"WHAT BROUGHT YOU HERE?" INTERNATIONAL POSTGRADUATE STUDENTS' PERSPECTIVES

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ABSTRACT

We investigate motivational factors for studying physics in Australia through interviewing eleven international physics PhD students at a research-driven Australian university. They are academically competent and enthusiastic and likely to be different from the majority of undergraduate international students. This may provide different perspectives about young adult international learners who are underrepresented in the higher education literature.

KEYWORDS

international students – PhD study – motivational factors – scientific elites.

INTRODUCTION

Physics is categorised as the hardest of the hard sciences (Blackmore, 2007; Hooker, 2004) with four sets of institutional imperatives—universalism (impersonality and objectivity), communism (common ownership to share the products), disinterestedness (curiosity driven and enthusiasm for knowledge), and organised scepticism (empirical and logical) (Merton, 1973). A high level of intellectual competition is traditional and typical in the science community, with a hierarchical stratification, with, for example, Nobel Prize winners as the elite (Zuckerman, 1977). In this context, PhD study in physics is likely to be just the basic learning to begin to be a scientist and the beginning of apprenticeship in the research field.

In world science, international travel and communication are common among physicists, to solve scientific problems and share knowledge (Benka, 2006). This mobility suggests the possibility of strong internationalisation and globalisation of higher education, and international competition in research, in science fields such as physics. However, international students are often viewed as a homogeneous mass, with deficiencies in English and unfamiliarity with Western learning styles (Asmar, 2005). Despite different academic requirements at different levels of study, the majority of international students in English language courses, undergraduate, and coursework postgraduate levels, whose main goal is often the acquisition of professional or degree qualifications, are often included together with research postgraduates who aim for higher academic achievements. The heterogeneity of international students at the postgraduate level and the motivational factors for their study abroad are simply ignored. As a result, prevailing views of international students in higher education, such as being English-deficient, or having a passive learning style dominate—competent and highly skilled international students in research work at the postgraduate levels are typically underrepresented.

In particular, an active effort to improve the status and recognition of the research-driven universities in higher education markets could be of enormous future benefit for all Australian universities. One cost-effective strategy in which this might be achieved is to court more academically competent international students from other countries. These competent students can be potential collaborators or partners to build long-term high-value international links, contributing to internationalisation of Australian higher education both academically and economically. For this strategy to be successful, these academically competent students must receive high-quality postgraduate research training in the Australian universities. To provide high-quality postgraduate research training, as the first step, Australian education providers or educators have to know about the customers—who they are and why they choose the particular discipline in the Australian university. In this study, we investigate factors influencing international PhD students in physics in an Australian university and their motivations

Motivational factors for study abroad of PhD students

The motivation of international postgraduate students has been little reported in the literature. However, Ichimoto (2004) presented motivational factors for four postgraduate Japanese women studying in Australia. Both push (subordinated women's social position—conditions in home country) and pull (academic desire and career development—individual needs) factors appeared. The investigation of a range of personal (pull) factors of international students along with home country (push) factors

is an important part of understanding adult international students and their social contexts.

At the postgraduate level of study, cognitive intrinsic learning motivation (e.g., curiosity and the desire to understand and solve problems) (McInerney & McInerney, 2006) cannot be separated from contextual extrinsic motivational factors (e.g., rewards, better future options, support from family or partner) because postgraduate students are often economically independent adult learners, rather than dependent school learners. Therefore it is vital that individuals consider the balance of these intrinsic and contextual extrinsic factors when making final decisions about studying abroad.

METHODOLOGY

Eleven international PhD students in physics at a research-driven university in Australia, from Europe, Asia, Africa, and South America were interviewed about their motivations for study abroad in Australia. All interviews were one-to-one semi-structured interviews, and recorded and transcribed. Transcripts were reviewed and approved by the interviewees. Thematic analysis (Braun & Clarke, 2006) was adopted, supplemented by narrative analysis (Fraser, 2004) to explore the participants' individual motivational factors in physics and overseas study.

All eleven interviewees were male, from 26 to 36 years old. The time spent in their PhD study at the Australian university varied from three months to three years and five months. All of them were receiving scholarships from the host university in Australia or their home countries. Four out of the eleven had industry work experience (e.g., as engineers) before their PhD studies. The others had academic employment experience such as university lecturers, teaching assistants or tutors, and research assistants.

RESULTS

Multiple influential factors on study abroad motivation—learning science, seeking life experience, learning English, and other factors—were reported by the students. No single factor is dominant in their study abroad decisions, which are based on a combination of these factors, along with their particular personal and social circumstances. Students from developing countries are likely to be more focussed on the acquisition of advanced knowledge and working in a stimulating intellectual environment because of the lack of study or research resources in their countries of origin (e.g., library facilities, experimental facilities, and financial support for postgraduate students, for example, to attend international conferences). Some students from developed countries also consider the opportunity for different life experiences in Australia, and consider their past education, learning, and prior research training in their home countries to be good (e.g., publication experience in high-quality journals, a high level of mathematical, scientific, and technical skills training, and good computational resources).

The international students, in general, follow their genuine interests in physics. This enthusiasm for learning physics is a fundamental motivation for them. This is shown even more strongly by some students with prior work experience in industry, leaving well-paid jobs in order to study physics for many years.

> *…in high school, I was really interested in the sciences…so when I got out of school I was like, I really want to do something in science. But as I said, in [home country], the trend is that everyone becomes an engineer or everyone becomes a doctor. So if you go look for financial or monetary considerations… Now it's time to do something which I'm interested in. I've already done what my parents were interested in… I was earning a lot of money. And I knew that in about four or five years I could really earn a lot of money. I felt that it was kind of not very challenging but I also felt that in a few years, I'll just burn out. Because I didn't feel that I had a really strong motivation to do some nice work there (interviewee 11).*[6]

PhD study in physics is often seen as an apprenticeship for technical learning in their specialised fields. To maximize this, it is often desirable to be exposed to and try various approaches, as used or developed by different scientists or research groups. The value of learning by interacting with scientists in different countries is highly appreciated by these international students in their physics apprenticeship.

> *It's a great opportunity to get to know people that, if I had stayed in [home country], I would just listen about, but would hardly have the chance to interact with. The interaction with these people is an invaluable thing, because it seems to me to be the only way to really understand different approaches to science (other than your own) (interviewee 8).*

6 Quotations are taken from the interview transcripts.

> *...To get an international perspective of physics…that's one of the reasons why I value overseas study. Just to get an idea of what's going on globally (interviewee 1).*

Overseas experience was also seen as valuable to potential employers, as expected in the light of the international and mobile nature of European higher education (Maiworm, 2001; Wachter, 2004).

> *… the professor [at home university] got an offer from another university…and that I could do a PhD in [a place at home country] and I had no inclination of going to [there] whatsoever… she [girlfriend] said that going abroad would be an option. And I said I think it's more interesting to go see the world rather than going somewhere else in [home country]… That you show you're flexible and mobile and willing to take risks or certain steps for your job... (interviewee 9).*

A well-known research group or the research leader's reputation was a critical factor in choice of destination for PhD study in physics. This finding accords with a previous study on international research internship students in physics (Choi et al., 2007). It seems reasonable given that the level of individual scientists' capacity and accomplishment are laid out in the pyramid of stratification, with Nobel laureates at the top (Zuckerman, 1977).

The availability of a scholarship is an essential factor to attract students for PhD study in Australia, in competition with other advanced science countries such as USA, UK, and other European countries. As indicated earlier, physics is regarded as a difficult subject and does not attract many students. A quick response to the international student's application is a preferable factor. In addition, prior positive short-term experiences such as exchange-student experience during high school or an internship experience during undergraduate study affects their PhD study decisions.

> *…I was actually planning to go to [country]… I knew that there were really good universities in [country] which have a good reputation in my country…I got this scholarship to come here [Australia] first. I was actually processing my stuff for the [country] but it was going to take longer… (interviewee 3).*

DISCUSSION

The findings show that, overall, the factors underlying the decision to undertake international study in physics as adult protégés are not universal. Although personal enthusiasm for science learning (e.g., a genuine personal interest in a particular field of physics) drives the students towards postgraduate study and their PhD in physics, other social factors (e.g., international reputation of the particular research group or individual physicists, availability of suitable training in their home country, the influence of partners, desire for overseas experience, the availability of a scholarship, quick responses to email communication, and prior positive short-term exchange or internship experiences) affect their final decisions for study abroad in physics. In particular, the research reputation of the host research group, rather than host university name "brand", is important (Choi et al., 2007). The offer of a scholarship for international PhD students is almost essential.

Prospective PhD students in physics consider different life experience and improvement of English language. However, these life experiences and English language factors are not the main factors for international students in physics. This may indicate a clear distinction between students in physics and others in non-science or soft-science disciplines, and also between academic elite students and the bulk of international students seeking undergraduate or Masters degrees or improved English language skills. These findings concerning the varying characteristics of international PhD students in different disciplines accord with the research of Wright and Cochrane (2000) in relation to timely successful PhD theses submission in the UK.

CONCLUSION

International PhD students' motivations for studying physics in Australia are multidimensional. PhD study in physics is the beginning of an ongoing process of learning science and research. Providing a high quality research education and rewarding experience in Australian higher education will benefit both students and higher education providers, with direct research output and the forging of long-term international links.

Knowledge of the motivations of students is an essential first step in delivering a satisfying experience that addresses these motivations. This can operate on a number of levels. Firstly, supervisors and other staff responsible for research training and supervision can focus better on what students might be seeking. Indeed, the awareness that students can have a diverse range of motivating factors, and that the motivations of international students can vary greatly, and differ from those of domestic students, can lead to an active attempt to learn more about motivations in individual cases. Secondly, at an institutional

level, the promotion of individual programs can be supported by information on the motivations of typical international students. Finally, if prospective students consider their own motivations more consciously, they can better judge to what extent they are likely to be satisfied by postgraduate research work at a particular institution or with a particular researcher or research group.

From the perspectives of the students, they are making a significant investment in time and career development, as adults, aiming at a career in research in physics, in academia or industry. Some of the interviewees had returned to study from well-paid industry work, seeking greater career satisfaction and intellectual stimulation. In many ways, this is a remarkable gamble, given the highly competitive nature of the job market in research and academia in physics, indicating a high level commitment to further and lifelong learning. At the very least, there is a demand for the deliverers of this experience to attempt to meet the expectations of the students, who make a significant contribution to quantitative measures of research productivity. Can this be done in the absence of awareness of the expectations?

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