

**Expectations regarding graduate attributes and skills by early career PhD-graduates and their employers (0093)**

Doctoral students commence on their path for a wide variety of reasons, with diverse experiences and skill sets behind them. Consequently, their expectations of the outcomes from their doctoral work and of the value it will add to their skill sets are also likely to be varied (Leonard, Becker, and Coate, 2005).

Furthermore, graduates from doctoral programs find employment in various sectors, including higher education, public, and private (Access Economics, 2010), across which, the patterns and levels of skill sets required are viewed with varying importance by employers (Borrell-Damian, 2009).

This paper examines the relative importance placed by doctoral graduates and their employers on a range of skill sets and graduate attributes. This examination, from the viewpoint of both graduates and their employers across the public, private, and higher education settings, enables discussion of the importance of considering doctoral training, its purposes, and outcomes from multiple viewpoints. This allows discussion of expectations between sectors, employees, and employers to be undertaken.

There have been varied attempts, nationally and internationally, to integrate some of these considerations into doctoral training via the provision of alternative or add-on experiences during the doctorate (Borrell-Damian, 2009). The largest single effort in Australia to ensure doctoral training that considers employers outside academe is the Cooperative Research Centre (CRC) program. This program was introduced in 1990 to bring together industry, government, and universities, and is now in its 14<sup>th</sup> funding round. The primary purpose of this collaboration is to engage in applied, end-user driven research in the information and communication technology, manufacturing, mining, agricultural, environment, and medical science sectors (Department of Innovation, Industry, Science and Research, 2011).

Education, including PhD programs, is a mandated component of every CRC, with the intent for the 'industry contribution to CRC education programs to produce industry-ready graduates' (Department of Innovation, Industry, Science and Research, 2011). Thus far, the success of the CRC program in realising this goal has been supported via case studies, however, little information is known about the demographics of this population of PhD graduates, nor how their experiences and outcomes differ to those of their peers outside the CRC program.

The study reported here sought to examine the impact of the CRC program on doctoral education and outcomes and to combine this with a preliminary investigation of employer's perceptions of PhD graduates across the higher education, public, and private sectors. To realise this, an extensive survey was sent to all locatable PhD graduates (five-to-ten years post-graduation) from: (a) the CRC program (CRC group) regardless of the university they attended; and (b) from matched disciplines at three universities in capital cities (non-CRC group). Participants in the CRC group, therefore, represent a variety of universities, including smaller, regional institutions whilst those in the non-CRC group were from large research intensive universities. It was anticipated that the additional opportunities provided by a research intensive university would approximate the additional educational opportunities provided to those in the CRC program.

Responses were obtained from 327 CRC graduates and 741 non-CRC graduates and provided information on: PhD experiences; post-graduation career experiences; perceptions on the development, use, and importance of graduate attributes; and demographic information. In addition, graduates were invited to provide contact details of a representative from their employing organisation to complete a survey on some of these areas from the employer's perspective. This resulted in 280 employer responses across the higher education (75%), public (19%), and private (6%) sectors.

The results shed light on who CRC PhD graduates are and some areas in which their PhD experience was different to that of their peers not associated with a CRC. For example, whilst 47% of non-CRC participants were female, the proportion of women in the CRC sample was only 35%. Employment destinations five-to-ten years post-graduation were also different between the two groups and indicate support for the claim the CRC program increases PhD student's exposure to work outside of academe.

And whilst there were some significant differences between the groups in participant's retrospective reporting of the extent to which they had engaged in various activities (such as conferences, undertaking teaching, and coursework), there were fewer differences in their reporting of the extent to which they believed the PhD had helped them to develop a range of graduate attributes and skills. Over 80% of graduates in each group agreed that the skills learnt during their PhD had prepared them for employment.

Examination of the responses from employers of PhD graduates revealed some interesting contrasts, however. Employer's expectations of the extent to which PhD graduates in their workplaces would be able to demonstrate various graduate attributes and skills were seldom matched by the extent to which they reported that graduates were actually proficient in these skills. Trends in the data also suggest the varying importance that employers from the different sectors place on specific graduate attributes and skills.

Taken together, the results from these two surveys provide important insights into the ways in which graduates and employers perceive the importance of a variety of graduate attributes and skills for early career post-PhD work. This highlights the potential benefits of informing PhD students about the types of activities available to them to develop skill sets that may be viewed favourably by employers from different sectors (Borrell-Damian, 2009). Additionally, opportunities for increasing graduates' exposure to industry during the PhD may serve to open broader employment opportunities (The Allen Consulting Group, 2010).

The study also serves to prompt further examination, consideration, and discussion of the concept of graduate attributes and skills at the doctoral level and of the different purposes that the doctorate can realise for graduates and employers. The discussion of these purposes, as well as expectations and perceptions (on the part of graduates and employers) regarding the possession and demonstration of various graduate attributes and skills also enables a discourse into the extent to which a doctorate should not be viewed as the end of training, but as a precursor to ongoing learning.

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