1-12. Retrieved from <http://ojs.library.ubc.ca/index.php/cjhe/article/view/1566/1615>.
- Nerad, M., & Heggelund, M. (2008). *Toward a global PhD? Forces and forms of change in doctoral education worldwide*. Seattle: University of Washington Press.
- Nerad, M., Rudd, E., Morrison, E., & Picciano, J. (2007). *Social science PhDs five+ years out: A national survey of PhDs in six fields*. (Highlights Report). Seattle, WA: Center for Innovation and Research

- in Graduate Education. Retrieved from <http://depts.washington.edu/cirgeweb/c/wp-content/uploads/2008/02/ss5-highlights-report.pdf>.
- Newell, W. H. (1994). Designing interdisciplinary courses. In J. T. Klein and W. G. Doty (Eds.), *Interdisciplinary studies today*. San Francisco, CA: Jossey-Bass.
- Noor, N. M. (2006). Reading academic text: Awareness and experiences among university ESL learners. *GEMA Online Journal of Language Studies*, 6(2), 65-78. Retrieved from [http://www.ukm.my/ppbl/Gema/GEMA%20vol%206%20\(2\)%202006/norizah.pdf/](http://www.ukm.my/ppbl/Gema/GEMA%20vol%206%20(2)%202006/norizah.pdf/).
- Norris, E. M., & Gillespie, J. (2009). How study abroad shapes global careers. *Journal of Studies in International Education*, 13(3), 382-397. doi:10.1177/1028315308319632.
- North Carolina State University Online Outcomes Assessment Bibliography. (n.d.). www2.acs.ncsu.edu/UPA/assmt/resource.htm
- Odin, J. K., & Manicas, P. T. (Eds.). (2004). *Globalization and higher education*. Honolulu, HI: University of Hawaii Press.
- O'Hara, S. (2009). Internationalizing the academy: The impact of scholar mobility. in R. Bhandari and S. Laughlin (Eds.), *Higher education on the move: New developments in global mobility* (pp. 29-47). New York, NY: Institute of International Education.
- Olson, C. L., & Kroeger, K. R. (2001). Global competency and intercultural sensitivity. *Journal of Studies in International Education*, 5(2), 116-137.
- Osborn, N. (2001). *Diagnosing and developing cross-cultural expertise in global leaders*. Retrieved December 6, 2004 from www.team-inc.net/Docs/Crossculturalexpertise.doc.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. New York: Cambridge University Press.
- Paige, R. M. (2004). Instrumentation in intercultural training. In D. Landis, J. M. Bennett, and M. J. Bennett (Eds.), *Handbook of intercultural training* (3rd ed.) (pp. 85-128). Thousand Oaks, CA: Sage.
- Paige, R. M. (2003). The Intercultural Development Inventory: A critical review of the research literature. *Journal of Intercultural Communication*, 6, 53-61.
- Paige, R. M., Fry, G. W., Stallman, W. M., Josic, J., & Jon, J. (2009). Study abroad for global engagement: The long-term impact of mobility experiences. *Intercultural Education*, 20(Supplement 1), S29-S44. doi: 10.1080/14675980903370847.
- Paige, R. M., Jacobs-Cassuto, M., Yershova, Y. A., & DeJaeghere, J. (2003). Assessing intercultural sensitivity: An empirical analysis of the Intercultural Development Inventory. in R. M. Paige (Ed.), *Intercultural Development [Special issue]*. *International Journal of Intercultural Relations*, 27 (4), 467-486. doi:10.1016/S0147-1767(03)00034-8.
- Park, P. (1993). *Voices of change: Participatory research in the United States and Canada*. Westport, CN: Bergin & Garvey.
- Partnership Forum. (2008). *Guide to reciprocal campus-community partnerships: A unique collaborative study of partnerships from the perspectives of both community partners and higher education partners*. Proceedings from Portland State University's Partnership Forum, Portland, OR. Retrieved from http://www.pdx.edu/sites/www.pdx.edu/cae/files/media_assets/Guide_corrected_041808.pdf.
- Pauw, C. (2010). *Tracking academic collaboration in the global south*. Presentation to the Academic Consortium 21 International Forum, Shanghai, China. Retrieved from <http://gse.sjtu.edu.cn/ac21/GraduateEducation/Pauw>.

- Pearson, D. E., & Callaway, R. M. (2006). Biological control agents elevate hantavirus by subsidizing deer mouse populations. *Ecological Letters*, 9(4), 443-50. doi:10.1111/j.1461-0248.2006.00896.x.
- Peterson, P. V. (1998). *Intercultural sensitivity and the early adolescent* (Unpublished doctoral dissertation). University of Minnesota, MI.
- Pickert, S. (1992). *Preparing for a global community. Achieving an international perspective in higher education* (ASHE-ERIC Higher Education Report No. 2). Retrieved from <http://www.eric.ed.gov/PDFS/ED350892.pdf>.
- Pfotenhauer, S. (2010, June 24). Portuguese partnerships seek to tackle European higher-education reform challenges. *The Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/Portuguese-Partnerships-See/66043/>.
- Porter, G., & Brown, J. W. (1991). *Global environmental politics*. Boulder, CO: Westview Press.
- Potocnik, J. (2007, February). *Opening address*. Presentation to the conference Scientific Publishing in the European Research Area: Access, Dissemination and Preservation in the Digital Age, Brussels, Belgium.
- Qin, D., & Lykes, M.B. (2006). Reweaving a fragmented self: a grounded theory of self-understanding among Chinese women students in the United States of America. *International Journal of Qualitative Studies in Education*, 19(2), 177-200. doi:10.1080/09518390600576087.
- Quinn, M., & Broberg, L. (2006). Experiential learning across borders: A joint graduate initiative in transboundary environmental policy, planning and management. *Western Humanities Review*, 60(2), 130-140.
- Rarick, D. O. (2010). The student centered classroom made real: Transforming student presentations in an advanced course on technical German. *Die Unterrichtspraxis/Teaching German*, 43(1), 61-69. doi:10.1111/j.1756-1221.2010.00064.x.
- Rarick, D. O., & Hedderich, R. (Eds.), (2010). *Online Journal for Global Engineering Education*. <http://digitalcommons.uri.edu/ojgee/>
- Ringold, D. (1998). *Intercultural sensitivity: The influence of study abroad*. (Unpublished Master's thesis). University of Minnesota, Minneapolis.
- Robinson-Pant, A. (2009). Changing academies: Exploring international PhD students' perspectives on 'host' and 'home' universities. *Higher Education Research & Development*, 28(4), 417-429. doi:10.1080/07294360903046876.
- Rosenberg, A. (2007). *Philosophy of social science* (3rd ed). Boulder, CO: Westview Press.
- Ryan, M. E., & Twibell, R. S. (2000). Concerns, values, stress, coping, health and educational outcomes of college students who studied abroad. *International Journal of Intercultural Relations*, 24(4), 409-435. doi:10.1016/S0147-1767(00)00014-6.
- Sadrozinski, R. (2005). *Evaluative framework for international collaboration*. (Report to the National Science Foundation). Retrieved from <http://depts.washington.edu/cirgeweb/c/wp-content/uploads/2008/07/evaluative-framework.pdf>.
- Savicki, V. (2008). *Developing intercultural competence and transformation: Theory, research and application in international education*. Sterling, VA: Stylus Publishing.
- Schauber, A. C. (1999). *Assessing organizational climate: First step in diversifying an organization* (Unpublished doctoral dissertation). The Union Institute, Cincinnati, OH.
- Schmaus, W. (2008). A new way of thinking about social location in science. *Science & Education* 17(10), 1127-1137. doi:10.1007/s11191-007-9129-z.

- Scholz, B. (2004). *Wegbereiter einer wissenschaftlichen karriere: DFG-Stipendienförderung für postdocs. Guide for a scientific career: German Research Council – fellowship support for postdocs*. Bonn, Germany: Deutsche Forschungsgemeinschaft.
- Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven, CT: Yale University Press.
- Schimmack, W., Gerstmann U., Schultz, W., & Schramel, P. (2005). Leaching of depleted uranium in soil as determined by column experiments. *Radiation and Environmental Biophysics*, 44(3), 183–191. doi:10.1007/s00411-005-0013-4.
- Schmidt-Kopenhagen, R., Oumeraci, H., & Grüne J. (2006). Tsunami wave decay in near and onshore areas. In J. M. Smith (Ed.), *Coastal Engineering 2006: Proceedings from the 30th International Conference* (pp. 1664-1676). doi:10.1142/9789812709554_0141.
- Schuh, J.H. et al. (2002). *Assessing the experiences of doctoral students from a formative perspective*. College of Education, Educational Leadership and Policy Studies: Iowa State University.
- Scott, P. (1998). *The globalization of higher education*. Berkshire, UK: Open University Press.
- Shafritz, J.M., & Whitbeck, P. H. (Eds.). (1978). *Classics of organization theory*. Oak Park, IL: Moore Publishing Company, Inc.
- Shaheen, S. (2004). *The effect of pre-departure preparation on student intercultural development during study abroad programs* (Unpublished doctoral dissertation). Ohio State University, Columbus, OH.
- Shapiro, J. (2001). *Mao's war against nature: Politics and the environment in revolutionary China*. New York, NY: Cambridge University Press.
- Shepherd, N. (2010, July 30). Thinking Africa differently. *Mail & Guardian*. Retrieved from <http://www.mg.co.za/article/2010-07-30-thinking-africa-differently>.
- Shusterman, R. (1998). Understanding the self's others. in C. Gupta and D. P. Chattopadhyaya (Eds.), *Cultural otherness and beyond*. The Netherlands: Koninklijke Brill NV, Leinder.
- Sisco, L. A., & Reinhard, K. (2007). Learning to see what's invisible: The value of international faculty exchange. *Business Communication Quarterly*, 70(3), 356-363. doi:10.1177/10805699070700030409.
- Smith, L. (1999). *Decolonizing methodologies: Research and indigenous peoples*. London, UK: Zed Books. Dunedin, New Zealand: University of Otago Press.
- Spitzberg, B., & Changnon, G. (2009). Conceptualizing intercultural competence. in D. K. Deardorff (Ed.), *The SAGE Book of Intercultural Competence* (pp. 2-52). Thousand Oaks, CA: SAGE Publications, Inc.
- Stanford Research Institute. (2002). *International outcome assessment of the Fulbright Scholar Program*. (SRI Report). Stanford, CA: Author.
- St. Clair, A., & McKenry, L. (1999). Preparing culturally competent practitioners. *Journal of Nursing Education*, 38(5), 228-34.
- Stearns, P. N. (2008). *Educating global citizens in colleges and universities: Challenges and opportunities*. New York: Routledge.
- Stohl, M. (2007). We have met the enemy and he is us: The role of the faculty in the internationalization of higher education in the coming decade. *Journal of Studies in International Education*, 11(3-4): 359-372. doi:10.1177/1028315307303923.
- Stokes, D. E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, D.C.: The Brookings Institution.
- Storti, C. (1997). *The art of coming home*. Yarmouth, ME: Intercultural Press, Inc.

- Storti, C. (2001). *Old world, new world: Bridging culture differences: Britain, France, Germany and the U.S.* Yarmouth, ME: Intercultural Press, Inc.
- Straffon, D. A. (2003). Assessing the intercultural sensitivity of high school students attending an international school. in R. M. Paige (Ed.), Intercultural Development [Special issue]. *International Journal of Intercultural Relations*, 27(4), 487-501. doi:10.1016/S0147-1767(03)00035-X.
- Sussman, L. R. (1992). *The culture of freedom: the small world of Fulbright scholars*. Savage, MD: Rowman & Littlefield Pub Inc.
- Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-47). Monterey, CA: Brooks-Cole. doi:10.1016/S0065-2601(05)37005-5.
- Takai, J. (2011, February). *Cross-cultural exchange: Intergroup or intragroup?* Presentation to the 2011 CIRGE NSF workshop, Washington, D.C.
- Taylor, O. L. (2009, April 20). *Globalizing graduate education and research: Opportunities and challenges*. Presentation. Retrieved from http://www.cgsnet.org/portals/0/pdf/CGSNSF2009_Taylor.pdf
- Teichler, U., Enders, J., & Fulton, O. (2002). *Higher education in a globalizing world: International trends and mutual observations: A festschrift in honour of Ulrich Teichler*. Boston: Kluwer Academic Publishers.
- Teichler, U. (2004). The changing debate on internationalization of higher education. *Higher Education*, 48, 5–26. <http://www.jstor.org/stable/4151528>.
- Thagard, P. (2006). How to collaborate: Procedural knowledge in the cooperative development of science. *The Southern Journal of Philosophy*, 44(S1), 177-196. doi:10.1111/j.2041-6962.2006.tb00038.x.
- The Royal Society. (2011, March). *Knowledge, networks and nations: Global scientific collaboration in the 21st century*. (Royal Society Policy Document 03/11). London, England: Author. Retrieved from http://royalsociety.org/uploadedFiles/Royal_Society_Content/Influencing_Policy/Reports/2011-03-28-Knowledge-networks-nations.pdf.
- Thibeault, B. H. H. (2001). *Effects of international internships on intercultural sensitivity development* (Unpublished Master's thesis). Southern Illinois University, Carbondale, IL.
- Thomas, C. (2000). How can south-south cooperation contribute to a knowledge-based development strategy? *Cooperation South*, 1, 49-59. Retrieved from http://www.ecdc.net.cn/events/co_south200001/6.htm.
- Thompson, G. (1999). Introduction: Situating consumption, space, and place. *International Social Science Journal*, 160, 139-152. doi:10.1111/1468-2451.00184.
- Tijssen, R. J. W., van Leeuwen, T. N., & van Wijk, E. (2009). Benchmarking university–industry research cooperation worldwide: Performance measurements and indicators based on co-authorship data for the world's largest universities. *Research Evaluation* 18(1), 13-24. doi:10.3152/095820209X393145.
- Tijssen, R. J. W. (2007). Africa's contribution to the worldwide research literature: New analytical perspectives, trends, and performance indicators. *Scientometrics*, 71(2), 303-327. doi:10.1007/s11192-007-1658-3.
- Tise, E. (2009). *Isolation and information famine stifling Africa's growth*. 19th Annual Mortenson Distinguished Lecture. Retrieved from <http://www.library.illinois.edu/mortenson/lectures/2009/Tise-lecturetext.html>.

- Towers, K. R. L. (1990). *Intercultural sensitivity survey: Construction and initial validation*. (Unpublished doctoral dissertation). University of Iowa, Iowa City, IA.
- Trice, A. G., & Yoo, J. E. (2007). International graduate students' perceptions of their academic experience. *Journal of Research in International Education*, 6(1), 41-66.
- Trompenaras, F., & Hampden-Turner, C. (2004). *Managing people across cultures*. West Sussex, England: Capstone Publishing Ltd.
- Trompenaras, F., & Prud'Homme, P. (2004.) *Managing change across corporate cultures*. West Sussex, England: Capstone Publishing Ltd.
- Tuleja, E. A. (2008). Aspects of Intercultural Awareness through an MBA Study Abroad Program: Going "Backstage". *Business Communication Quarterly*, 71(3), 314-337. doi:10.1177/1080569908321471.
- Universities UK. (2009). *Researcher mobility in the European research area: Barriers and incentives*. Research Report. London, UK: Universities UK. Retrieved from http://www.universitiesuk.ac.uk/Publications/Documents/Researcher_mobility.pdf.
- Välimaa, J. & Hoffmann, D. M. (2011) *Change in networks, higher education and knowledge societies (CINHEKS)*. EUROCORES/EuroHESC Collaborative Research Project. Retrieved from <http://ktl.jyu.fi/ktl/cinheks>.
- Van Der Wende, M., & Westerheijden, D. (2009). Rankings and classifications: The need for a multidimensional approach. In F. Vught (Ed.), *Mapping the higher education landscape: Towards a European classification of higher education* [Higher Education Dynamics Vol. 28] (pp. 71-86). Dordrecht: Springer Netherlands. doi:10.1007/978-90-481-2249-3.
- Van Hook, C. W. (2004). *Preparing teachers for the diverse classroom: A developmental model of intercultural sensitivity*. Retrieved December 6, 2004 from <http://ceep.crc.uiuc.edu/pubs/katzsym/vanhook.htm>.
- Vande Berg, M., & Paige, M. R. (2009). Applying theory and research: The evolution of intercultural competence in U.S. study abroad. in D. K. Deardorff (Ed.), *The SAGE Book of Intercultural Competence* (pp. 419-437). Thousand Oaks, CA: SAGE Publications, Inc.
- Verbik, L. & Lasanowski, V. (2007). *International student mobility: Patterns and trends*. London, UK: The Observatory on Borderless Higher Education. Retrieved from http://www.eua.be/fileadmin/user_upload/files/newsletter/International_Student_Mobility_-_Patterns_and_Trends.pdf.
- Vital, M. Y. (1999). *Analyzing the intercultural sensitivity of diversity development specialists in the U.S. Postal Service* (Unpublished Master's thesis). Intercultural Communication Institute (ICI)/McGregor School of Antioch University, Portland, OR.
- Von Reinhart, W. (2001). German for science and technology: Teaching strategies for beginning students, *Die Unterrichtspraxis/Teaching German*, 34(2), 119-32. <http://www.jstor.org/stable/3531369>.
- Wagner C. S., Staheli, L., Silberglitt, R., Wong, A., & Kadtke, J. (2002). *Linking effectively: Learning lessons from successful collaboration in science and technology*. Arlington, VA: Science and Technology Policy Institute, RAND Corporation.
- Ward, D., Ngairorue, B., Apollus, A., & Tjiveze, H. (2000, August 1). Perceptions and realities of land degradation in arid Otjimbingwe, Namibia. *Journal of Arid Environments*, 45(4), 337-356.
- Watanabe, G. G. (1992). *A comprehensive developmentally-based undergraduate diversity education model at Washington State University* (Unpublished doctoral dissertation). Washington State University, Pullman, WA.

- Westrick, J. (2002). *Making meaning from difference: The influence of participation in service-learning on intercultural sensitivity of high school students at an international school in Hong Kong* (Unpublished doctoral dissertation). University of Minnesota, Minneapolis, MN.
- Westrick, J. (2004). The influence of service learning on intercultural sensitivity: A quantitative study. *Journal of Research in International Education*, 3(3), 277-299. doi:10.1177/1475240904047356.
- Whalen, B. (1996) Learning outside the home culture: An anatomy and ecology of memory. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 2. Retrieved from http://www.frontiersjournal.com/issues/vol2/vol2-01_Whalen.htm.
- Wilson, A. H. (1993, Winter). Conversation partners: Helping students gain a global perspective through cross-cultural experiences. *Theory into Practice*, 32(1), 21-26. <http://www.jstor.org/stable/1476478>.
- Wilson, S. (2009). *Research is ceremony: Indigenous research methods*. Winnipeg, Canada: Fernwood Press.
- Wisker, G., Robinson, F., & Shacham, M. (2007). Postgraduate research success: Communities of practice involving cohorts, guardian supervisors and online communities. *Innovations in Education and Teaching International*, 44(3), 301-320. doi:10.1080/14703290701486720.
- Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *The World Bank Research Observer* 15(2), 225-249. <http://www.jstor.org/stable/3986417>.
- Wray, K. B. (2007). Evaluating scientists: Examining the effects of sexism and nepotism. in H. Kincaid, J. Dupré, and A. Wylie (Eds.), *Value-Free Science? Ideals and Illusions* (pp. 87-106). New York, NY: Oxford University Press.
- Wray, K. B. (2002). The epistemic significance of collaborative research. *Philosophy of Science*, 69(1), 150-168. doi:10.1086/338946.
- Wylie, A. (2002). *Thinking from things: Essays in the philosophy of archaeology*. Berkeley, CA: University of California Press.
- Wylie, A. (2006). Introduction: When difference makes a difference. *Episteme: A Journal of Social Epistemology*, 3(1-2), 1-7. doi:10.1353/epi.0.0009.
- Yamamoto, S. (1994). *Qualitative study of Japanese students' intercultural experiences in the U.S. in relation to the Developmental Model of Intercultural Sensitivity* (Unpublished Master's thesis). Portland State University, Portland, OR.
- Yamamoto, S. (1996). A theoretical grounding of the intercultural sensitivity model. *Contexture*, 14, 67-88.
- Yamamoto, S. (1998). Applying the developmental model of intercultural sensitivity in the Japanese context. *Journal of Intercultural Communication: SIETAR Japan*, 2.
- Yopp, J. (2009). *Differing and convergent views and practices employed by U.S. and European universities regarding joint and double degrees at the doctoral level*. Paper presented at the AIEA Annual Conference "International Education, Engaging Communities", Atlanta, GA.
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9, 1-27.
- Zimmerman-Timm, H., & Dawla, A. (2011). *Thoughts about international exchange and experiences for scientists – A German view*. Unpublished manuscript.
- Zoellick, R. B. (2010, September 29). *Democratizing development economics*. Retrieved from <http://go.worldbank.org/EY8V84BR10>.

Appendix C: Pre-Survey Questions

Professor Maresi Nerad
Director, Center for Innovation and Research in Graduate Education
University of Washington, Seattle

December 6, 2010

Workshop Pre- survey

Investigating the International Experiences in STEM Graduate Education and Beyond: An NSF Workshop to Develop a Research Agenda

February 6 (dinner), 7 and 8 (until 1 p.m.) Arlington, VA

Name _____

Country & Institution _____

1. Please describe briefly what motivates your interest in the workshop topic.
2. Thinking about the workshop topic, what areas of inquiry are you most interested in seeing researched in the future and why? (see 3-page summary)
3. During the workshop, there will be some opportunities for people to deliver "lightning talks" of no more than 10 minutes on aspects of the inquiry. If you have not already sent us a response to this question, is there a topic you would like to address briefly for the benefit of the collaboration? If so, please describe it briefly or attach your talking points.
4. From your perspective, what would you most like to take away from the workshop?
5. Are there specific resources you have found particularly interesting or useful you think would add value to the literature summary? If so, please attach those (annotated) literature citations or websites.
6. Additional comments? Please do not hesitate to add your thoughts. Thank you.

Appendix D: Summary of Evaluation Completed at Workshop Site



INVESTIGATING THE INTERNATIONAL EXPERIENCES IN STEM GRADUATE

EDUCATION AND BEYOND: From Anecdotal to Empirical Evidence, February 6-8, 2011

I. Compilation of quantitative feedback from participants

Through survey responses, participants affirmed that the workshop met their expectations, encompassed relevant content, generated useful research questions, and clarified the challenges related to assessing the impact of international experiences.

They also agreed that the structure and processes of the workshop helped address the workshop goals and that the workshop helped extend their networks for future collaborations.

Less universal were sentiments related to the workshop blog: 17 of 24 respondents agreed that this was useful in preparing for the workshop.

Below is a summary of the survey results:⁶

		++	+	0	-	--
1.	The workshop met my expectations.	☐ 18	☐ 7	☐	☐	☐
2.	Overall, the content was relevant to the workshop topic.	☐ 19	☐ 6	☐	☐	☐
3.	The workshop succeeded in generating useful research questions.	☐ 18	☐ 5	☐ 2	☐	☐
4.	The choice of topics and organization was helpful in the effort to develop conceptual frameworks.	☐ 15	☐ 9	☐	☐	☐ 1
5.	The workshop was helpful in clarifying the challenges related to assessing the impact of international experiences.	☐ 14	☐ 9	☐ 2	☐	☐

⁶ Scale: ++ = strongly positive ; + = positive; - = negative; -- = strongly negative
(In descriptions below, positive refers to ++ or +)

6.	The workshop structure/processes was helpful to address to workshop goals.	☐ 16	☐ 8	☐ 1	☐	☐
7.	The blog was useful in preparing for the workshop.	☐ 9	☐ 8	☐ 6	☐	☐ 1
8.	I was able to extend my network for future collaborations.	☐ 12	☐ 11	☐ 2	☐	☐

1. The workshop met my expectations: 25/25 positive
2. Overall, the content was relevant to the workshop topic: 25/25 positive
3. The workshop succeeded in generating useful research questions: 23/25 positive
4. The choice of topics and organization was helpful in the effort to develop conceptual frameworks: 24/25 positive
5. The workshop was helpful in clarifying the challenges related to assessing the impact of international experiences: 23/25 positive
6. The workshop structure/processes were helpful to address to workshop goals: 24/25 positive
7. The blog was useful in preparing for the workshop: 17/24 agreed; 6 neutral; one strongly disagreed. Several indicated that the blog would be helpful in the aftermath of the workshop.
8. I was able to extend my network for future collaborations: 23/25 positive.

II. Summary of qualitative feedback

The workshop was an excellent opportunity to hear diverse perspectives from a “wide range of disciplines, nationalities, genders, ages and ideas,” although that diversity sometimes challenged disciplinary and epistemic assumptions. As one participant commented, “Diversity of participants was benefit and disadvantage.”

Several participants hoped to hear from even more international perspectives. Taking on lenses of different roles was a helpful exercise for most, but not all. Many participants wished for more time and more targeted opportunities to develop future collaborations. Continuing to accumulate resources through building the blog and/or a website, through developing a bibliography, and through targeted NSF funding were all mentioned as desired outcomes: “[It] would be nice if NSF were flexible to react to outcomes of the workshop and solicited proposals from us going forward.”

Overall, participants appreciated the organization and reported emerging with new conceptual frameworks and assessment tools. Several mentioned acquiring new ideas about intersections between ideas of science and international, regional, and disciplinary variations.

Some sought more specific strategies and deliverables or hoped for a more thorough integration of ideas. Many appreciated the interactive workshop format combining break-out groups with presentations. Participants expressed enthusiasm overall and gratitude for an engaging workshop. As one wrote, “The event was well organized, and I think your team did a nice job using innovative facilitation strategies.”

III. Qualitative feedback from workshop participants, arranged by topic

Question: Was there anything you found particularly useful?

Dynamics

- Everything!
- The dynamics [were] very good.

Conceptual Learning

- Distinguishing between scientific, professional and social inter-cultural competencies.
- **Idea** exchange.
- Learning about **frameworks and strategies for assessment** and evaluation that I didn’t know about before.
- Talking to assessment experts.
- Helped me to conceptualize framework for research and methods to use.
- Posing of new questions, introductions to new ideas, networking, listening.
- Awareness of the various ways and aspects of assessing exchange programs. Taking perspectives of the other – student/policy maker/faculty/researcher.
- Emphasis on linking graduate exchange and international research collaboration are important for the **equitability** of partnerships.

Diverse Perspectives

- **Multiple perspectives** of international collaboration.
- Many very informative presentations and opportunities for interactive discussions and networking.
- Multiple perspectives – good job drawing a wide range of disciplines, nationalities, genders, ages and ideas.
- The breadth of people, disciplines and countries involved was great.
- Exposure to a diverse group with various viewpoints.
- Broadening perspective on international experiences
- Viewing through **different lenses** (discipline, educational level, country)

Workshop Format

- Enjoyed lensing idea, break out discussions.
- Morning break-out groups
- Breaking down into four groups on day 1 was useful, as was allowing stickers to ‘vote’ to indicate most important topics.
- The mix of talks followed by round table discussions.

- I think the mix of presentations and group work was well balanced.
- The interactive workshop format
- I learned how to organize an interactive workshop effectively.

Networking

- **Networking** with old and new colleagues to discuss collaborative possibilities.
- Networking, hearing **different perspectives**.
- Group work, networking possibilities; open mind of the organizers to adapt the schedule of the last day (formulating next steps) to the actual needs

Preparations and Follow-Up Opportunities

- Blog post workshop.
- I thought the prep work for the workshop was effective.

Question: Would you like to suggest any improvements regarding the workshop organisation?

Participants and perspectives

- Diversity of participants was benefit and disadvantage.
- Good mixing up of participants (in the physical, not mental sense!) Perhaps even more of this to keep us and our thinking on the move.
- I think the participants were a little too heavy from Pacific Northwest.
- Government/systematic perspective would have been useful. Too much focus on student experience and individual outcome.

Effectiveness of 'lenses'

- I wasn't convinced that the role playing through a 'lens' added anything.
- The different lenses were from my point of view not so realistic; time as a student is far away, different tasks of families in US...

Developing future collaborations

- Make some time for smaller focus groups to brainstorm on joint proposals.
- Would be great to get some one-on-one focus group time with NSF offices.

Videos

- The lunch time video on day 1 was underwhelming.
- More student videos would have been useful.

Organization was great

- Excellent
- The workshop organization was just wonderful!

Question: Would you like to share additional suggestions?

Disseminating discussions and results

- The workshop was timely and the blog should be made available to the public, policy-makers.

- We would maybe continue to discuss in the blog in order to pursue the issues that have been raised here.
- The workshop was targeted at STEM education, but would be nice if you could share the outcomes of this workshop with other fields of studies.

Gratitude

- Thank you for all your hard work! And for all the interactive exercises.
- Thanks for all your work – the event was well organized, and I think your team did a nice job using innovative facilitation strategies.
- Great job! I hope to be invited again!
- Great workshop
- Not at this stage. I will think about it. Maybe this sounds as lack of critical sense, but I'm really overwhelmed and so enthusiastic about this workshop that I need a few days to process it all before coming back with proposals. Bravo and thank you!

International Perspectives and Other Participants

- More international participants – to hear from the 'other side'.
- Including post docs; maybe internationalization is more useful for them.
- Including government industry, because they are in many cases future employees.
- I think a case could be made that this was such a successful workshop because of the developed global competence of the participants. Bravi, indeed!

Further developing conversations

- Some of the discussion looked at student seminar support systems for international collaborations (health insurance). This may be recommendations for that field or need elaboration with psychology to get to theory.
- We had a lot of great, but not intertwined ideas that were not wholly integrated in the end. A more thorough integration process, i.e. formulating next steps, may have served us better. In particular, the five groups at the end all were working on very similar matters, so a more diverse selection of tasks may have been more effective.

Theoretical considerations

- More conversation about policies and science studies, and how it informs our understanding of international collaborations.
- Learning the different perspectives of 'hard' scientists and social scientists was a high-light for me.
- More research needs to be done on identifying science differences between regions and countries. Question is, how to do this, using but not abusing stereotypes.

To NSF

- [It] would be nice if NSF were flexible to react to outcomes of the workshop and solicited proposals from us going forward.

Appendix E: Post-Survey Questions and Responses

WORKSHOP POST-SURVEY

May 6, 2011

Investigating the International Experiences in STEM Graduate Education and Beyond: An NSF Funded Workshop

to Develop a Research Agenda

Held February 6th-8th, 2011, Arlington, VA.

Name _____

Country & Institution _____

1. Since the February workshop have you initiated any collaborations with workshop participants?

YES ☐ NO ☐ If yes, how many? _____

2. If so, please describe the type of collaborations and their content. Naming the partners will allow us to build on each others' work and support each others' endeavors.

3. Please describe the impacts of the workshop on your overall work:

- ☐ I am aware of new resources
- ☐ I am aware of a different field of study that looks at international evaluation and assessment of international experiences
- ☐ The workshop helped me develop an improved evaluation design
- ☐ The workshop introduced me to new literature useful for my teaching and research

☐ I have shared new perspectives on assessment dimensions with my colleagues

☐ Other (please be specific)

4. Did you come up with further thoughts on conceptual frameworks or methods for assessing international collaborations? Please describe.

5. What would be helpful to you in order to move to the next step in your collaborations?

6. How can CIRGE (the Center for Innovation and Research in Graduate Education) help your work?

☐ Organizing a follow-up meeting to further collaborations

☐ Working with you on evaluation design

☐ Providing contacts with international partners

☐ Providing updated bibliography

☐ Sending report from the workshop

☐ Creating space for “assessment” network information on the CIRGE website

☐ Other (Please be specific)

Thank you for taking the time to complete this survey. Please return it to mnerad@uw.edu at your earliest convenience.

Compilation of Survey Responses

1-2. Have you begun further collaborations? If so, what?

- Collaborating on assessment tools specifically for global engineering programs and on funding ideas for building an online archive of resources & tools for global eng. ed. education and assessment.
- I am now in contact with X who I did not know prior to the workshop, regarding a number of possible collaborative directions, including at least one idea for an NSF grant proposal.
- I have started talking to X and Y about scientifically investigating the impact of mechanisms like Humboldt awards (for Junior and Senior researchers) on the quality and the trajectory of their academic careers.
- X has begun an exchange of letters with me; he wants us to co-operate in order to study environmental policies. Y has also sent me a letter and we should begin to discuss ideas of common interest.
- I followed up with a number of persons from the workshop and had some email exchanges. The one that has been most promising is the collaboration with X...given the common interests we share on intercultural competence development.
- I will be contacting the AAAS fellow I met at the workshop.

4. Did you come up with further thoughts on conceptual frameworks or methods for assessing international collaborations? Please describe.

- It became even clearer to me than before that what is out there right now are assessment tools for cross-cultural skills (e.g. IDI; MGUDS; The SAGE Handbook for Intercultural Competence, etc.) Those provide useful frameworks for international education but they need to be complimented by tools assessing the specificity of STEM learning abroad. Science and engineering learning/skills are not captured by those tools; hence the chance and responsibility of international science and engineering programs to develop them.
- Prior to the workshop, I was not familiar with the logic model of program evaluation and assessment. Darla Deardorff's discussion of this model was helpful and useful.
- Our focus has been to develop metrics for assessing the institutional impact of international activities. Very little has been done in this area, but federal agencies as well and universities are expanding international activities.
- I have realized that longitudinal and comparative work evaluating the effects of international experiences both on the host and sending institutions are required.
- One needs to develop a comprehensive, multi-level approach ("assessment package?"), as these collaboration[s] have effects on students, faculty, institutions, and possibly whole systems. Develop methods that include both quantitative and qualitative elements.
- The complexities of evaluating educational systems across countries became much more obvious through this workshop. The purposes of education in different countries varies and so using cross-country comparison data becomes problematic. My methods have therefore become more qualitative, encouraging communities at the local level, in part, because I am less sure of what summative quantitative data can really tell us.
- My primary purpose was to learn from other colleagues regarding the features of successful international collaborations. In this respect, I gained from both the assessment results that were presented and more from informal discussions.
- The most important thing is to define what really matters for each side. In developing countries we have a tradition of following agendas devised by developed countries, which is usually not helpful for our both scientific and social development. I think every player in science and in doctoral education (a player might

be more than 1 country, it could be an association of countries) should be very aware of its interests and aims first of all. This could mean that international cooperation would really work for the benefit of all involved.

5. *What would be helpful to you in order to move to the next step in your collaborations?*

- At present I need to identify appropriate NSF programs and units to support some projects I am now formulating, and I especially need to find support for larger projects through multiple NSF divisions.
- If colleagues from engineering or science fields which have international programs running for their students were considering sharing their tools, and cooperated on our new project. The next opportunity is the Colloquium on International Engineering Education at BYU in Provo, Nov. 3-5, 2011, where we have planned in an assessment workshop.
- It would be useful to bring the discussion of our graduate workshop to the attention of undergrad programs since most of what we discussed is relevant for them as well.
- Would be helpful if the NSF folks who were there would take a more active role in post-workshop discussions...

I'm happy to work with others in terms of assessment/evaluation, given my expertise in this area... (not many have connected with me on this though)

- We would like to seek out a small set of institutions from the ones that attended the workshop and validate the metrics developed.
- Obtaining a list of participants' current and planned work on international experiences in order to develop partnerships.
- I already plan to incorporate some of the things I learned in designing future international collaborations. Further improvements in the way international research collaboration proposals are reviewed would help.
- To work on the topic above: how to define the interests and aims of each player.

The Center for Innovation and Research in Graduate Education (CIRGE) at the University of Washington, Seattle is the first U.S. research center devoted to the study of doctoral education. CIRGE's work enables graduate programs to respond effectively to the most challenging issues in graduate education today: accountability, internationalization, interdisciplinary work, and the increase in dual-career couples in the workforce. CIRGE is internationally recognized among program leaders, funders and policy makers as a trusted source of insightful analyses and practical information for improving graduate education.

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