Assessing international (post)graduate education

A research agenda

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'Internationalisation' has become the new buzzword for universities around the world, with jointly offered degrees as well as smaller-scale exchanges for students. Despite this rapid expansion of international campuses and programmes, and the increasing acceptance and encouragement of international experiences for [post]graduate students, little comprehensive evaluative work has been done to assess their efficacy on a broad scale and to determine what types and models of international work can be most effective. The lack of reliable and comprehensive data is especially problematic for science and engineering fields, where academic staff anxieties about forming students into competent scientists often collide with enthusiasm for encouraging international collaborations. Questions of exactly what makes a competent, or excellent, scientist, and what may benefit the scientific domain, do not have easy – or agreed-upon – answers.

This article assesses the current state of internationalisation and international experiences, focusing in particular on science and engineering fields. It discusses initial results from a workshop, sponsored by the US National Science Foundation and organised by the Center for Innovation and Research in Graduate Education at the University of Washington, to develop an interdisciplinary research agenda aimed at launching and coordinating empirically driven research on international graduate education. It concludes by identifying areas for future research.

Introduction

In their article for the 1995 volume of *Australia Universities' Review* on Postgraduate Studies and Postgraduate pedagogy, Sid Morris and Wayne Hudson laid out a framework for radically redefining international education in Australia by changing teaching methods, expanding languages of instruction and assignment submission, making university infrastructure more inclusive, and generally placing international students at the centre of educational innovation that should spread to Australian students as well. Sixteen years later, some of their ideas still sound radical – like replacing toilets with seatless models – but the rapid expansion of international education and the construction of entire campuses in other countries must be beyond what they imagined. Today, internationalisation of universities is the new buzzword. As Knight describes (2008), we now witness the internationalisation of higher education on a new level:

> '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 cross-border movement of education programmes (franchise, twinning, branch campus, etc.), and providers (commercial companies, non-government organisations, traditional universities), is unprecedented' (Knight 2008, p. 10).

This unprecedented expansion of international education has seen administrators in many countries scrambling to sign memoranda of understanding and develop joint or dual degree programmes (Berka 2011; Kuder & Obst 2009). International exchanges are becoming requisite in many universities at the undergraduate level, and this trend is quickly extending into the graduate level as well. Not only the physical location and movement of people but also the nature of many scholars' academic work has changed dramatically. 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). Developing a 'collaborative advantage' rather than a 'competitive advantage' can be an important way to build on the necessity of working together to solve complex problems (Lynn & Salzman 2006).

The increased pressure to internationalise must be seen in the context of globalisation. Governments have followed the economic theories of the knowledge society: believing in the power of advanced education to spur economic growth and build national capacity, governments are allocating substantial funds to increase the research and development capacities of their countries (Nerad 2011). Indeed, 'the preparation of the next generation of PhDs needs to include multi-cultural competencies in order to be able to work collaboratively in international teams on solving societal problems in multi-national settings' (Nerad 2011). Therefore, in recent years, international experiences for doctoral students have become sought after for both their general educational and career preparation values. For instance, in the US the National Science Foundation (NSF) created a new programme in 2005, Partnership for International Research and Education (PIRE), that emphasises international exchange experiences for US PhD students. The NSF-funded innovative, interdisciplinary doctoral programme, Integrated Graduate Education, Research and Training (IGERT), created in 1997, also encourages international experience. In Europe, the ERASMUS Mundi and the Madame Curie programme support inter-European international education and career development. Individual university departments are also establishing international collaborations with programmes or laboratories from other nations to work on global problems and in the process help their students and postdocs develop cultural expertise.

Many universities – particularly those in Australia, New Zealand, the UK, as well as some colleges in the US – derive substantial operating income from the tuition and fees paid by international students at the undergraduate level. For example, international students (at all levels) provided 14.9 per cent of the total income for Australian higher education in 2009 (Marginson 2011). International experiences for those beyond the undergraduate level are more costly, often require subsidisation, and therefore can be more difficult to fund. Despite the importance – especially in the context of shrinking national and regional budgets – of showing accountability for these high expenditures, evidence about the value of international experiences in graduate education remains largely anecdotal (Kirk 2008). After considering whether universities are becoming new incarnations of multinational corporations, Daniel Denecke of the Council of Graduate Schools 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 staff, and institutions' (Denecke 2011). Similarly, the Royal Society report on international scientific collaboration emphasised 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' (Royal Society 2011, p. 6). While international partnerships are vital, significant questions remain.

An increasing push to demonstrate value is thus giving new urgency to outcomes-based research on international educational experiences. This is particularly true for science and engineering 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 academic staff alike to clearly demonstrate the value of their international engagement.

It is hoped that 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 homogenise, but instead to accept differences and embrace diversity (Guerin & Green 2009; Nerad 2009). But do and can these experiences fulfil the great expectations that we have for them? This question has proven exceedingly complicated to answer. It is to open a discussion and to build a research agenda with the goal of assessing and evaluating international experiences that we write this article. In part, it builds on the authors' earlier work to begin dialogues in person through an international workshop supported by the US National Science Foundation and held in Washington, DC in February 2011.

Reviewing the literature: what do we know about international experiences of postgraduate students?

While detailed research into the exact benefits or hindrances to (post)graduate students undergoing international training during their degree is yet incomplete, studies of graduate students and even undergraduates who study abroad may serve usefully as a base for this new area of inquiry. They explore the role of international students in the hosting nation, the effect of mobility on scientific careers and productivity, and the potential for intercultural competence and existing studies of undergraduate exchange to better inform future research. Here we review some key studies that can serve as models for further research.

Hans de Wit has discussed broad aspects of internationalisation in higher education, taking a historical and comparative perspective, in two wide-ranging books (de Wit 2002; de Wit 2010). 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; Nerad (2011a) has likewise pointed to missed opportunities to draw on international students as resources for the entire university community. Studies that take the perspectives of international students' experiences in the United States are increasing, and these newer studies are differentiating among international students, rather than treating them as one uniform group (e.g., Trice & Yoo 2007; 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 (Qin & Lykes 2006) at US universities.

Among studies of international exchanges among doctoral students and postdocs, some focus simply on mobility (Ackers *et al.* 2008; Avveduto 2002; Verbik 2007), while others examine postdocs as skilled migrants (B. Cantwell 2009). Only a few examine productivity of international exchanges and the impact on scientific careers. Jöns' study (2007) 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 conceptualise 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 multinational comparison, as the recent Royal Society report (March 2011) has done too. 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 maximise the career and scientific impact for scientists of international collaborations. Nerad (2011a) points to a new conceptual learning model that includes international competences.

Assessments of specific programmes in terms of success in training, research, and academic staff exchange offer useful starting points for research questions leading to generalisable 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 & Reinhard (2007) focus their study on academic staff 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.

Research on the impact of study abroad programmes for undergraduate students offers insight into factors important in international exchange experiences for doctoral and postdoctoral students (Dwyer & Peters 2004; Martin, Bradford & Rohrlich 1995; Norris & Gillespie 2009), including possible negative impacts of international exchange (Ryan & Twibell 2000). Gullahorn & Gullahorn (1996) offers an especially useful starting point for characterising 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).

Existing literature thus 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. Occupying a key role in this category is intercultural competence. Defined as a complex concept that broadly deals with effective and appropriate interactions with those from different backgrounds, cultures, or perspectives (Deardorff 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. It offers pedagogical tools and assessment instruments that might be adapted to purposes of evaluating the impacts of international exchanges for doctoral and postdoctoral students. 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, Jacobs-Cassuto, Yershova, & DeJaeghere 2003). In general, the field of intercultural competence offers a diverse set of research approaches and findings, which should be synthesised where relevant to the particular types of exchanges undertaken among early career researchers (e.g., Altshuler, Sussman, & Kachur 2003; Greenholz 2000; Paige, Jacobs-Cassuto, Yershova, & DeJaeghere 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.

Postgraduate 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

A final 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). In the US, the existing Survey of Earned Doctorates (SED) does not collect data on international experiences. The 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 (Hogan *et al.* 2010). The Organisation 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 doctorate holders and reasons for mobility in seven countries in Europe *(http://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 US scientific enterprise and the quality of PhD graduates need to be developed and refined. Starting points are offered by evaluation research of NSF IGERT programmes with strong international components (Heg & 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 programmes 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, pp. 21-29) also includes interview protocols for academic staff and students over three phases and an online survey in the appendix, making it a useful resource. Finally, Kirk (2008) reports on a NSF workshop intended to develop approaches for evaluating international science and engineering-related 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, p. 4). More specific measures of scientific and technological skill acquisition, the area 2008 workshop participants struggled to define for assessment purposes, still await creation.

Taken together, these various areas represent starting points for developing a more cohesive, long-term assessment on the value of international experiences at the postgraduate level.

Convening an international, interdisciplinary workshop to develop a research agenda

With financial support from a grant by NSF, an international, interdisciplinary workshop was designed to stimulate the research agenda setting on understanding the value added of international collaboration at the postgraduate level. This workshop was motivated by the CIRGE emphasis on the research of institutional and educational challenges faced by interdisciplinary and increasingly international doctoral programmes and their evaluations, as well as the 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, CIRGE researchers were inspired by their experience of establishing effective research communities of international experts in doctoral education and subsequent publications through the CIRGE series of international research synthesis workshops (see CIRGE website, *http://depts.washington.edu/cirgeweb/*).

The programme was designed to (a) increase the mutual understanding of essential topics relevant to investigating 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 programmes, and (c) move collectively towards charting research directions for the next years. A series of short talks (10 minutes) helped 'ignite' ideas about relevant research topics, 'fuelled' awareness of important assessment aspects in international collaborations, and 'kept the flames burning' to enable the participants to identify potential collaborators for future research on international programmes and experiences. A simple conceptual framework was applied, exploring issues of collaboration and assessment before, during and after the international collaboration activity.

Prior to the workshop, participants identified the following key concerns through a pre-workshop survey:

- How can we maximise 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 & Blumenfield 2011; Graybill & 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.

Workshop results

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

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?

The following sections address preliminary efforts to

pool knowledge regarding these questions and to further refine the questions into concrete research topics.

Planning for international collaboration: the institutional context

One frequently voiced frustration by the research community is the challenge of obtaining funding for international collaborators, and the dangerous imbalance of research relationships that could result from a US Congress-funded agency that restricted funding for foreign researchers. Timelines for international collaborative work and the structure of doctoral student funding also posed challenges: 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. Furthermore, the outcomes of international experiences should be studied over a longer term than most grant evaluations allowed. Structurally, then, existing strict doctoral programme length in many fields poses barriers to international work and to assessing its outcomes.

In addition, racial and gender disparities are often magnified by international doctoral education opportunities (Ackers *et al.* 2008; Hogan *et al.* 2010). 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. Postgraduate 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 (Zippel 2011). 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 postgraduate adviser continues to be crucial in the formation of students. Compounding the problem, more men than women receive unsolicited invitations to engage in international work by another institution. Zippel suggests that developing an application process for women to research abroad rather than requiring them to be selected by a mentor or an academic staff person would help alleviate this disparity (Hogan *et al.* 2010).

A working group at the workshop developed a 'wish list' for making internationalisation more feasible. Funding, and joint submission of grant proposals, was a constant desire, but diversity-supporting elements like dependent support and full inclusion of minority individuals were also priorities on the wish list.

Internationalisation 'wish list'

International collaboration opportunities should:

- Be constraint free: explore joint funding possibilities.
- Include increased programme support, funding travel, personnel, associated research and stipends.
- Fund supplies for offices and laboratory expenses.
- Initiate reactivation transitions earlier: provide support resources for post-doc to return for careers, conferences, and other travel.
- Address institutional level-challenges: these challenges are particularly acute in institutions facing a budget crunch, where staffing constraints prevent multiple grant submission.
- 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 US is often less resplendent.

Examining length, timing, and characteristics of effective international experiences

What length of international experience is most effective, and when should the experience occur? Can multiple experiences occur, as preferred by the subjects of Avedduto (1998) (although they lacked the funding for multiple experiences)? One researcher emphasises, 'The greater the culture gap, the longer it may take for meaningful understanding to develop' (Bordia 2011). 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 variations in the type of international experience affect the outcomes? It will be important to distinguish in evaluation research between individual student exchanges and more complex research collaborations.

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?

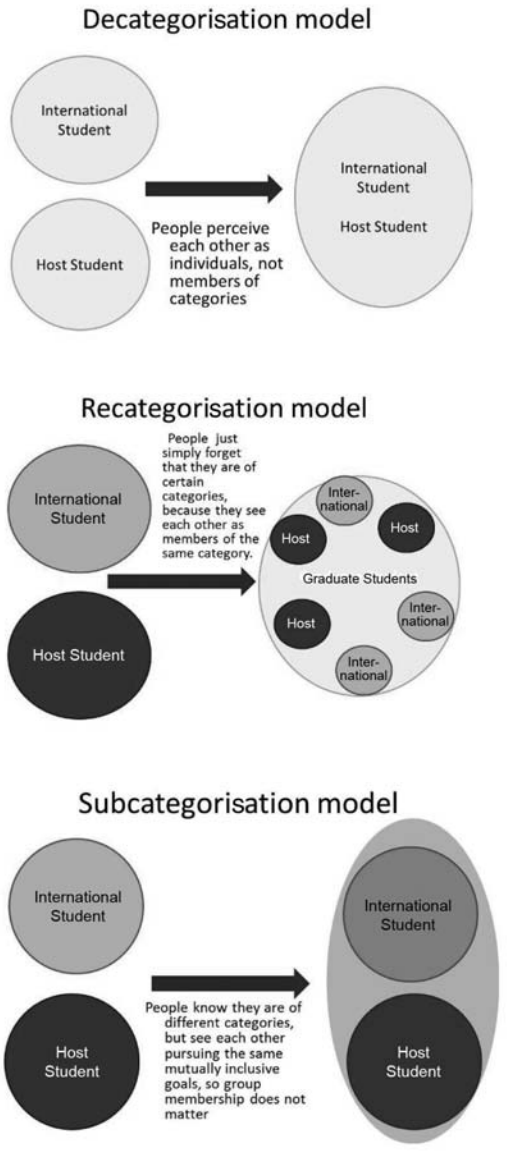
During his presentation, Bordia (2011) explained that 'effective collaborations have a scientific basis, complementary expertise, and appropriate facilities.' He also emphasised that for students, having an assigned host is essential. Nagoya University social psychology professor Jiro Takai (2011) offered insights from psychology about fostering effective relationships between students from the host country and students from abroad, an important yet under-studied aspect of the international experience (cf. Nerad 2011a). After explaining that merely bringing groups into contact with each other has been largely discredited as an effective tool for cross-cultural understanding – proximity does not guarantee meaningful interaction – , he drew from social identity theory (Tajfel & Turner 1979) to suggest that optimal results would occur from changing the ways in which students identified. 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 (Figure 1).

Takai's work points to the potential for universities to draw on recategorisation, decategorisation, and subcategorisation to 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.

Assessing outcomes following international experiences and developing frameworks for outcomes assessments

Questions about assessing outcomes on an individual level (please consult Nerad & Blumenfield 2011 for additional questions about assessing outcomes on an institutional level):

Figure 1: Shifting categorisations



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

- What is the value of individual interdisciplinary skills compared with interdisciplinary team skills?
- 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?

The hope to find a universal framework for assessing international experiences for postgraduate students and

for early career researchers is understandable, but not realistic. Different lenses can be applied to approach the finding of a framework. Different frameworks follow different questions. For example, one common question would be, 'Does international work lead to better science? Does it form a better scientist?' An evaluation looking to answer these questions would need to first clarify the programme objectives and then build an assessment tailored to those objectives. Tools drawing from the intercultural communications field are seldom field-specific. A model from the Engineering Cultures China / Global Hub consortium combines disciplinary-specific knowledge (engineering) with intercultural competence training (Jesiek & Beddoes 2010). This programme included several training modules and several online assessment modules. The flexibility of this tool meant that students could complete assessments during their international engineering internships in China as well as during the training and after the programme completion.

The number of high-quality, programme-specific assessments of international experiences for postgraduate students is growing. Now, programme directors and responsible academic staff need to carefully consider how to pool this information to contribute to a larger understanding of promising practices in international research and education. Longitudinal, multi-country studies should be coordinated and supported by national (or international) funding agencies. Assessments should be robust, incorporating quantitative and qualitative approaches; they should also be balanced between formative and summative assessment (Pfotenhauer 2010); and they should take advantage of creative assessment tools like data-driven storytelling (Macklin 2011). Assessments should not rely entirely on student self-report, but should gather information from multiple perspectives. For example, host country collaborators, international student colleagues, employers, advisors, and same-university colleagues could all be well-positioned to provide insight into how well individuals achieved certain outcomes. Depending on the outcomes to be measured, additional people or units could be included as well.

Examining relationships resulting from international research experiences can provide a helpful tool for assessment. Shawn Wilson, author of Research Is Ceremony: Indigenous Research Methods (2009), emphasises 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. For example, one American university sent several cohorts of doctoral students to collaborate with community organisations in another country. However, the students lacked linguistic competence necessary to pursue research independently, and overlooked the necessary aspects of nurturing a mutually beneficial long-term relationship. This led to an earlier-than-anticipated end to productive collaboration. One university administrator in South Africa described US 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.'

Summary and recommendations

In this article we reviewed recent literature that is useful for approaching research on assessing international (post) graduate education and collaboration. We found that the existing publications focus more on the undergraduate level of international exchanges than the postgraduate one. At the postgraduate level the focus is on the mobility of doctorates, especially within Europe, and on joint publications and creation of international networks. We found that the intercultural competencies concept offers much for future research at the postgraduate level, and that insights from intergroup psychology play an additional role in building understanding. We also found that attention to the effects of international experiences for magnifying or minimising inequalities should be an important component of future research. We further reported from findings of an international, interdisciplinary workshop on the topic of developing a research agenda for assessing international postgraduate education and collaboration.

Results

No single uniform conceptual framework will be able to move this nascent field forward. Rather multiple lenses, qualitative and quantitative methods, and the multitude of stakeholders need to be considered. Only with many-faceted, complex case studies with mixed methods will we arrive at a comprehensive understanding of whether value has been added to postgraduate education and research through international experiences and collaboration or not. Such assessment research will approach studies with a framework of before, during and after the international activity, and will distinguish between the individual or institutional level of analysis and the contribution to the advancement of science and knowledge *per se.* Future research will pay attention to gender and race issues within international collaboration and to the rel-

Figure 2: Thinking through Inclusivity

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 programmes, and structure (partnerships and exchanges).

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

During:

How structured is the programme? Are there mentorship programmes?

An effective programme 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?

evance of length of exchanges or visits to other countries and cultures. Future research needs to be particularly alert to national funding structures and whether these facilitate or hinder international national collaborations.

Figure 2 provides an example using the structuring framework of before, during, after and applying it to the issue of inclusiveness.

Recommendations

We recommend that national and international funding agencies support, coordinate and pool emerging cases of individual institution's assessment studies to help build a comprehensive understanding of the values of international engagement and provide critical evidence for the justification of resources allocated to them. We recommend that any new collaborations build elements into international experiences that maximise institutional rewards and support diverse students and researchers, creating a more reciprocal and equitable endeavour. To accomplish these goals will require efforts beyond that which a single research institute in any one nation can muster. It will also require that research results pay attention to ongoing asymmetries in academic knowledge production. Existing measures of international collaboration like citation indices, currently reliant on only English-language publications, need to be updated in order to accurately reflect the scale and scope of collaboration, and to adequately reward scholars for publishing in non-English language venues. Finally, paying careful attention to the changing carrots and sticks used by universities, often at the behest of national governments, as countries reform and recalibrate their higher education systems (e.g., research assessment exercises of the sort recently revamped in Australia (cf.AUR 53:1)), and noting how they affect international collaborations of both junior scholars and postgraduate students, will be critical.

We close with a call for collaborators. We hope that this important research agenda may attract new participants and foster connections among those already engaged in similar work.

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Acknowledgments

We would like to thank the US National Science Foundation for funding the grant proposal, Investigating the International Experiences in STEM Graduate Education and Beyond: From Anecdotal to Empirical Evidence (#105029). We also thank the February 2011 workshop participants for their ongoing engagement with this work.

Endnote

Throughout this article, the term 'academic staff' is used to describe research professors and other teaching staff, often those who supervise students. Its equivalent term in North American usage is 'faculty.'

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