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An emerging PhD curriculum and what this might mean for doctoral level threshold concepts

Margaret Kiley
Research School of Humanities and the Arts
The Australian National University and
University of Newcastle
Australia
Margaret.kiley@anu.edu.au

Abstract

Until recently the PhD in Australia consisted mainly of individual study and research with a supervisor and optional attendance at university/faculty workshops. However, over the past five years universities have begun introducing forms of coursework, often with mandatory attendance by candidates and sometimes incorporating work from existing Professional Doctorates. With these developments in Australia there has been an opportunity to examine this more formal approach to learning to undertake research and the possible role of Threshold Concepts in the related curriculum and pedagogy. It was hypothesised that universities would focus their coursework on those areas which they considered significant and from there embed into the assessment the various Threshold Concepts identified in learning to be a researcher.

To test the hypothesis three cases were used as examples from different Australian universities with different doctoral cohorts and different forms of coursework. Of the research-related areas of focus all three universities included the Threshold Concepts of research paradigm, framework, knowledge creation/originality, theory and writing. On the other hand, the Threshold Concepts of argument/thesis, analysis, creativity and 'doctorateness' were not readily evident in the case analysis. Of particular interest was the inclusion of mandatory courses in research integrity in all cases, although this has not yet been identified as a Threshold Concept. However, the evident focus on flexibility and personalising the learning programs, even where there were required courses, reflects the strong view of many supervisors in Australia that the PhD is an individualised learning program negotiated between candidate and supervisor.

Keywords: Threshold Concepts, doctoral education, research, PhD coursework, curriculum

Introduction

Unlike the Australian Professional Doctorate which generally involves coursework in the first year of the program, until recently the PhD curriculum in Australia involved the candidate mainly working individually with a supervisor /supervisory panel with optional attendance at workshops, seminars, and advisory/support services. These practices in Australia (and similarly in the UK and New Zealand) have been quite different from the system in North America where coursework has been an integral part of the PhD since its introduction.

However, over the past five years Australian universities have begun introducing forms of coursework, some of it formal award study and sometimes workshops and seminars with mandatory attendance by candidates. Formal coursework in this sense implies that the candidate enrols in the courses through the standard university system and that there are attendance and assessment requirements. Furthermore, with formal coursework, the details generally show on a graduate's transcript. Workshops and seminars, on the other hand, generally do not involve formal assessment and do not usually appear on the transcript.

In addition to the introduction of coursework into the PhD in Australia, over the past few years the Australian Qualifications Framework (Australian Qualifications Framework Council, 2013)—referred to as the AQF—has been formalized and monitored in a way that is much more explicit than in the past. This framework defines the learning outcomes and requirements for all tertiary courses and in the case of this paper, for candidates at the doctoral level (Level 10).

With these steady, and quite speedy developments in Australia there has been an opportunity to examine this more formal approach to learning to undertake research and the possible role of Threshold Concepts through curriculum design, including assessment and pedagogy.

It was hypothesised that universities would focus their required coursework on those areas which they believed were particularly important (see for example Walker, 2013). From there it was considered that the universities might embed into the assessment the various Threshold Concepts identified in learning to be a researcher that is: analysis, theory, knowledge creation, research paradigm, framework, argument/thesis, creativity (Kiley, 2009; Kiley & Wisker, 2009, 2010); writing (Humphrey & Simpson, 2012); and doctorateness (Trafford & Leshem, 2009). This integration of Threshold Concepts into the curriculum was considered to be possible, even if the Threshold Concepts were not consciously or explicitly named or identified but rather 'known' to be critical for understanding by those experienced in doctoral education. Additionally, it was posited that the analysis might highlight possible Threshold Concepts that have not yet been identified in the literature.

Background

Three different aspects of the literature related to doctoral student learning and programs have been brought together for this study. The first is the literature related the Threshold Concepts in learning to be a researcher. The second involves an examination of the literature related to doctoral education curriculum, and the third addresses various components of doctoral pedagogy.

Threshold concepts in learning to be a researcher

Within the overall focus of this special issue the work of Meyer and Land (2006) and their colleagues related to Threshold Concepts frames this study. However, while the original work on threshold concepts was embedded in various disciplines it has since been applied by others to examine the concepts across disciplines that are critical to an understanding of learning to be a researcher. The characteristics of a threshold concept such as being transformative and integrative resonate with doctoral supervisors as they witness their students "crossing over" thresholds of understanding and seeing knowledge in new ways (Land, 2008). Similarly the irreversible nature of the threshold concept is evidenced by the candidate who moves on to become an independent

researcher, often supervising new candidates and helping them cross similar thresholds of understanding.

Based on extensive interviews with doctoral supervisors, the work of Kiley (2009) and Kiley and Wisker (2009) indicated that six concepts challenged candidates, and often their supervisors. These initial threshold concepts, as noted above, were the concepts of analysis, theory, knowledge creation, research paradigm, framework, and argument/thesis. While these concepts were originally identified through interviews with supervisors it is often noted negatively in examiners' reports that an understanding of these concepts has not necessarily been demonstrated in the thesis (see for example Bourke, Hattie, & Anderson, 2004; Kiley & Mullins, 2004, 2006; Lovitts, 2007; Mullins & Kiley, 2002). For example, argument is one concept that is often reported in the examination literature where a candidate has not been able to sustain an argument or thesis, or if it is there, it is weak or unconvincing (Lovitts, 2007). Another example is framework, where supervisors reported the difficulties some candidates had with the concept of framing their research by theory, methodology or epistemological approach. The lack of framework is also noted in the examination literature. For example, Kiley (2004) notes that examiners' reports generally commented on whether candidates had developed a conceptual or theoretical framework for the work and undertaken the research within that framework. Understanding the concept of theory and its role in research was reported by a number of respondents as posing serious challenges for some candidates who were unable to grasp the critical role of theory and theorizing (Kiley, 2015).

Creativity was also proposed as a Threshold Concept by Kiley (2010). This concept, rather than relating, as some candidates thought, to the creative arts it was rather the notion, particularly in the sciences, where creative approaches to research are different from undertaking original research. "'Doctorateness' or the combination of both 'doing' and 'achieving' a doctorate…merges the issues of research process and research technique" (Trafford & Leshem, 2009 p. 305) and it is proposed by those researchers that doctorateness is also a Threshold Concept in learning to be a researcher. In 2012 Humphrey and Simpson argued that the concept that the writing process itself was part of the research was, in fact a Threshold Concept.

While it is to be expected that there are discipline-specific Threshold Concepts the above concepts, to date, are ones recognized as being part of becoming a researcher.

Doctoral level curriculum

In those countries where formal coursework has not been a standard part of the Doctor of Philosophy it has been unusual to use the term 'curriculum' in relation to the PhD. After all, as one might suggest, 'each candidature is an individualized learning experience between the candidate and their supervisor, in other words, that is the curriculum'. However, more recently with the introduction of greater structure into the PhD, especially in this case, in Australia, it has become more common to use the term curriculum to address many of the issues related to this level of study (Kiley, 2014a). Furthermore, with qualifications bodies such as the Australian Qualifications Framework (2013) and the UK Quality Assurance Agency (http://www.qaa.ac.uk/en), there has been an increased focus on identifying issues such as aims and learning outcomes in the PhD.

One of the issues often raised in the debate about the doctoral curriculum is the initial question: what are the aims of a PhD program? For many the answer depends on who is asking (Kiley, 2014b). Often one hears that the aim of the PhD is to prepare future cohorts of academics. Others argue that the aim of the PhD is to educate independent, skilled researchers for a range of futures. On the other hand it is argued that there is now a tacit 'core curricula' in PhD programs.

What might this all mean? One obvious answer is that the PhD curriculum is unclear, and others take this to suggest that we should reconsider even thinking in curriculum terms at this level. This might be one reason for avoiding deeper study into examining the various curriculum aspects of the PhD.

Doctoral pedagogy

Pedagogically the PhD system in Australia has been traditionally based on the one-to-one candidate/supervisor with the research dissertation as the sole item of assessment,

that is, somewhat different from the US committee and coursework model. However, one of the key understandings of the PhD experience is that of socialisation. This is a concept that has been particularly strong in the USA and gaining interest in Australia. For example, Austin (2002) and Austin and McDaniels (2006) suggest that Boyer's four notions of scholarship provide a fruitful way of candidates learning to appreciate scholarly work and its quality, particularly for those who are intending to pursue an academic career. The four scholarships outlined by Boyer (1990 p.16) are: 'the scholarship of *discovery* [traditional, basic research]; the scholarship of *integration* [such as textbook writing]; the scholarship of *application* [for example outreach]; and the scholarship of *teaching'*.

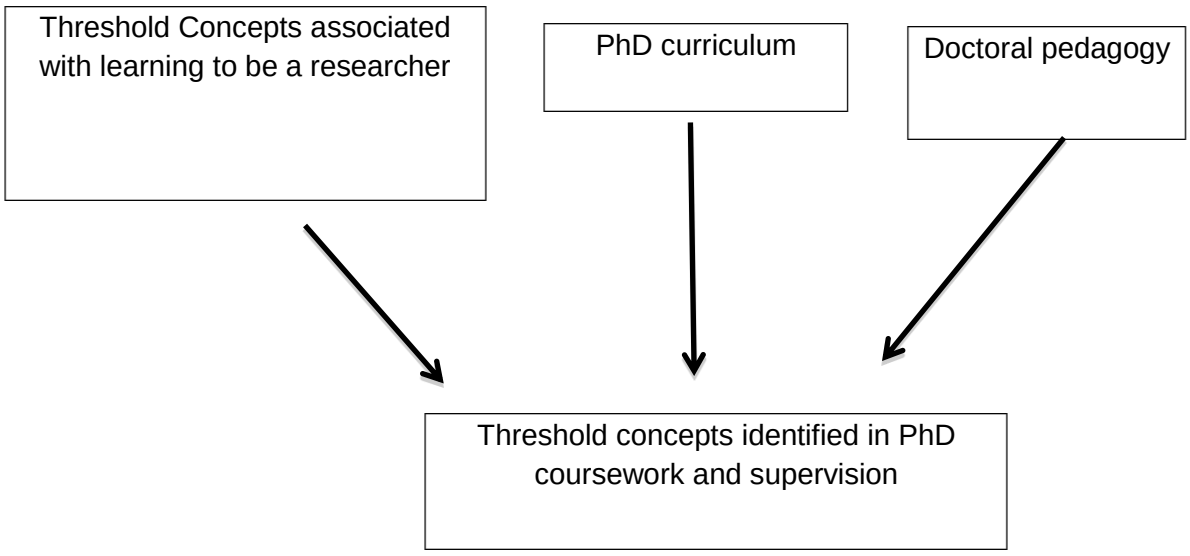
Gardner (2008) takes further the work of preparing future faculty by addressing the various phases of socialisation and the challenge for supervisors in balancing support and 'hand-holding' at the PhD level with learning to be independent during the various stages of candidature. This challenge is succinctly presented by Hopwood (2010 p. 105) when he suggests that on the one hand the ideal candidate is one who exhibits agency and independence and at the same time is able to ask for help.

Socialising candidates into being scholarly researchers requires a particular pedagogy, not unlike that suggested by Vygotsky, Cole, John-Steiner, Scribner, and Souberman (1978) so many years ago and then further developed by Lave and Wenger (1991) where, through Communities of Practice, more experienced peers and collaborators are able to assist the new learner to move from the periphery to the centre of the learning community.

Australian researchers, Boud and Lee (2005, 2009) have given particular attention to pedagogic practices in doctoral education claiming that while the recent attention to supervisor development has some benefits, a focus on peer learning is required. This argument is supported by Olson and Clark (2009) who use Shulman's (2005) signature pedagogies to suggest that addressing the dimensions of such a pedagogy, can lead to professional learning because: 'once learned and internalized we don't have to think about them; we can think with them' (p.56). This claim is very similar to the transformative and irreversible nature of Threshold Concepts. The various dimensions of these signature pedagogies are:

> a surface structure, which consists of concrete, operational acts of teaching and learning…a deep structure, a set of assumptions about how best to impart a certain body of knowledge and know-how…an implicit structure, a moral dimension [and] finally, each signature pedagogy can also be characterized by what it is not—by the way it is shaped by what it is not. (Shulman, 2005 54-55)

Figure 1 Framework for study



In summary, the three different sources of literature: threshold concepts, curriculum, and doctoral pedagogy come together as outlined in Figure 1 to provide a framework for this study

Research design

In order to address the hypothesis that Threshold Concepts related to doctoral education would intentionally or unintentionally be addressed in the programs developed for candidates a case study approach was adopted (Creswell, 2007; Stake, 1994). Creswell argues that "*case study* research involves the study of an issue explored through one or more cases within a bounded system (i.e. a setting, a context)" (Italics in the original p. 73).

Cases were drawn from three different Australian universities each having developed its PhD curriculum independently from one another. The doctoral programs from the three universities were analysed to identify the topics included in their programs and then this analysis was linked to: those Threshold Concepts which had already been identified; the curriculum outline provided Australian Qualifications Framework (Level 10); and the pedagogical literature.

The three universities were examples of different approaches to the introduction of coursework. University 1, a large and well-established university, at a central level, undertook an extensive review of current practices related to research methods courses offered across the institution. Their analysis indicated that as a result of 'well-meaning' staff wishing to include a range of communication and other skills, the actual research methods content had been squeezed out. As a result, schools were invited to review their methods courses and redevelop them as a three month offering with an explicit focus on research methods and the other issues that had crept in over time, for example research integrity and various academic practices were handled at a central level. From this work the university developed a framework which addressed some areas of the curriculum as required in the first year of candidature, and other aspects of practice in the subsequent years.

University 2, a smaller, newer university with substantially fewer doctoral enrolments, developed a 'whole of candidature' program and this process was developed centrally in conjunction with students and staff. A working party was established to investigate whether structured learning opportunities that complement the traditional model of supervision would address opportunities for improvement in skill development, completion rates, and time to completion. A draft whole-of-candidature program was developed addressing different types of skills as outlined in the Australian Qualifications Framework (2013). There was agreement that it was important to ensure that there was support for candidates in mid to late candidature, not only 'up front' in early candidature.

University 3, a very decentralized university, encouraged different parts of the university to develop their own approaches with little or no guidance and framing. As a result, some sections of the institution introduced formal coursework requiring successful completion within the first 12 months of candidature and others with no formal requirements at all. Furthermore, where coursework was introduced in some sections of

the university this coursework was specifically related to advanced disciplinary knowledge and in others the coursework was specifically related to research-skills. However, in both these cases successful completion was a requirement for continuing candidature. In terms of analysis, for this institution the research-related coursework was analysed and reported rather than the advanced disciplinary knowledge coursework.

Following the identification of the three universities as Creswell (2007) suggests, multiple sources of data were sought. Initially background research was undertaken through document and web site analysis. Following that, discussions were held with the Gradate Dean or Deputy (or equivalent) to understand the particular focus and design of the institution's new 'coursework'. To provide additional information I was fortunate to be able to attend a number of meetings of the Australian Council of Graduate Research and to discuss with them the various models and examples that were developing.

Findings

University 1 has a program for candidates in four parts: research integrity, research methods, research techniques, and academic practice. In the overall program categorized as Research Integrity modules such as ethics and authorship were addressed. Under the heading of Research Methods were topics on literature review and research design, research question, appropriate methods, and planning and conducting research. The Research Techniques set of courses involved specialized workshops on particular techniques such as interviewing, observation, survey design and the use of specialised software. The fourth category, Academic Practice included a wide range of courses related to teaching, writing, and research communication.

The analysis of University 2's program indicated that it also had two major components: research-related and 'other'. The research-related program included: academic writing; analysing and interpreting data; responsible and ethical research; designing and conceptualising valid research with impact; and communication. The 'other' skills included: leadership; career planning; networking; and project management. However,

the completion of the initial studies culminated in successful confirmation of candidature.

University 3 represented a number of institutions that offered programs that were designed for candidates in the first six to twelve months of candidature. The research-related courses included: thesis writing and writing for publication; research methods and techniques; research integrity; and situating/contextualising the research. Successful completion of these courses was a requirement for continuing candidature. The advanced disciplinary knowledge was taught specifically at AQF Level 9 (Masters) or 10 (Doctoral).

As the above indicates the research-specific areas of focus for all three universities included: writing; research methods and design; situating or contextualising the research; and ethical research. Of interest, all three programs included ethical research/research integrity and yet the concept of being an ethical or 'integritous' researcher has not yet been identified in the literature as a Threshold Concept in learning to be a researcher.

Evidence of Threshold Concepts

Following the initial analysis, the three research-related courses/training programs were then analysed in more depth with an aim of identifying any specific Threshold Concepts embedded within each.

Returning to the findings above, the following were common across the three institutions offering research-related programs:

- Research methods and design
- Situating or contextualising the research
- Writing; and
- Research integrity.

On closer analysis of the *research methods and design* programs is was possible to identify four specific research Threshold Concepts i.e. research paradigm, framework, theory, and originality/knowledge creation. For example, using one of the schools of

University 3 the requirements for the research proposal arising from the courses offered to first year students included: a review of the methodology to be used, a review of its theoretical underpinnings and perspective to be used in the study, and a suggestion as to the originality of the proposed work. Universities 1 and 2 addressed similar issues, although using slightly different terminology.

Writing support, in each of the institutions was generally offered throughout candidature with one-to-one support, workshops, writing groups such as “Shut up and write” and writing retreats. Certainly in terms of frequency, workshops, seminars and opportunities for writing outnumbered the other workshops available to candidates indicating that the institutions were conscious of providing many opportunities for the development of this Threshold Concept proposed by Humphrey and Simpson (2012).

Finally, research ethics or integrity as outlined above was an anomaly. Not only was research integrity training provided in three institutions, it was one program/course that was mandated by each where some of the other courses were not. But why has this issue, so critical in the education of researchers, not yet been identified as a Threshold Concept? This matter will be discussed further along with the other Threshold Concepts that were not evident in the analysis. So in summary, from the anaylsis of the courses the following Threshold Concepts were identified: research paradigm; framework; knowledge creation/originality; theory and writing.

Evidence of curriculum planning

As an additional source of data relating to curriculum, an analysis was undertaken of the Level 10 (Doctoral), Knowledge, Skills and Application of skills (Australian Qualifications Framework, 2013). Of interest, the AQF reflects the existing Threshold Concepts outlined above and yet the AQF makes no specific mention of ‘ethics in research’ or research integrity. That is not to say they did not address what might be broadly described as academic integrity on p. 64 where the Framework states under the application of knowledge of skills; “with full responsibility and accountability for personal outputs” (See Table 1).

Table 1. Level 10 (Doctoral) descriptor: The Australian Qualifications Framework (2013, p.64)

Knowledge *Graduates of a Doctoral Degree will have:* • a substantial body of knowledge at the frontier of a field of work or learning, including knowledge that constitutes an original contribution • substantial knowledge of research principles and methods applicable to the field of work or learning
Skills *Graduates of a Doctoral Degree will have:* • cognitive skills to demonstrate expert understanding of theoretical knowledge and to reflect critically on that theory and practice • cognitive skills and use of intellectual independence to think critically, evaluate existing knowledge and ideas, undertake systematic investigation and reflect on theory and practice to generate original knowledge • expert technical and creative skills applicable to the field of work or learning • communication skills to explain and critique theoretical propositions, methodologies and conclusions • communication skills to present cogently a complex investigation of originality or original research for external examination against international standards and to communicate results to peers and the community • expert skills to design, implement, analyse, theorise and communicate research that makes a significant and original contribution to knowledge and/or professional practice
Application of knowledge and skills *Graduates of a Doctoral Degree will demonstrate the application of knowledge and skills* • with Intellectual independence. • with initiative and creativity in new situations and/or for further learning. • with full responsibility and accountability for personal outputs • to plan and execute original research with the ongoing capacity to generate new knowledge, including in the context of professional practice

It is worth noting from Table 1 that each of the Threshold Concepts reported to date is included in the framework other than 'doctorateness' which, it could be argued is the sum of the overall requirements and if one assumes communication skills incorporates writing.

However, of particular interest was lack of a formal overall curriculum framework within which the institutions' courses and programs sat. In light of the outline earlier in this paper, it may not surprising given that thinking in curriculum terms at the PhD level is not a common practice in Australia. Rather, the PhD has, and to a large still is seen as an individualized learning experience designed by the candidate and her/his supervisors. This issue is highlighted in the following section.

Evidence of pedagogical practices

Findings from the analysis of the data with regarding to evidence of pedagogical practices were perhaps more obvious than for curriculum. Each of the institutions had a substantial focus on the flexibility and individuality of its programs. The three institutions used in this study offered many, many learning opportunities that were left to candidates and supervisors to decide on whether they would engage or not. Furthermore, even where there were requirements the supervisor was often involved the assessment. This supervisory role was often because the coursework was integrated into the research phase of candidature and it was appropriate for the supervisor to comment as part of ongoing work. However, more explicitly, in each case, the formal or informal coursework in the first 12 months of candidature culminated in the candidate successfully completing the confirmation of candidature proposal. While others, such as Head of School, might be involved, generally the proposal, consisting of a written report outlining the project and a seminar, is assessed by the supervisory panel. This reliance on the supervisory panel might not be surprising given that earlier work reported by Kiley (2014a, 48) suggests that research supervisors in Australian universities are very committed to the individualised nature of the PhD education with the term 'coursework' often seen as inappropriate:

> Based on responses from participants it became clear that the term 'coursework' was inappropriate and a more appropriate term is a 'structured

program' or 'structuring the PhD curriculum'. Critical aspects of this structure include: a clear set of learning outcomes; an overall framework within which candidates and supervisors can identify and develop their own, individualised program; and the importance of supervisor involvement.

Discussion

In light of the topic of this special issue, the main focus of the discussion is on Threshold Concepts as they were, or were not evident in the initial introduction of coursework in the Australian PhD. While the existing concepts of research paradigm, framework, knowledge creation/originality, theory and writing were evident the Threshold Concepts that did not appear from the analysis included:

- Argument/thesis
- Analysis
- Creativity; and
- 'Doctorateness'.

Starting with the last, that is 'doctorateness' it could be argued that this is certainly not a concept that one might be able to address in the early stages of candidature, but rather one that emerges later, perhaps even, as Trafford and Leshem (2009) suggest, very much toward the end of the research learning process.

Creativity, on the other hand, is a concept that could be linked with a number of the above learning experiences without being made explicit. For example, aspects of originality and knowledge creation might link with creativity, although, it is argued that it is possible to undertake original research which is not necessarily creative for example in its use of methods and approaches. However, it is worth noting that creativity is explicitly mentioned in the AQF framework (see Table 1 above).

Given that the AQF framework specifically notes: "expert skills to design, implement, analyse, theorise and communicate research…" the omission of analysis from the three cases studied is of particular note. It is suggested that this omission might well be because of a general view that teaching analytic skills before one has data on which to

practice analysis might not be as helpful to the candidate as waiting and using 'real' data. However, in several instances, including one of the cases used for this study, where the requirements for the Confirmation of Candidature report is noted, there is no specific mention of the analysis methods to be employed. This is an issue worth considering in further work assuming an increase in evaluation and research related to teaching research methods in Australian universities.

The fact that argument is another Threshold Concept that is not specifically identified in the cases might be because some consider that the argument develops as the research unfolds. However, as Metcalfe (1996 p. 39) suggests: "research *is* argument" (emphasis added) and that one can introduce the concept of argument right from the early stages of research candidature.

There are a number of possible explanations for these various omissions. The first is that the original Threshold Concepts are incorrect and that more recent work suggests that they are not as critical to research learning as initially thought. The second is that the Threshold Concepts are considered to be important later in the research process and so not critical to introduce in the first 12 months of candidature. The third, and possibly the most likely reason is that this level of structuring the PhD curriculum is in its early stages and it will not be until evaluations and reviews have been undertaken that additional topics, possibly addressing the Threshold Concepts n
oted, are included.

Conclusion

From this initial analysis ethics and research integrity stand out as the anomaly. They have not been identified as a Threshold Concept to date and yet they are explicitly included in the three programs analysed—and also in another ten out of 12 programs examined at random making a total of just on 40% of all Australian universities analysed. On the one hand it could be argued that integrity is something addressed in at least undergraduate levels if not earlier with plagiarism training and the use of software packages such as Turnitin and so it is not something that challenges doctoral candidates. However, drawing on the experience over many meetings of the Australian

Council of Graduate Research, their reporting would definitely indicate otherwise. This is not to say there are not notable cases where candidates have fully understood the concept of research integrity but have chosen to act otherwise, but on the other hand cases indicating a lack of understanding of the concept are not uncommon. Another reason might be that in the original research on Threshold Concepts supervisors were asked to report on learning challenges encountered by candidates and perhaps for those interviewed research integrity had not been an issue for their students. Clearly this is an area that calls for future research.

Finally, with the transition from an almost exclusive focus on the candidate and supervisor as the designers of the PhD to now the involvement of school, faculty and central staff in designing the learning experience there is a delicate balance to negotiated. This balance is between fully individualising the learning experience on the one hand and ensuring that all candidates are introduced to the full range of knowledge and skills required to successfully complete the PhD award. The emerging research on the role of peers in doctoral learning (see for example Aitchison, 2009; Boud & Lee, 2005; Devenish et al., 2009) suggests that this might assist in negotiating future developments.

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