

Globalization and its impact on research education: Trends and Emerging Best Practices for the Doctorate of the Future

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It is truly an honour to be here and I am delighted to have this opportunity to present my thinking and observations about the impact of globalization on research training and about the globalization trends in doctoral education—often called 'best practices' but I like to call them 'promising practices—for the doctorate of the future. These promising practices and trends were discussed at a conference, in September 2005 at the University of Washington in Seattle, organized by CIRGE, the Center for Innovation and Research in Graduate Education. The conference brought together experts from all six continents and fourteen countries including three Australian members, who I believe are present today.

In my talk today I will argue that: a) globalization has not only brought a number of common trends to doctoral education worldwide—we may speak of converging practices—but also has had differing effects on differing regions and on the more and more diverse doctoral student population worldwide; b) due to globalization, doctoral education is confronted with the tension between building a nation's infrastructure—which means preparing for the next generation of professionals and scholars inside and outside academia—and the necessity of educating domestic doctorate students for participation in the international scholarly community; and c) lastly I will argue that we need to prepare our doctoral students adequately for times of globalization and an increasing national interest in the role of doctoral education for the knowledge economy. We need to educate our students to BOTH think globally and act locally AND to act globally and think locally.

Today's doctoral education is precisely the place where we have the opportunity to look across national boundaries and learn and study how the effects of certain approaches benefit or harm people outside our hemisphere—it cannot be 'local' anymore. In the history of universities we have come full circle, from the universities being in the medieval age, centres of learning to becoming nation-state universities which pursued national interests, specifically in the nineteenth and twenties centuries and now once again emerging as international centres of learning and scholarship. We need to educate doctoral students who are **world citizens**, who cross national boundaries without seeking to assimilate and homogenise but instead accept differences and embrace diversity.

Following I will: define globalisation; talk about its effect on doctoral education worldwide; highlight two challenges the effects of globalization pose for doctoral education; name emerging promising practices which we can observe worldwide; and end with a few recommendations for future research.

Globalization—some definitions

I am using the definition of globalisation given by Freidman in his 1999 book *The Lexus and The Olive Tree*, where he describes globalisation as the 'inexorable integration of markets, nation states and technology to a degree never witnessed before—in a way that is enabling individuals, corporations and nation-states to reach round the world further, faster, deeper and

cheaper than ever before.'

Tony Gibbins and Manuel Castels (one British and the other Spanish, now living in US), a sociologist and an urban planner, argued that the process of globalisation is **a force**; it is more powerful than industrialisation, urbanisation and secularisation combined. In contrast, some groups of scholars and activists view globalisation, not as an inexorable process but rather as a deliberate ideological project of economic liberalisation that subjects states and individuals to more intense market forces (see John Douglas, 2005).

What we are actually seeing occur is the skill bias of recent technological advancement leading governments to strive for a competitive advantage in emerging knowledge-based industries. If a nation does not have sufficient numbers of adequately educated and trained workers, it will need to either: a) increase the PhD production of knowledge workers (as has happened in Europe, Asia, Australia and New Zealand), however, this is costly, and time consuming; or b) governments will need to liberalise short term immigration of highly skilled labourers—bringing skilled workers to capital and technology.

In the meantime, we have observed that political forces are unpredictable and may instead restrict immigration policies, as we have seen in the case of the US. Now, what is happening is that capital and technology is brought to the highly skilled workers, rather than the worker to capital or technology. Work has been "outsourced" to poorer countries, or rather to countries which have a lower salary scheme but who have a highly trained labour force. Multinational companies are setting up R&D companies in India and in China, rather than petition or lobby to have Indian programmers admitted to the US. Every three years I visit my parents-in-law in Bangalore and the last two times I could observe how US and European multinational companies, especially software and bio-tech companies, have set up operations there, hiring hundreds of PhDs, mostly Indian PhDs either trained abroad or trained at home, but also PhDs from other countries. Thus, I am arguing that we need to train our own domestic students to be citizens on the world stage. Today the international student, specifically those with degrees in science and engineering, have an advantage on the global PhD labor market.

Effects on Doctoral Education Worldwide

So what does this mean for higher education, particularly for doctoral education? One, it means an increase in PhD production because, as I explained, the post-industrial society needs knowledge workers for the new economies. Should there not be sufficient domestic students readily available, international students are recruited with the hope that they will remain in the country and join the national workforce. It also means education has become commercial and generates revenues.

When I invoke the term **knowledge economy** I am speaking of the concept that "future economic performance will be closely based on the skill and innovation level of the labor force, underpinned by effective research and R&D capacity" (Harmon). Universities are increasingly seen as significant knowledge producers and thus as agents for economic growth. Nations, such as China, Singapore, and the European member nations therefore developed a new interest in their universities and investment in knowledge. They translated this investment into a direct increase in PhD production. The European Union countries decided in the Bologna treaty to invest 3% of each country's gross national product in R&D by 2010.

Now let me give you some figures about the increase of PhD production: (I

use PhD here synonymously for doctoral degrees.)

- ❖ China, in 1991, granted 2,556 PhDs—half of those in science and engineering. In 2001, China granted 12,500 PhDs—two thirds of them in science and engineering
- ❖ Japan, in 1991, granted 10,758 PhDs—one third of them in science and engineering fields. In 2001 there were over 16,000 PhDs, and half of them were in science and engineering.
- ❖ Taiwan, in 1991, had only 466 PhDs, practically all (410) were in science and engineering fields. Now, in 2002, Taiwan had nearly 2000 PhDs and again practically every one is in science and engineering.
- ❖ Germany, in 2002, granted 23,000 PhDs, 60% of these were in science and engineering.
- ❖ France, in 2002, granted 10,000 PhDs, 60% in engineering.
- ❖ The UK, in 2003, granted 14,000 PhDs, 60% in science and engineering.
- ❖ The European Union altogether, in 2002, granted 76,500 PhDs of which 55% were in science and engineering.
- ❖ Central and Eastern Europe in 2002 granted 45,740 PhDs; interestingly only 40% were in science and engineering.
- ❖ Australia in 2002, granted 4,420 PhDs—half of them in science and engineering.
- ❖ New Zealand in 2002 awarded 510 PhDs—60% in science and engineering.
- ❖ And in the US in 2002, 40,710 PhDs were awarded, about 60% in science and engineering.

We see a drastic increase of PhD production, especially in Asian and European countries due to substantial financial investment by the governments in these countries.

Now let us examine the increase in the percentage of doctoral degrees earned by foreign students in selected countries in 2003:

- ❖ Germany—in 2003 of the 23,000 PhDs awarded, 10% went to foreign students. Of all the PhDs in Germany in science and engineering, 14% went to international students.
- ❖ In Japan, of all the PhDs awarded in 2003, 13% were international students; and again, of all the science and engineering PhDs, 13% went to their international students which are mainly from Asia, e.g. Malaysian etc.
- ❖ In the UK 39% of all its PhDs awarded went to international students; of all the science and engineering PhDs awarded 39% went to international students, mainly Asian.
- ❖ In the US, 30% of all PhDs were awarded to international students and 37% of all science and engineering PhDs went to international students.

A very clear picture emerges. We see an enormous increase in the production of science and engineering PhDs in Asian countries, and we see a large proportion of science and engineering PhDs being awarded in Western countries to Asian students.

Why do we see an increase in international students?

Why do universities like to have international students, Australia being one of them? Multiple reasons motivate the intake. Let me take the US as an example. In engineering, mathematics and economics, relatively few US

students studied for a doctorate, specifically in the eighties and early nineties, since with just an undergraduate degree in science or engineering one could earn a \$70,000 starting salary in one of the high tech places such as the California Silicon Valley. However, since university departments do not like to shrink in size, international students filled the ranks. In such cases international students functioned as a 'reserved force' to keep up the numbers in departments.

In addition to wanting to avoid size reduction, universities around the world also want a top quality pool of doctoral students. Many of the international students come from the very best undergraduate institutions of their home countries. Take India as an example. The Indian Institutes of Technology, from which many of the Indian students who go abroad come from, are very selective higher education institutions. The entrance exams are rigorous—only 2% of the applicants are admitted. These students are very smart and well trained and everybody loves to have them in their pool of doctoral students. The same is also true for Chinese students from top Chinese universities.

A third factor motivating universities today to actively recruit international students is economics. International students pay high out-of-state tuition, and thus bring in revenue, as in the case of the UK, and also in Australia. This direct economic motivation for increasing the number of international doctoral students does not apply to all countries. Generally speaking, it does not apply to the US institutions, although international doctoral students pay high out-of-state tuition. Admission to US doctoral programs is highly competitive. Increasingly, US universities are offering multiple-year funding for the doctoral students they admit. Further, public US universities have to pay out-of-state tuition for every international student they admit to the state. Private universities mostly waive the fees after one or two years in the program if the student is in good standing.

Also a number of European countries, Germany for example, do not (yet) charge tuition. Economics is not the motivation for this practice. Rather, many highly industrialized countries have become aware that having a diverse student body enriches the doctoral education experience. Further, nations have recognized that acquainting international doctoral students to one's culture is an investment in the future for social, political and economic reasons, as many current international students are likely to become future leaders. Attracting these students to their universities allows for the formation of international partnerships early on in the careers of these future leaders. Students who have a good educational experience abroad will be more inclined to look favourably on these countries after assuming leadership roles at home (and international students bring money to the universities in the form of fees and spending money at the local community as consumers).

What other trends of global nature affect doctoral education?

Besides an increase in PhD production and an increase in the international flow of doctoral students worldwide, we have observed an increased global communication spurred by technology innovations which make communication across vast spaces easier, faster and more wide-spread. Scholarly networks have formed rapidly. They have been actively and explicitly supported by the European Union and some international foundations. The global nature of pressing problems such as AIDS, bird flu, and the many issues connected to the environment have no national boundaries, and scholars around the world are coming together to address them.

All over the world we observe an increased request for accountability of

moneys that government and private funding agencies have invested into higher education. In terms of doctoral education accountability requests translate into documentations of educational outcomes such as time-to-doctoral degree, completion rates, and information of career outcomes. All of these trends are visible also in Australia. Your government has developed funding schemes that include some of these indicators. Your national association of graduate deans is working with a research center at the University of Queensland on a career outcome study. This may allow for a possible comparison between Australian and US PhD career outcomes.

And lastly, universities worldwide are entering a worldwide ranking competition. In September 2005 *The Economist* published a list of top international universities, resulting in one more goal on the list to achieve for university presidents; to have their institutions ranked among the best worldwide.

Challenges for doctoral education.

What are the particular challenges? One is clearly globalisation which has a different effect on different regions of the world and on the more and more diverse doctoral student population worldwide. Let me give you two examples of countries to illustrate this point. In South Africa, on the one hand you have some of the very best medical doctors worldwide heart specialists. The same is true in research connected to steel. Yet this country needs desperately to build up its own basic infrastructure; its overall people power. South Africa's population is young. The country needs to build up that young population. Training them at home is costly and not all higher education institutions are fully equipped to do this at a competitive standard. Sending their students abroad increases the risk they may not return. Should we receive students from South Africa we need to train them so that they are scholars who can collaborate with colleagues around the world and we need to train them to still think about their own country's needs. Not an easy task.

Besides the "brain-drain", there is also the issue of needing to prepare for national infrastructure building and the necessity of preparing domestic doctorate students for participation in the international scholarly community. This goal led a number of countries to move towards using English as a means of doctoral seminar instruction so that students become more fluent in using English; the current universally used language of scholarship. One of the key university roles is to pass on societal accumulated knowledge, which includes being a transmitter of certain cultural literature and knowledge. Teaching in a foreign language works counter to this role. For example, in the case of Norway, a small country with a language spoken by few people on the earth, concern is arising about preserving their literature and language heritage and passing it on to the next generation.

Common characteristics of doctoral education around the world

The following characteristics came from information gleaned from the presentations and discussions among the 14 countries present in Seattle 2005 at the Forces and Forms of Change in Doctoral Education Worldwide conference. They might tentatively be called a list of 18 promising (best) practices for future world doctoral education.

1. Students will be prepared for a variety of career possibilities, including research, teaching, government or industry.
2. There will eventually be a code of practice for departments and supervising faculty members.

3. Admissions will be competitive, not just a matter of a student asking a professor whether he or she will accept another doctoral candidate.
4. Students will be offered several years of funding—but with clear benchmarks and performance standards to be met at various stages of the degree process.
5. Students will have more than one supervisor.
6. Doctoral program will begin with a course or courses on epistemology, scientific method and research tools. Most scientific, technical and social problems we face have become too complicated and too large to be solved individually and from a single discipline perspective. Much of our research will need to be approached from a multidisciplinary perspective. Few scholars can master several disciplines, but we need to understand each other's disciplinary concepts and worldviews, and be able to communicate with each other. We need to make our students aware and introduce them to what we may call a general post secondary education course on epistemology: something like, 'How do we know what we know? What do we regard as evidence?'
7. Students will be expected to demonstrate a broad understanding of their core disciplines in some form of examination.
8. Within single disciplines, doctoral education will include some interdisciplinary or multidisciplinary component to prepare students to work in the multidisciplinary settings of contemporary research.
9. Students will receive training and experience in teamwork, project management, presentation skills, and communication skills.
10. Students will be able to choose between traditional dissertation studies or the publication of several articles based on their research. Universities will have policies to recognize articles with multiple authors.
11. Students will be expected to carry out some portion of their training or research in another nation. We have a small country, Denmark, where this is already the case. The Danish government pays every doctoral student to go for six months to another country to do their research. This is ideal.
12. International doctoral students and their cultural expertise and knowledge will need to be integrated into our curriculum. Not all countries have the money like Denmark to send their students abroad, so while we want to provide our (own) PhDs with international experience, we can do something less expensive at home and that is to integrate into the curriculum our international students. They are doctoral students, they are not undergraduate students: they are experts in their field and know much about their home country. We have global villages on our campuses we can use by assigning small research projects to our domestic doctoral students working together with international students. Thus students can learn without traveling to another country.
13. Future oriented doctoral education will have collaborative projects with other universities, research centers, or industrial research organizations. Entire doctoral programs—not just individual students—will collaborate.
14. Universities and national funding agencies will seek to create and utilize templates for the review of doctoral programs that synthesize the highest international standards for Ph.D. programs. They will reach out to international review teams for program review.

15. Doctoral education programs will use evaluation experts who are external to teams but use campus internal formative evaluation as an effort for ongoing improvement.
16. They will establish structured international collaborations with doctoral programs from other nations to develop research around some of the same global issues and problems.
17. Students will need to master more than just one language. Due to technology advances, English has become the dominant language. English speaking countries have dropped foreign language requirements for PhD education. This lack of foreign language skills has two negative consequences. First, is the fact that much is lost by not being able to communicate directly; and second, the fact that speaking English privileges some and disadvantages others. Having experienced how one is handicapped by not being able to express oneself sophisticatedly and quickly, is a humbling experience; one that is good to have gone through when acting on the world stage.
18. We need to initiate world citizenship education for domestic and international doctoral students.

You may think, 'It is nice to say, but how can this be done without extending time and additional resources?' Let me give you a concrete example: the School of Graduate Studies at the University of Melbourne and the Graduate School at the University of Washington are planning to bring together for two weeks a group of thirty doctoral students who will take part in an international leadership workshop. We intend to bring fifteen students from each university together, ideally from fields of studies that do not necessarily lead them to go abroad, who have their dissertations in common fields, and who have common interests, to learn and experience what new leadership means.

Our goals are to create a learning experience that not only includes leadership training, but also research collaboration in order to initiate interaction beyond a one-time meeting. This workshop will be structured so that the students understand that leadership skills have contextual components and are culturally influenced and that they become aware of national stereotyping. We also want to create an understanding of the effects of language and cultural dominance while practicing behavior of "new" leadership skills that are culturally sensitive. We are planning to provide opportunities in this workshop for indigenous Australian students to meet with indigenous Native American Indians. The universities will take turns in hosting and funding the workshop.

With this small, but concrete step, we hope to create opportunities to help postsecondary students become citizens who operate not only within a small sphere of elite intellectualism but, in the words of the educational theorist Henry Giroux, move them to become "critical public intellectuals [who define themselves] not merely as marginal figures, professionals, or academics acting alone, but as citizens whose collective knowledge and actions presuppose specific visions of public life, community, and moral accountability."

A few suggestions for needed research:

- ❖ We need more case studies on international entrepreneurship of universities
- ❖ More studies on the impact of globalization locally

In M. Kiley and G. Mullins (Eds.) (2006) *Quality in Postgraduate Research: Knowledge creation in testing times*. CEDAM, The Australian National University, Canberra

- ❖ We need studies about the acculturation of domestic students to international students. We need to know what our domestic students learn from their international peers
- ❖ We need studies that look at the interconnection of family and career after PhD completion

Have a good conference. I am looking forward to listening to you and to learning.

Thank you.

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