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Doctorates in the dark: Threshold concepts and the improvement of doctoral supervision

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Abstract

The overall goal of this qualitative research case study into doctoral writing was to determine if there were knowable threshold concepts and, if so, to develop effective strategies for helping students overcome them. In addition, it was understood that such strategies could have change implications for supervisory practice. Interview and survey data were collected from students and supervisors. From the student data two threshold concepts had emerged: "Talking to think"—a strategy for developing clarity in writing; and self-efficacy—the belief in one's ability to overcome writing barriers and become an independent academic researcher. In this paper, those two threshold concepts provide an organising framework for the presentation of supervisor findings and for discussion of supervisor professional development needs. The paper concludes with insights into how supervisor professional development could be improved and extended beyond its current focus on regulations and compliance issues.

Keywords

Threshold concepts, doctoral writing, supervisory practice.

Introduction

This paper describes findings from one of four case studies in a New Zealand two-year, qualitative research project that explored threshold concepts (TCs) in tertiary education (Harlow & Peter, 2014)—the point(s) at which students can become "stuck", unable to make intellectual progress. This case study was devoted to doctoral writing from the perspectives of students and supervisors. An overall goal of the case was to determine if there were knowable threshold concepts in doctoral writing and, if so, to develop effective strategies for helping students overcome them. Two TCs (Talking to Think and Developing Self-efficacy) were identified from the student data (Johnson, 2013), and they provide a framework in this paper for presentation of the supervisor findings and discussion of supervisor professional development to address students' writing needs.

Background

In 2006 the New Zealand Government introduced a policy of charging domestic enrolment fees to international doctoral students with the result that the annual tuition for overseas students declined approximately five-fold. Predictably the numbers of doctoral students escalated sharply over the next several years (Gerritson, 2010), which was not matched by an equivalent growth in staff numbers (Sampson & Comer, 2010). Moreover, this situation is not unique to New Zealand (OECD, 2013). Between 1991 and 2004, the United Kingdom experienced an 82% increase in doctoral enrolments and in the United States, a 12% increase (Nerad, 2010). Enders (2004) reports that PhD output in European countries such as Finland, Italy and Portugal doubled between 1990 and 2000, while Australia has also witnessed exponential growth, with PhD enrolments experiencing a 300% increase between 1990 and 2000 (Harman, 2004).

Reasons for the increase might be sought in the widening concept of "valued knowledge", but probably more significant are globalisation and new market-driven forces underpinning university education (Education Counts, 2013; Nerad, 2010; OECD, 2010). For New Zealand, policy developments to increase the education levels of Māori and Pacific peoples (Ministry of Education, 2011) have also contributed to an increase in student numbers, but all factors indicate an increased diversity of students in terms of ethnicity, age, language, full-time/part-time, and on-campus/distance (Education Counts, 2013; Group of Eight, 2013). As a consequence, the "massification" of doctoral enrolments world-wide is placing increasing pressure on educational institutions, funding agencies, and governments to re-examine how they view and manage quality in doctoral education (Halse & Mowbray, 2011; Luca & Wolski, 2013; OECD, 2013, p. 55; UNESCO, 2014).

Moving from an elitist educational environment, to one that includes far greater numbers of students from a wide variety of cultures and educational and linguistic backgrounds, has meant that the so-called "traditional" approach to doctoral study, in which a student works alone under the supervision of just one or two senior scholars, has become progressively inadequate and unsupportable (Boud & Lee, 2005; Johnson, Lee, & Green, 2000; Sampson & Comer, 2010). There are increasing numbers of doctoral students, yet the pool of suitably qualified supervisors within most institutions has remained relatively static. One can argue that reliance on time-intense, individually-oriented supervisory practice has become a luxury, which is increasingly difficult for universities to sustain. Yet, as Halse and Bansel (2012, p. 378) note, "the default model of the doctorate remains an individualised relationship between student and academic supervisor involving the preparation and supervision of a thesis/dissertation"; Colbeck (2007) remarks that even distinguished scholars often find it difficult to abandon traditional models of practice.

Thus, the need to critically examine how supervisory practice that can facilitate development of a diverse mix of thinking, writing, research, and organizational skills and competencies has become urgent.

Review of the literature

The format of doctoral supervision

Given changes to doctoral enrolments, the traditional model of one-to-one supervision has come under increasing pressure, as has been stated. Furthermore, since supervision is considered an important factor influencing issues of quality and completion in doctoral education (and as such is related to funding), universities have become obliged to address the quality of supervision (Kiley, 2011a, 2011b; McCallin & Nayar, 2012). A multitude of approaches to addressing supervision are reported in the literature and can be organized into three main themes: the nature of supervision, supervision models, and supervisor professional development. All three are discussed briefly below.

The nature of supervision

Doctoral supervision has an ambiguous place in universities. It is not clearly in the realm of teaching, but neither is it fully research. Until recently this has meant that supervision did not experience the same management pressures of improvement and performance outcomes as have teaching and research. However, in an increasingly competitive funding environment, this situation is changing (Lee & McKenzie, 2011). For example, Luca and Wolski (2013) have recently published the comprehensive *Good Practice Framework for Research Training* targeting improved training and research outputs at Australian universities. Guidelines to accompany the Framework include case studies and resources to exemplify good supervisory practice (Luca & Wolski, 2013).

Alternatively, supervision could be constructed as a self-regulatory collaborative learning experience for both student and supervisor. This would require shared values and interests, a shared language about the research topic and shared understanding of the purpose of doctoral education, shared responsibility for the ways of working, and a shared commitment to mutual support, trust, respect and empathy (Styles & Radloff, 2000). While this type of relationship levels the power differences between supervisor and student, it could risk becoming too informal and moving outside professional boundaries. It might also raise feelings of discomfort for students from different cultural backgrounds (Hemer, 2012; Manathunga, 2014).

Supervision models

The model of a student working on his or her own and being supervised by one, or sometimes two, supervisors tends to suit the self-directed student who does not need extensive input from supervisors. However, students being supported in this way often forgo broader discussions with other students and academic staff. This model could also limit the researcher capability development that is needed for contribution to the knowledge economy (McCallin & Nayar, 2012).

An alternative to one-to-one supervision is group supervision, in which students are supported by their supervisor(s) as well as peers. McCallin and Nayar (2012) identify the promotion of intellectual independence and provision of social and emotional support as advantages of this model, as well as the creation of networks for exchanging ideas, which complements one-to-one supervision. A group supervisory model can assist with identity formation in becoming a research scholar (Fenge, 2011). Dorn and Papalewis (1997) found greater student commitment, retention, and persistence, as well as the development of group collaboration and cooperation that continued after graduation. Burnett (1999) noted that the quality of theses improved, and completions increased. However, the potential for conflict was noted between advice given by individual and cohort supervisors. Fenge (2011) comments that the group supervisor requires special skills to be able to supervise across disciplines and that the benefits of this model might depend on the discipline.

Various authors suggest the idea of panel supervision to support the diverse needs of doctoral students, as it is unrealistic to expect that one supervisor can provide all necessary support. Some authors suggest that supervisors should seek additional assistance if they find their knowledge in a particular area is lacking (Grant, 2010; Strauss, 2012). Panel supervision also provides induction and mentoring opportunities for novice supervisors and a contingency plan in case a supervisor becomes unavailable.

Supervisor professional development

In order to improve the quality of supervisor professional development, appropriate opportunities need to be available to academic staff. McCallin and Nayar (2012) note the importance of supervisor professional development in a research context that is changing rapidly and recommend training that addresses policies and funding. Kiley (2011b, p. 590) notes the importance of "learning 'on the job' by co-supervising with a more experienced colleague". Therefore, with an increased level of knowledge,

and with skill development through workshops and other programs, it is more likely that supervisors will be in a position to supervise candidates in ways that are positive and effective".

An investigation across a sample of universities in Australia revealed that many universities have implemented supervisor development initiatives (Kiley, 2011a, 2011b; McCulloch & Loeser, 2014). These include the creation and implementation of policies related to research supervision, for example, (on-going) training requirements, registration of approved/accredited supervisors, and the creation of different competency levels for supervisors. They provide induction modules, online modules, workshops and/or training programmes for supervisors, which are mandatory in some institutions. The most common topics in these modules and programmes are the supervisor's roles and responsibilities, the relationship between supervisor and candidate, the clarification of expectations and roles within this relationship, the monitoring of candidate progress, and university policies regarding research supervision (Kiley, 2011b). Notably lacking are workshops that explicitly address strategies for helping supervisors assist students with their research and writing needs (Kiley, 2009).

Several authors express concern that many training courses or programmes assume that supervision issues can be resolved by means of "rational communication" (Manathunga, Peseta, & McCormack, 2010, p. 34) and may overlook the complexities of the supervisory process. To compensate these researchers introduced three different approaches (beyond the workshop model) to supervisor development and which contribute to the scholarship of supervision (Manathunga et al., 2010). They assumed an approach to supervisor development that brought the personal and emotional aspects of supervision to the forefront, working with "real" supervisors, rather than within a "generic supervisor" model (p. 41). Reflective writing served as the basis for critical inquiry, and learning circles, reflections on stories, and supervisors writing case studies of their own learning were included.

In another study Blass, Jasman, and Levy (2012) describe the reflections of five supervisors who engaged in collaborative research to explore their supervisory practices and discuss alternative methods of supporting supervisor development. They did so because of a lack of research on the actual supervision process, and also to improve their own understanding of how they approached supervision.

It is important to note, however, that supervision and doctoral research are complex activities. Singling out supervisor professional development, or more generally, the development of individual academics, as the sole means for improving the quality or effectiveness of doctoral supervisory practices might not produce the desired results. Reid and Marshall (2009) demonstrate that a coherent approach between policy, activities, and involvement of academics is needed to address the complexity of change required for sustained improvements at individual, departmental, and institutional levels.

Given the nuanced nature of doctoral education and supervision, what other factors could contribute to deepening our understanding of doctoral writing and excellence in supervision? Are there other conceptual frameworks that could inform practice? These questions were considered as part of our funded research project (Harlow & Peter, 2014), however, the doctoral writing case was different from the others in that it did not include any taught courses, but instead focused on research processes and academic writing. Specifically I was interested in exploring if threshold concepts exist in doctoral study and if so, how could supervision be effective for supporting students.

Research project

The main premise of the research project was that improved organization, presentation, and assessment of academic content could facilitate students' comprehension of threshold concepts, which in turn could lead to better learning outcomes. Harlow, Scott, Peter, and Cowie (2011) citing Meyer and Land (2003) in their discussion of threshold concepts in relation to tertiary-level engineering courses list five key characteristics. They are "transformative" in that the student's understanding of the discipline is changed; "irreversible" in that threshold concepts cannot easily be "unlearned";

"integrative" in that the interrelated nature of concepts within a discipline are more fully understood by the student; "bounded" in that the concept will be delimited, but could border on other threshold concepts (yet to be acquired); and "troublesome" in that the concept might appear counter-intuitive, and require the learner to "move from understanding in a 'common-sense' way to an understanding that goes against and beyond previous knowledge" (2011, p. 436).

Threshold concepts have been linked to ontological shifts (Meyer, Land, & Baillie, 2010), changes in identity, and hence understanding of what it means to become an artist, engineer, or in the case of the doctorate—a research scholar. It is important that students successfully cross intellectual thresholds and until they do so, they are only able to mimic deep understanding. They are unable to solve new problems or address different situations. In a conceptual sense, students are lost—wandering in a mental space of incomplete understanding. Meyer and Land (2003), refer to this as "liminal" space—a conceptual state of flux—a place of intellectual disturbance and uncertainty. In short, threshold concepts are where students get "stuck" (Davies, 2006; Meyer & Land, 2005; Wisker & Savin-Baden, 2009)—unable to make substantive progress in their academic work. According to Meyer and Land (2003, 2005), it is crucial to uncover why and how some students undergo a transformational, or even a creative, experience in the liminal space of learning. In the case of this research, it is also essential to determine which doctoral supervisory practices can best contribute to transformational experiences for students.

Methodology

Data collection, analysis, and findings from the student data

Data were collected in two ways: anonymous online surveys (students) and face-to-face interviews (students and supervisors). The surveys targeted doctoral students' research and writing concerns at three stages—conditional enrolment (their first six months (preparation of a full research proposal)), unconditional enrolment (research proposal submitted, defended, and accepted; research in progress), and completed (thesis submitted). The interviews (students and supervisors) were conducted with thirteen University of Waikato doctoral students who were at different stages of completion (as in the surveys) and fourteen doctoral supervisors. Of the fourteen supervisors, eleven were based at the University of Waikato, while the other three were from the University of Auckland, the Auckland University of Technology, and from an overseas (UK) university.

The survey instruments (students and supervisors) included structured, open-ended questions that elicited text-based responses. The interviews (45–60 minutes each) were audio recorded and comprehensive notes were also written during the conversations. The transcribed audio data and notes formed separate text-based datasets for the students and supervisors. Human research ethics approval was obtained from the university and all people who participated in any of the case studies did so on a strictly voluntary basis.

Analysis of the data included organizing the text-based survey data into Excel spreadsheet files, while the text-based interview data was synthesized into tables in MSWord. By reading and re-reading the organized texts, and with particular focus on the research and writing questions, several key themes have emerged (Braun & Clarke, 2006). In addition, and particularly salient for this project, our team-based approach to the research has included regular monthly meetings to share findings and discuss common insights across the case studies. Such discussion has thus facilitated the understanding of both particular ("within case") and generic ("across case") threshold concept themes.

Specific to the doctoral writing case study, two key findings were identified from the student data (Johnson, 2013). These included a lack of student understanding of what "writing" actually means and students' lack of confidence to structure and present ideas at the doctoral level, as is illustrated by selected student data.

> Previously i [sic] thought writing was writing (introductions and discussions for experiments for thesis), but i have learned that data analysis and results is also 'writing'. So for a while i thought i wasn't doing much writing and therefore i wasn't doing very well, but i was actually very busy with my data and interpreting results, so really i was making progress. Therefore; the writing process was not what i expected, or thought it was. [Student 4, unconditional enrolment]

> Different opinions of supervisors—one says 'write this way' the other says 'no, write this way', led to rewriting a few times, a bit disheartening (loss of motivation). [Student 5, unconditional enrolment]

> I felt confused and directionless at several points in my PhD … I did not know where to start, how to structure my argument. [Student 2, completed]

From the student findings I developed two threshold concepts (TC) that relate to doctoral writing (Johnson, 2013).

TC1: Talking to Think: Academic writing includes more than just the mechanical presentation of words on a page: it also includes reflection and understanding. Until one has clarified one's thinking (and has something to say), meaningful writing is difficult and can contribute to feeling lost.

TC2: Developing self-efficacy: Writing incorporates the ability to understand research practices, extract meaning from data, clearly articulate ideas (talk), and then present, shape, and reshape text on the page (write). Writing also includes a belief that understanding will emerge as new ideas emerge and are discussed, clarified, written, and refined.

Both threshold concepts reflect the five key characteristics described earlier; crossing them is transformative, irreversible, integrative, bounded, and troublesome for students, as they become independent scholars through the process of conducting research and writing a doctoral thesis.

The student findings then lead to reflection about supervisors' responses to their interview questions. Supervisor findings are thus reported here, but only as they relate to the two TCs from the student data (Johnson, 2013). Ideas relevant to supervisory professional development, specifically related to doctoral writing, are then explored and discussed.

Supervisor interviews and findings

Fourteen supervisors, predominantly but not exclusively, from the University of Waikato were interviewed by two researchers from the project. Their survey instruments contained structured, open-ended questions that elicited text-based responses, and each interview lasted from 45–60 minutes. Particularly relevant for this discussion are the questions that probed supervisors' own experiences of writing a thesis, their experiences of being supervised, the strategies they had used to become "unstuck" during the thesis process, and those they now used with their own students.

- Thinking back on your own experience of writing a thesis, did you get "stuck" anywhere?
- If yes, can you describe what you believe were the main difficulty(ies)?
- What specific strategies did your supervisor use (if any) to help you?
- What strategies did you develop on your own in order to make progress?
- How do you help your students become "unstuck"?

Supervisors' ideas about how to improve supervisory practice/professional development were also sought.

- What activities/strategies do you believe could benefit supervisors?
- What activities/strategies do you believe could benefit higher degree students?

Like the student interview data, the supervisor responses were organized into MSWord tables, but findings reported in this paper, and implications of the findings, only relate to the two TCs from the student data.

TC 1: Talking to think

It was clear from the supervisors' data that "talking to think" was an important strategy and one that some supervisors had experienced during their own doctorates, and subsequently when working with students. Moreover, supervisors shared ideas for how "talking to think" sessions could be structured. This included for example, the idea of extending the conversation beyond the immediate supervisory team, as was recommended by Grant (2010). The importance, but difficulty of helping students move ideas from written texts (reading) into their own writing was articulated and the role of discussion in effecting this process was mentioned. All of these comments are examples of the critical importance of talking as a necessary linguistic device for clarifying thinking.

> There are degrees of stuckness! It can be anything and everything. I have learned over the years, the more discussion and advice I give them [students] before they do something—designing the data collection and the more discussion there is before, the less they get stuck. [Supervisor 14]

> Find the solution in discussion with them [students] or they need to read more. Usually this helps—sometimes you might have to find someone else who is an expert in that area and can provide help. [Supervisor 2]

> I like to have students stop by and talk rather than "formal" meetings (although I do hold them too). [Supervisor 11]

The value of having doctoral students work together on their writing has been discussed often in literature (Johnson, 2013; Johnson, 2014; Maher, Seaton, McMullen, Fitzgerald, Otsuji, & Lee, 2008). Sometimes writing groups are established by supervisors; sometimes, as in the case of Maher, et al. (2008), students organize themselves into working groups for specific purposes. Supervisors discussed both types of cohort establishment in the interviews.

> We would have two or three students working in related areas. Projects were related but people were working together when possible. They all sat in the same room.... It encouraged cooperation and they all finished with a list of publications. [Supervisor 1]

> It's a team environment and where possible we try to locate students together and have them working together. We have a network here of two or three postdocs and they're held up as models to which the students can aspire. We're very well supported with technical support. We can't underestimate the value of a cohort and a tiered structure. Students don't feel isolated. [Supervisor 12]

Of course, talking is not enough. Students must eventually write, as several supervisors noted. Strategies to help students move through a process of talking (to clarify ideas), to writing (to articulate and learn), to reflection and revision (to improve articulated ideas), and then cycling through these steps again and again were described. Talking not only helps to clarify thinking, it shifts the student's role from writer to external reader or observer. Also, the key importance of structure, in what is essentially an unstructured degree programme, was highlighted in the data.

> You reinstate the milestones and you create artificial milestones. My experience is you have to put in place more immediate and more proximal signals to progress. If they get really slow, I'll send them away to sit at a big table with all the sections and sub-sections and if it was theoretical, this will be the section where <name> talks about such and such. Then get them to start working through the table. That works if there is a list, a set of landmarks. [Supervisor 13]

> Sometimes I get a student who is asking a question for which there is not an established paradigm. Then we need to talk about the possible ways that we can write this up in a way that would be absolutely clear for the reader. The first 'go' will be less than a page—check that they're doing what we agreed to do. And that it makes logical sense. It's done through discussion and then short bits of writing. [Supervisor 14]

> I use my whiteboard and pretend I'm at a conference and I talk to this idea as though I had an audience. Then once I've finished I transcribe it and then you can see the themes when it's typed up. Sometimes my best thoughts are in speech. [Supervisor 3]

> But you've got to be willing to sit there and look at the evidence and see what's fitting there best. It's iterative—assess that and see what's not exactly fitting and see if it gives an indication of where it could go. [Supervisor 6]

Although clearly there were supervisors who followed a dialogic approach to nurturing and supporting student writing (and were prepared to discuss it in the interviews), by far the greatest amount of interview time was devoted to TC2—self-efficacy.

TC 2: Self-efficacy

As a concept, self-efficacy extends beyond confidence (although that is certainly a key component) to include a *belief* that with consistent work (reading, talking, thinking, writing, revising), understanding will emerge and deepen. Self-efficacy is confidence emerging from self-sufficiency (autonomy), perseverance, and resilience and how this then relates to doctoral writing is important. Although supervisors shared a number of different thoughts about how students' *self-confidence* could be developed, from different ways of structuring conversations to "just doing it", none explicitly engaged in discussion about the wider concept of *self-efficacy* as related to doctoral-level writing. Certainly this does not mean that supervisors did not understand the concept, but what it suggests is that they are not epistemically fluent within a discussion of doctoral supervision.

> I work with students and help them identify where they are. I ask them—so you've read this body of theory—what are the main ideas that relate to your ideas? Building their confidence—just go with that idea. [Supervisor 5]

> I think one of the key things is building that level of confidence—that's what I'm good at. Motivation—and building confidence. When to lash out and be heavy and when to confidently observe. Building tacit knowledge. [Supervisor 11]

> It's how humans' brains work—we're very good at solving our own problems and supervisors and leaders need to be facilitators showing people how to do that. There's an energy when you solve your own problem rather than having someone tell you what you need to do. [Supervisor 4]

> I was stuck all the way but I did it quickly and I "just did it". You felt stuck because you didn't see yourself as an academic but you just got on with it. [Supervisor 8]

The idea of "just do it—get on with it" is complex, value-laden, and must be disaggregated in order to contribute to supervisory practice and professional development.

Supervisor training as related to the threshold concepts

What was clear from this research and from much larger datasets elsewhere (Paré, 2011) is that supervisors are seldom formally prepared for the rigours of developing students' doctoral writing expertise and competence. In response to questions about whether or not they had received any formal training, all supervisors in this research reported that they had received very little, if any, formal

preparation for supervision and none mentioned familiarity with doctoral writing as something that could or should be included in professional development.

> Osmosis—learning from others on the job. [Supervisor 12]

> No formal training. I just got my own PhDs in [year] and was put on a few panels as second supervisor. On some of the panels I was with colleagues and friends. I had my own supervisory experience to go by and it wasn't pleasant. [Supervisor 10]

> There may have been some things offered here but I didn't attend. [Supervisor 2]

Moreover, even when supervisors did attend workshops, they found them prescriptive and commented on the lack of opportunity to share strategies and practice tips, which they would have found useful. It is worth noting, however, that supervisors were also relatively vague on what they meant by "practice tips" beyond the sharing of "horror stories". Again, these are complex topics, which need to be "unpacked" and articulated for supervisor professional development.

> I learned that you can't sit there for four hours and be talked at—it's supposed to be run like a conversation but it never does. It was quite a formal presentation. They gave us resources from another university around graduating standards. [Supervisor 3]

> It would be interesting to see different models. There could be completely different strategies that I'm not aware of that would work very well. Departments could have some guidelines of how things should work—there should be explanation of why there were guidelines. [Supervisor 2]

> Supervisors definitely need help—just getting supervisors along with other supervisors is a good thing. Informal discussions are an opportunity to raise problems that are currently going on for them. I certainly felt that I—I was very uncomfortable about doing something in which I had no training. [Supervisor 6]

Given these findings and the current context of doctoral education, discussion of the implications of supervisory professional development, particularly as related to student writing has become urgent.

Discussion and conclusion

Paré (2011) in his discussion of large-scale research in Canada into doctoral supervision reported that there are insufficient opportunities for supervisors to develop an understanding of doctoral writing as rhetorical practice. He believes that supervisors are required to provide much more than guidance in a particular content area; they need to be writing teachers. However, as Kamler and Thomson (2006) wryly state, "doctoral writing [is] a kind of present absence in the landscape of doctoral education" (p. x). This does not mean that research writing processes should not be taught, nor does it lessen the need to find the most appropriate methods for doing so (Kamler & Thomson, 2004).

Ward (2014) interviewed supervisors during her research and asked them about their conceptions of supervision and the practices they most valued. She was interested in the limits of supervision and in exploring respondents' every-day supervisory practices. She found that amongst supervisors in her study, there was a lack of clarity about what the "PhD" means and what is involved in doing one. Interestingly, Ward (2014) also found that supervisors had not familiarized themselves with educational theory, and most were unaware that doctoral supervision and writing were legitimate fields of research study in their own right. In effect, they lacked epistemic fluency in doctoral supervision.

Yet, as was mentioned earlier, a cursory examination of doctoral supervisor professional development initiatives being offered at various universities around the world indicates a focus on regulations, timely completions, progress reports, and the nature of communication in the supervisory relationship. Of course supervisors must be aware of these requirements, but I believe that there is an urgent need

for much more comprehensive preparation of supervisors that extends beyond a compliance focus and recognizes the more far-reaching goals of higher degree education in the 21st century. As has been stated earlier, universities face multiple pressures in higher education including the need to develop candidates who are well-rounded researchers and who can identify and articulate their contribution to society. Kiley (2014) in her discussion of the changing nature of the Australian PhD cites increased numbers of students, variation in entry pathways and qualifications, an increased international cohort, and changing patterns in graduate employment as key factors that can shape the development of models of supervisor preparation.

Let us return then to the main focus of this paper—a discussion of findings from the supervisor data, as related to the two doctoral writing TCs, and strategies to lift supervisory professional development (Johnson, 2013; Kiley, 2009; Wisker, Robinson, & Shacham, 2007). TCs emerging from this research have lead to insights that could extend the content of supervisor professional development beyond regulations and compliance issues. While it might be unrealistic to assume that supervisors are, or can become, rhetoricians, nevertheless explicit discussion of what "writing" means at the doctoral level is essential. Also, raising supervisor awareness that there is a body of research around writing and supervision—that there is an epistemology associated with the *doing* of a doctorate—is critical.

Further, the importance of supervision within the university and its unique place within both teaching and research must be recognized. Both supervisors and doctoral students are developing expertise, critical thinking, writing, and communication skills as they engage in the research process with each other and with colleagues. As such, opportunities to discuss and understand self-efficacy as a complex idea that extends beyond "just get on with it" could help supervisors "unpack" it and consider how they can help students. Finally, I would recommend that as much as possible, universities develop bespoke professional development programmes that would acknowledge existing skills while helping supervisors identify gaps and opportunities to expand their knowledge. What was clear from the supervisor feedback in this research is that expertise varied, but that all respondents considered supervision as an extremely important facet of their academic work. Nevertheless, professional development that extends beyond compliance and funding to include alternative supervisory models, and recognition that there is a body of important research around the doctorate that can inform practice are urgently required and in forms that supervisors will embrace.

Acknowledgements

References

Blass, E., Jasman, A., & Levy, R. (2012). Supervisor reflections on developing doctoralness in practice-based doctoral students. *Quality Assurance in Education, 20*(1), 31–41.

Boud, D., & Lee, A. (2005). 'Peer learning' as pedagogic discourse for research education. *Studies in Higher Education, 30*(5), 501–516.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. Retrieved from https://eprints.uwe.ac.uk/11735/

Burnett, P. (1999). The supervision of doctoral dissertations using a collaborative cohort model. *Counselor Education and Supervision, 39*(1), 46–52.

Colbeck, C. L. (2007). Envisioning the future of doctoral education: Preparing stewards of the discipline—Carnegie essays on the doctorate (review). *The Journal of Higher Education, 78*(5), 611–613.

Davies, P. (2006). Threshold concepts: How can we recognise them? In R. Land & J. H. F. Meyer (Eds.), *Threshold concepts and troublesome knowledge* (pp. 70–84). London, England: Routledge.

Dorn, S. M., & Papalewis, R. (1997, March). *Improving doctoral student retention*. Paper presented at the American Educational Research Association Conference. Chicago, Illinoia, USA

Enders, J. (2004). Research training and careers in transition: A European perspective on the many faces of the PhD. *Studies in Continuing Education, 26*(3), 419–429. doi:10.1080/0158037042000265935

Fenge, L. (2011). Enhancing the doctoral journey: The role of group supervision in supporting collaborative learning and creativity. *Studies in Higher Education, 37*(4), 401–414.

Gerritsen, J. (2010,). New Zealand: Fee policy attracts foreign PhD students. *University World News , Issue 345*. Retrieved from http://www.universityworldnews.com/article.php?story=20100219130536770

Grant, B. (2010). The limits of 'teaching and learning': Indigenous students and doctoral supervision. *Teaching in Higher Education, 15*(5), 505–517. doi:10.1080/13562517.2010.491903

Group of Eight. (2013). *The changing PhD: Discussion Paper*. Turner, ACT, Australia. Retrieved from https://go8.edu.au/publication/discussion-paper-changing-phd

Halse, C., & Bansel, P. (2012). The learning alliance: Ethics in doctoral supervision. *Oxford Review of Education, 38*(4), 377–392.

Halse, C., & Mowbray, S. (2011). The impact of the doctorate. *Studies in Higher Education, 36*(5), 513–525. Retrieved from http://www.tandfonline.com/ doi/abs/10.1080/ 03075079.2011. 594590

Harlow, A., & Peter, M. (2014). Mastering threshold concepts in tertiary education: "I know exactly what you are saying and I can understand it but I've got nowhere to hook it." *Waikato Journal of Education, 19*(2) , 7–23

Harlow, A., Scott, J., Peter, M., & Cowie, B. (2011). 'Getting stuck' in analogue electronics: Threshold concepts as an explanatory model. *European Journal of Engineering Education, 36*(5), 435–447.

Harman, K. (2004). Producing 'industry-ready' doctorates: Australian cooperative research centre approaches to doctoral education. *Studies in Continuing Education, 26*(3), 387–404. doi:10.1080/0158037042000265944

Hemer, S. R. (2012). Informality, power and relationships in postgraduate supervision: Supervising PhD candidates over coffee. *Higher Education Research & Development, 31*(6), 827–839. doi:10.1080/07294360.2012.674011

Johnson, E. M. (2013). "Previously I thought writing was writing": Reflections on doctoral writing spaces. In S. Frielick, N. Buissink-Smith, P. Wyse, J. Billot, J. Hallas, & E. Whitehead (Eds.), *Research and development in higher education: The place of learning and teaching* (Vol. 36, pp. 233–242). Auckland, New Zealand: HERDSA.

Johnson, E. M. (2014) Toward the building of a cross-disciplinary doctoral research and writing culture. *Journal of University Teaching & Learning Practice, 11*(1). Retrieved from http://ro.uow.edu.au/jutlp/vol11/iss1/4

Johnson, L., Lee, A., & Green, B. (2000). The PhD and the autonomous self: Gender, rationality and postgraduate pedagogy. *Studies in Higher Education, 25*(2), 135–147.

Kamler, B., & Thomson, P. (2004). Driven to abstraction: Doctoral supervision and writing pedagogies. *Teaching in Higher Education, 9*(2), 195–208.

Kamler, B., & Thomson, P. (2006). *Helping doctoral students write: Pedagogies for supervision.* London, England: Routledge.

Kiley, M. (2009). Identifying threshold concepts and proposing strategies to support doctoral candidates. *Innovations in Education and Teaching International, 46*(3), 293–304.

Kiley, M. (2011a). Government policy and research higher degree education. *Journal of Higher Education Policy and Management, 33*(6), 629–640.

Kiley, M. (2011b). Developments in research supervisor training: Causes and responses. *Studies in Higher Education, 36*(5), 585–599.

Kiley, M. (2014, April 11). *How might coursework in the PhD be related to employability? Paper presented at the 11th bi-annual Quality in Postgraduate Research conference.* Adelaide, SA, Australia.

Lee, A., & McKenzie, J. (2011). Evaluating doctoral supervision: Tensions in eliciting students' perspectives. *Innovations in Education and Teaching International, 48*(1), 69–78.

Luca, J., & Wolski, T. (2013). *Higher degree research training excellence: A good practice framework, [Final report].* Sydney, NSW, Australia: Office for Learning and Teaching. Retrieved from http://www.olt.gov.au/project-best-practice-framework-inform-and-guide-higher-degree-research-training-excellence-australi

Maher, D., Seaton, L., McMullen, C., Fitzgerald, T., Otsuji, E., & Lee, A. (2008). Becoming and being writers: The experiences of doctoral students in writing groups. *Studies in Continuing Education, 30*(3), 263–275.

Manathunga, C. (2014, April 11). *Theorising the 'inter' in intercultural supervision: place, time and knowledge in intercultural supervision.* Paper presented at the 11th bi-annual Quality in Postgraduate Research Conference. Adelaide, SA, Australia.

Manathunga, C., Peseta, T., & McCormack, C. (2010). Supervisor development through creative approaches to writing. *International Journal for Academic Development, 15*(1), 33–46.

McAlpine, L. (2012). Academic work and careers: Relocation, relocation, relocation. *Higher Education Quarterly, 66*(2), 174–188. doi:10.1111/j.1468-2273.2012.00514.x

McCallin, A., & Nayar, S. (2012). Postgraduate research supervision: A critical review of current practice. *Teaching in Higher Education, 17*(1), 63–74.

McCulloch, A., & Loeser, S. (2014, April 11). *Does supervision training work? Steps towards a framework and an evaluation of a long-running induction workshop.* Paper presented at the 11th bi-annual Quality in Postgraduate Research Conference, Adelaide, SA, Australia.

Meyer, J. H. F., & Land, R. (2003). Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising within the disciplines. In C. Rust (Ed.), *Improving student learning. improving student learning theory and practice – 10 years on* (pp. 412–424). Oxford, England: OCSLD.

Meyer, J., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistomological considerations and a conceptual framework for teaching and learning. *Higher Education, 49*(3), 373–388.

Meyer, J., Land, R., & Baillie, C. (Eds.). (2010). *Threshold concepts and transformational learning.* Rotterdam, The Netherlands: Sense.

Ministry of Education. (2011). *Tertiary Education Strategy 2011–2015.* Wellington, New Zealand: Author. Retrieved from www.minedu.govt.nz

Ministry of Education. (2013). *Research degree completion rates.* Retrieved from Ministry of Education, Education Counts website: http://www.educationcounts.govt.nz/indicators/main/quality-education-provider/2035

Nerad, M. (2010). Increase in PhD production and reform of doctoral education. *Higher Education Forum, 7*, 69–84. Retrieved from http://depts.washington.edu/cirgeweb/increase-in-phd-production-and-reform-in-doctoral-education-worldwide/

Neumann, R., Kiley, M., & Mullins, G. (2008, April). *Australian doctoral graduates: Where are they going?* Paper presented at the Quality in Postgraduate Research Conference, Adelaide, SA, Australia. Retrieved from http://www.qpr.edu.au/2008/qpr2008_part2.pdf

OECD. (2010). *Key findings of the OECD—Know INNO project on the careers of doctorate holders.* Author. Retrieved from http://www.oecd.org/sti/inno/CDH FINAL REPORT-.pdf

OECD. (2013). *Education at a glance 2013: OECD Indicators.* Author. Retrieved from http://dx.doi.org/10.1787/eag-2013-en

Paré, A. (2011). Speaking of writing: Supervisory feedback and the dissertation. In L. McAlpine & C. Amundsen (Eds.), *Doctoral education: Research-based strategies for doctoral students, supervisors and administrators* (pp. 59–74). Dorchester, The Netherlands: Springer.

Reid, A., & Marshall, S. (2009). Institutional development for the enhancement of research and research training. *International Journal for Academic Development, 14*(2), 145–157.

Sampson, K., & Comer, K. (2010). When the governmental tail wags the disciplinary dog: Some consequences of national funding policy on doctoral research in New Zealand. *Higher Education Research & Development, 29*(3), 275–289.

Strauss, P. (2012) 'The English is not the same': Challenges in thesis writing for second language speakers of English. *Teaching in Higher Education, 17*(3), 283–293.

Styles, I., & Radloff, A. (2000). Jabba the hut: Research students' feelings about doing a thesis. In A. Herrmann & M. M. Kulski (Eds.), *Flexible futures in tertiary teaching. Proceedings of the 9th Annual Teaching Learning Forum 2–4 Feb 2000.* Perth, WA, Australia: Curtin University of Technology. Retrieved from http://lsn.curtin.edu.au/tlf/tlf2000/styles.html

UNESCO. (2014). *Higher education in Asia: Expanding out, expanding up. The rise of graduate education and university research.* Retrieved from http://www.uis.unesco.org/Education/Pages/higher-education-asia-report.aspx

Ward, M-H. (2014). *What limits do academics experience to their practice of supervision?* Paper presented at the 11th bi-annual Quality in Postgraduate Research Conference, Adelaide, SA, Australia.

Wisker, G., Robinson, G., & Shacham, M. (2007). Postgraduate research success: Communities of practice involving cohorts, guardian supervisors and online communities. *Innovations in Education and Teaching International, 44*(3), 301–320.

Wisker, G., & Savin-Baden, M. (2009). Priceless conceptual thresholds: Beyond the 'stuck place' in writing. *London Review of Education, 7*(3), 235–247.