

Doctoral learning journeys: supporting and enhancing doctoral students' research and related skills development through research evidence-based practices

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This project investigates how doctoral students make 'learning leaps' to recognise and cross conceptual and skills thresholds in their research and ways in which they can be best supported to do so. It responds to current national and international concerns about the nature of the doctorate, its purpose and value for different stakeholders. The research takes place in a number of UK universities, representing differences in the sector. It aims to (a) explore and conceptualise the nature of doctoral students' learning during research and skill development; (b) examine and enhance the practices of supervisors and examiners in order to support and assess students' learning. The project will both create new conceptual and factual knowledge about doctoral student learning and supervisory practices, and produce printed and electronic materials to support students and supervisors.

Introduction

Research into threshold concepts in the disciplines has largely focused on undergraduate students' learning (Meyer & Land, 2003; 2005; 2006), while latterly our own parallel research has started to identify threshold concepts and conceptual thresholds at the research education level; postgraduates' experiences with threshold concepts and conceptual threshold crossing; and supervisors' experiences of identifying conceptual threshold crossing and 'nudging' students across.

The NTFS project 'Doctoral Learning Journeys' (2007-10) builds on this ongoing research, exploring conceptual threshold crossing more generically in doctoral learning, identifying supervisor and examiner awareness of this and strategies used to 'nudge' students into more conceptual, critical and creative levels of work.

Theoretical background

Our thinking is influenced by research into linkages between teaching and learning and developing supportive academic communities of practice (Lave and Wenger, 1991), meta-learning (Flavell, 1979) and the threshold concepts research of Meyer and Land (2003; 2005).

We argue that research at the doctoral level has critical points when students make 'learning leaps',

moving work beyond descriptive fact-finding to conceptual levels of understanding. These 'aha' moments represent moves beyond their comfort zones where students acquire new ways of seeing their research. They experience conceptual paradigm shifts regarding their research and themselves.

Meyer and Land's (2003) notion of 'threshold concepts' encapsulates such 'new ways of seeing'. They identify core learning outcomes with examples from pure maths (complex numbers; limits); literary studies (signification); and economics (opportunity cost). Their evidence shows that a threshold concept is likely to be:

- *'transformative'* – leading to significant, probably irreversible, shifts in perception
- *'integrative'* – exposing previously hidden interrelatedness
- *'bounded'* – bordering into new conceptual areas
- *'troublesome'* – conceptually difficult, counter-intuitive or alien.

Students passing through the 'portal' opened by a threshold concept experience change in their use of symbolic language, understanding of their discipline and conceptual appreciation of research issues. Threshold crossing also involves a state of liminality, whereby students 'strip away' the old and pass into the new. However, they may be stuck in this liminal state between older understandings and new appreciation of concepts (Meyer & Land, 2005). Some become frustrated, losing confidence or dropping out (Meyer & Land, 2005; Trafford, 2007).

At the doctoral level we have identified and explored both discipline-specific threshold concepts and generic conceptual thresholds. We argue that doctoral conceptual threshold crossing includes:

- ontological shifts – security of self and identity in the world is challenged
- epistemological shifts – knowledge is problematised and deepened.

Kiley and Wisker (2008; 2009) and Wisker, Kiley and Aiston (2006) have explored supervisory strategies that empower doctoral students to cross conceptual thresholds at various stages in research. Trafford (2007) examined difficulties doctoral students encounter in acquiring and using conceptualisation.

Since confidence in handling conceptualisation is central to doctoral-level work, this itself represents a 'threshold concept' (Leshem and Trafford, 2007).

Methodology and methods

Quantitative and qualitative approaches are combined in four research stages: Stage A comprises a large-scale survey of doctoral students, investigating their learning processes, experiences and development; Stage B maps individual learning journeys of 16–20 doctoral students through narrative interviews and journaling; Stage C involves semi-structured interviews with doctoral supervisors, examiners and research programme leaders; Stage D develops theoretical models and resource materials relating to supervisory strategies, e-learning environments and written texts to support doctoral students' learning and scholarly progression.

Early data and findings

To date we have conducted the survey, recruited students from a range of universities across the UK, begun a process of interviewing at regular intervals which will continue into 2010, set up opportunities for journaling and begun recruitment of supervisors.

Analysis of both the survey and narrative interviews identifies student awareness of beginning to work at a more conceptual, critical, creative level in their doctoral studies, although for many in their first year, this is often couched in terms that express a preliminal state. The survey identified ways in which doctoral students indicated crossing conceptual thresholds:

- **Discovery** – the identification of a new theory, theorist or concept that encapsulates thinking
- **Synthesis** – the bringing together of two or more concepts to create a new concept
- **Verbal** – the discovery of new ways of thinking as a result of discussion or the recognition of knowledge sufficient to defend a position
- **Mechanical** – almost superficial adoption of a conceptual position to satisfy requirements of the discipline
- **Innate** – 'I always thought this way'.

In both the survey and interviews, doctoral students use a variety of metaphors to describe learning

journeys and experiences. Learning leaps are often described metaphorically, in visual terms ("a lightbulb moment") or kinaesthetic terms ("things clicked into place") as are moments where students feel they are stuck, e.g. "I hit a brick wall". Learning moments where students indicate conceptual threshold crossing may occur when they:

- identify research questions
- determine relationships between existing theories and their own work
- devise methodology and engage with methods
- analyse data
- reach conclusions, conceptual as well as factual.

Discourse analysis is revealing ways in which doctoral students begin to signify and articulate their awareness of working conceptually or experiencing 'learning leaps'. Learning moments may be experienced as a major ontological or epistemological shift or as a series of moments, for example when different aspects of the theoretical or methodological framework fall into place.

“ In terms of learning moments I think you have those small or medium moments every now and again, don't you, when you read and you are exposed to new ideas and you think ah now, I've got it and then actually a couple of weeks later you're a bit further but then you have another one of those moments and so you kind of gradually ... get closer and closer to the final thing, the final shape of your theories and ideas about it. ”

2nd-year Philosophy student

Interviews are revealing practical strategies which aid conceptual threshold crossing. Beginning the process of defending work to supervisors and the wider research community can be crucial. The importance of questioning by supervisors is encapsulated in this example where a student experienced a conceptual shift while preparing to present a research outline:

This example indicates experiences of conceptual threshold crossing, including a transformation of

“ A couple of weeks ago I found that things have stopped ... mentally I found myself up against a brick wall ... I just felt that I was kind of stuck and it wasn't moving and it was all bitty, I'd done all these chunks of work but I couldn't really see how they fitted together and ... so I reached quite a crisis point. Especially when I got negative feedback I just felt quite down hearted about it and ... having the supervision, talking it through, taking a step back from everything, ... taking it to bits and being questioned about everything and then having to simplify everything, in order to present. I mean over a couple of days – my supervision was one day and my presentation was the next day...

I came out of that whole process feeling that I could kind of see it, I could see that there was shape there ... ”

1st-year Gender Studies student

understanding which is simultaneously troublesome and accompanied by an initial loss of confidence. However, the supervision enabled the student to 'take a step back' from the research and begin to clarify their work in order to justify it to their peers. The survey and interview data so far indicate student responses to such conceptual threshold crossing in terms of initial discomfort or uncertainty, heightened confidence as researchers, and shifts in identity. Affective language is often used to describe how students felt during this process.

Interim conclusions

The research has so far identified critical points when students make conceptual 'learning leaps', experience conceptual paradigm shifts regarding their research and themselves and demonstrate 'new ways of seeing'. However, students often struggle to articulate this experience and may benefit from developing academic language and meta-learning at this level.

Practical strategies that may enable work at a more conceptual level have been reported by doctoral students, including questioning strategies to prepare students to justify their work along with writing and presentation opportunities. Such

strategies will potentially benefit supervisors as they may indicate ways in which doctoral students can best be encouraged and enabled to make 'learning leaps' and cross conceptual thresholds, and how supervisors recognise when this is about to occur or has occurred. So far this is a very rich experience; interesting findings are emerging as the research progresses and the results should inform the development of resources and prove useful to the sector.

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