



Is the PhD a qualification that is more or less standardised and accepted all over the world?

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The authors read with interest the letter from Tomas Kron to the Editor [1]. In his letter, Professor Kron provided commentary on the Topical Debate by Booth, Whitaker and Baldock [2] regarding the need for all accredited radiotherapy physicists to possess a PhD qualification in the future.

In his letter, Prof. Kron stated that “a PhD is a qualification that is more or less standardised and accepted all over the world”. That the PhD “is more or less standardised” requires further consideration and interrogation. For instance, variation is often found regarding what the accepted ‘standard’ of the doctoral thesis is [3]. Further, the provision of the research training and development, sometimes referred to as research education, is not always consistent, resulting in variation in the skills and experience gained from the PhD [4].

The doctoral examination process has for many years been recognised as having risks and uncertainties associated with it [3]. In this process, examiners are tasked with providing an independent assessment of a body of scholarship (thesis) to determine whether it meets a required threshold ‘standard’. Examiners, often international, are usually provided with an examination rubric by the doctoral candidate’s institution of enrolment that gives guidance regarding the criteria which evidences that the thesis has demonstrated deep disciplinary knowledge, advanced research expertise, independence of thought and approach, and original contribution to knowledge. It is, however, often the experience of administering institutions of doctoral examinations that examiners do not always adhere to the criteria of the examination rubric provided and approach the examination process with their own biased interpretations and often

subjective opinions as to what constitutes the appropriate doctoral standard. As is often the case for inexperienced doctoral examiners, this may be informed by their own personal ‘standards’ and experiences or the examination standards of their own institution [5]. Whilst these differences are often identified in quality assurance processes adopted by institutions to ensure the robustness of their institution’s doctoral examinations, there is always the risk they may not.

Another important aspect of the non-standardisation of the PhD is in the variation of doctoral training and development that many candidates undertake to develop generic skills in addition to the doctoral project undertaken [6, 7]. In some countries, the so-called *master-apprentice* model is standard in which candidates concentrate only on the thesis project as the product or output whilst working under a project supervisor [7]. In other countries, a more *programmatic* approach is adopted in which, in addition to the thesis project, the development of transferable skills that engender creativity, critical thinking, problem solving and innovation, are incorporated into doctoral programs which often administered through a university graduate research school [7]. Further, in some countries there is a hybrid approach with combinations of both master-apprentice and programmatic models adopted.

In Australia, for example, in 2015 the federal government sponsored a review of Australia’s university research training system to respond to the changing research environment which was becoming increasingly focussed towards innovation, impact, and industry engagement [4]. The review published in 2016, and led by the Australian Council of Learned Academies (ACOLA), highlighted the need for a shift to a more formalised approach in universities to embed transferable skills training as part of doctoral research training and development undertaken so as to ensure that research training programs would be capable of producing highly skilled doctoral graduate scholars who would be best placed for employment opportunities in the future knowledge society [7]. The ACOLA review was informed by previous reviews

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such as the Roberts Review [8] undertaken in the United Kingdom (UK) that resulted in national government funding for the VITAE Researcher Development Program for doctoral training and development in UK universities [9]. Subsequently, a number of universities in other countries, including Australia, adopted the VITAE approach to guide and inform transferrable skills training development, which was endorsed by graduate research peak bodies such as the Australian Council of Graduate Research.

Prof. Kron's stated view was presumably proffered in the context of the radiotherapy physicist working in the radiotherapy clinic. This raises an additional training and development consideration regarding the doctoral candidate undertaking a project in a clinical environment that may be somewhat remote or detached from the university of enrolment with a local supervisor also being somewhat detached from the university of enrolment. In such environments, there is the potential for doctoral candidates, often enrolled part-time whilst working full-time in the clinic, not being fully aware of the doctoral training and development opportunities being made available through an institution's graduate research school. This has the potential to negatively impact the enabling and expected experiences of the doctoral candidate and potentially the so-called standard of the resulting PhD.

For professional bodies that oversee the accreditation and standardisation of radiotherapy physics professional training such as the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM), it is important to have awareness of the potential differences in so-called doctoral standards.

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