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BECOMING DOCTORATE AS AN END-POINT AND A POINT OF DEPARTURE

INTERVENTION EXPERIENCES OF DOCTORAL SUPERVISORS AND CANDIDATES

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INTRODUCTION

There are generic features of 'the doctorate' that transcend disciplines, universities and doctoral procedures. Perspectives on doctoral outcomes include features of received wisdom, which scholars often refer to as the 'gold standard' of the doctorate (Trafford & Leshem 2008: 34–35). When standards at such a scholarly level are met, they constitute 'doctorateness', which is what examiners expect to be displayed in doctoral theses (Halse & Malfroy 2010; McAlpine & Ashgar 2010). To achieve generic scholarly standards, doctoral candidates are expected to progress beyond merely reporting facts; levels of knowledge, skills and attitudes that involve intellectualising, conceptualising and contributing to existing knowledge are required. Candidates and supervisors who display this understanding appreciate connections between doing research and writing a doctoral thesis, and for candidates at some institutions, defending their thesis in a doctoral viva. When these criteria for a doctoral degree are met, then 'doctorateness' is demonstrated (Trafford & Leshem 2008; 2011).

Universities are particularly concerned that doctoral career options are increasingly fluid within tight job markets. Doctoral education may then be narrowly viewed as research training with research results being produced at the expense of traditional educational and scholarly functions (Eley & Murray 2009; Malfroy & Yates 2003). Park (2007) argues that companies employing doctoral graduates are generally positive about the added value and research-related attributes they bring to their work. Consequently, the characteristics of educated, rather than just trained, researchers are recognised as being expert in a particular area or field of knowledge; resourceful and able to discover what is needed and used; mindful of the 'bigger picture' and using scholarly expertise networks appropriately and professionally; and

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adaptable to change by linking research areas and/or techniques to contexts and circumstances (Pearson & Brew 2002; Cumming 2010).

For academics with responsibilities for enhancing the quality of research education, supervision therefore involves creating high-impact research environments for candidates, which makes it necessary to access resources including trans-institutional and trans-national expertise essential to conduct and promote high-quality research and advanced levels of conceptual understanding (Austin 2009; McAlpine & Asghar 2010; Trafford & Leshem 2008). Resource requirements also challenge candidates and supervisors to reconsider their respective research roles, learning and development. Such changes require deliberate doctorateness interventions for candidates and supervisors.

DOCTORATENESS INTERVENTIONS

Our project started in 2009 with a planning phase against the background of the work done by two of the co-authors. Since 2002, Trafford and Leshem (2002a; 2002b; 2008) have published extensively on the concept of doctorateness and doctoral education. Their work stemmed from six years of conducting professional development workshops for supervisors and candidates from at least 30 disciplines and over 50 countries. They have also participated in more than 100 doctoral vivas at different universities internationally. Their experience of doctoral study, supervision and examining indicated that draft text and completed doctoral theses display how candidates assemble and present scholarly arguments. Furthermore, interim and final examination reports illustrate how examiners approach scholarship in doctoral theses and reach conclusions in this regard. The evidence that emerged generated practical insights upon which candidates and supervisors could act.

The project planning was followed by a pilot phase in 2010. We decided on a two-day developmental workshop format appropriate for candidates and supervisors. Participation thus involved both 'providers' of supervision (experienced and/or inexperienced doctoral supervisors) and 'receivers' of supervision (advanced and beginner candidates). The pilot intervention was repeated in 2010 with slightly modified content and activities.

Themes for intervention were closely related to both local (South African) and foreign doctoral requirements. They addressed processes and implications associated with achieving doctorateness rather than focusing on either the mechanics of doctoral supervision or the complexities of research methodology. This approach emphasised how candidates could be assisted in raising their levels of thinking about their research topics, their research processes and their potential contribution(s) to knowledge.

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The emphasis aligns with examiners' expectations for their summative examination of doctoral theses. These expectations recognise generic research features and processes that transcend disciplines. The workshop interventions thus argued for promoting doctoral education and the professional development of supervisors across disciplines. Table 13.1 shows the topics covered in the pilot phase.

TABLE 13.1 Seven topics included in the pilot workshop interventions (See Bitzer, Trafford & Leshem 2013)

Topic	Description
The nature of doctorateness and its significance	Doctorateness includes those essential features that are necessary in all doctoral theses. This topic explains the 12 critical components of doctorateness showing how supervisors can guide candidates to include these features in their research and writing their thesis. Examples illustrate how examiners view either the presence or absence of doctorateness and how this influences their judgment of scholarly merit in theses.
Levels of thinking	Doctorateness emerges when researchers raise their level of conceptual thinking about research. This topic illustrates how to approach research in a scholarly manner moving from the descriptive to the conceptual and so display understanding of research, doctorateness and scholarship.
The conceptual framework	Appreciating how conceptual frameworks emerge from theoretical perspectives, influence research design and aid drawing conclusions represent theoretical and empirical consistency. Examples of 'good' and 'poor' doctoral research are presented.
Thinking like researchers	Examiners judge doctoral theses against formally stated criteria for candidates to become competent researchers. This topic explains how supervisors enable candidates to 'think like researchers' and demonstrate such evidence in theses.
How to conclude a thesis in one chapter	The conclusions chapter is acknowledged as being the most difficult chapter for candidates to write. Since it is usually the last piece of significant text that examiners read, it is important that it conveys justifiable and positive impressions about the thesis and its scholarly merit. This topic draws on examples from candidates, supervisors and examiners to illustrate how this objective can be achieved.
Introducing a model to audit a thesis	Research is expected to be coherent and integrated. This topic explains how auditing the text of a thesis ensures that methodological rigour and scholarship are appropriately demonstrated. By viewing research as cyclical rather than linear, the audit model offers practical ways for supervisors and candidates to scrutinise doctoral research before submitting a thesis.
Polishing protocols: guiding candidates to better academic practices	Drafting a thesis includes acknowledging administrative and academic protocols that are frameworks of rules which readers expect to see in a thesis. Evidence has shown that examiners scrutinise how candidates – and by implication supervisors – ensure that the protocols are self-evident in doctoral text.

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The third phase (2011 to 2015) involved a series of 10 workshop interventions with 277 candidates and supervisors from 15 South African universities. Participation was voluntary with between 25 and 30 members per workshop. Data generation included:

- a pre-intervention profile survey questionnaire before each workshop;
- post-intervention and on-site feedback from participants;
- delayed post-intervention participant feedback via e-mail between one and two years after workshop participation.

Pre-intervention questionnaires focused on the experience, background and expectations of participants while on-site post-intervention questions involved open-ended items exploring how participants experienced interventions and what they learnt. Three open-ended questions guided the delayed post-intervention e-mail survey via uncompleted statements:

1. The input on doctorateness helped me to think differently about ...
2. The input on doctorateness reinforced my thinking about ...
3. The doctorateness idea and practices influenced my studies/supervision in the following ways ...

Since we had reported in some detail about pre- and on-site post-intervention data earlier (Bitzer *et al* 2013), the focus in this chapter is on the potential learning gain of candidates and supervisors that involve post-hoc intervention data.

RESULTS

Respondents to our e-mail invitation for post-intervention feedback comprised 22 supervisors and 19 doctoral candidates. Some respondents had already completed their studies and were now supervising other doctoral candidates. We deliberately excluded responses of the 2015 participants as it was too close to their workshop experience. From the remaining responses we selected 15 information-rich narratives from eight supervisors and seven candidates. Narrative data were analysed using simple content analysis comprising codes, clusters and themes (Saldana 2009). Feedback from the other respondents was unused because of lack of information or institutional duplication.

Question one sought views on how doctorateness interventions assisted respondents in thinking differently about their studies or their supervision. Candidates highlighted five issues: a different approach to methodology, better clarifying the knowledge gap in their studies, scrutinising the planning stage of their projects, viewing differently

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the level of thinking required at the doctoral level, and seeing the value and use of conceptual frameworks:

Candidate one (C1) and her supervisor "... had to change the methodological approach of the thesis that eventually made the output a better one..."

C2 reported: "I realised how doctoral research should be different from other research – especially the doctoral student has to clearly demonstrate where the gap is."

C3 emphasised changed thinking: "The input on doctorateness helped me to think differently about ... the scope, boundaries and originality of the topic I had chosen for my PhD. It helped me plan the stages of my PhD better."

C4 commented on intellectual demands in doctoral studies: "The level of thinking that must be applied during your PhD journey. How participants and data are engaged with and to always stay true to your chosen paradigm."

C7 endorsed the value of conceptual frameworks: "As I was listening to them I asked myself if I would still be the same person that I was had I attended the workshop prior to commencing and whether I really appreciate the value of the conceptual and the theoretical framework."

In responding to question one, supervisors pointed to seven areas of changed thinking on doctoral supervision: reviewing their understandings of the concept 'research approach', how doctoral ends relate to their beginnings, how the doctorate may contribute to knowledge in more than one way, how conclusions can be drawn in different ways and on different levels, how doctoral thinking could be explicated, how conceptual links within a thesis could be afforded, and how the roles of the supervisor may be reviewed:

Supervisor one (S1) said: "I obtained a new way of looking at research, not qualitative and quantitative but deductive and inductive and it made much more sense. I wish I had the chance to attend such a workshop before I did my D in 2007. At least now I can assist my D students better."

S2 changed his view on " the importance of thinking about the oral exam or viva right from the beginning".

S3 pointed out: "It [the workshop] made me think differently about the different kinds and levels of conclusions – eg to distinguish between factual/descriptive conclusions and higher-level conclusions, for instance, conceptual conclusions. Many of the dissertations and theses that I evaluate end with descriptive conclusions, which are a mere summary of the results ..."

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S4 referred to the need for explicating doctoral complexity: "Making some of the complexities inherent in the doctoral process explicit ..."

S6 pointed towards facilitating an understanding of thesis linkages: "I now actively use the magic circle as a starting point for the first conversation with my doctoral candidates. We revisit this circle again before the thesis is submitted for examination ..."

S8 referred explicitly to her reviewing the own supervisory role: "[I reconsidered] ... the supervision task, especially since I am (or was, two years ago) a relative newcomer to the task. Even though my own institution does not require a final defence (= viva), I found the focus placed on this both relevant and interesting, since similar searching questions tend to arise in examiners' feedback."

Question two asked participants to indicate how and in which respects doctorateness interventions reinforced their thinking about aspects of study and supervision. Five issues emerged from candidate feedback: consulting expertise beyond supervisors, explicating their research approach, to have a clear 'study map', how to make thinking visible, and the intense effort required by a PhD study:

C1 said: "... [to ask] the opinion of other scholars on issues that are unclear. This ensured that with different suggestions and advice, a better way to improve research quality is accessed."

C2 reported: "After attending the workshop, I realised that it was imperative that a doctorate thesis should be explicit in terms the approach to be followed: deductive, inductive – this reinforced my focus."

C3 commented: "The input on doctorateness reinforced my thinking about ... the need to have a very clear 'map' or plan for the PhD and the importance of the conceptual framework in this respect ..."

C5 hinted at reinforced thinking about doctoral explicitness and clarity: "... to really make your thinking visible".

C6 clarified reinforcement in terms of required effort: "I have always appreciated the reality of intense effort that the candidate should put into the PhD. The tone and the emphasis of the workshop confirmed that."

Supervisor responses to question two rendered five confirmatory issues: seeing the research process as a journey, observing the importance of links among research components, acknowledging the importance of theory, noting the salient requirements for doctorateness, and pointing out the need to maintain a critical stance throughout the supervision process:

S1 confirmed his view of the research journey: "The fact that research is a journey and nothing is cast in stone. You need to convince a candidate

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to become one with her research and needs to have a passion for the topic.”

S2 confirmed the facilitation of independent research capabilities of candidates: “[They need the] ability to identify knowledge gaps to be filled by a PhD study; ability to match data collection and analysis to the research goals or research questions and to see the role and importance of the literature review and conclusions chapters.”

S3 clarified her belief in the value of theory: “[It] confirmed that my thinking on the issue of theory was sound. This was a huge relief and gave me confidence in my supervision and assessment of the contribution of a study. It also confirmed and further developed my thinking about the role of a conceptual framework in research. I therefore always require of my students to make a choice and justify which theory/theories will be used in their own study as conceptual framework.”

S6 emphasised a renewed perspective on doctorateness: “... the doctorateness concept and process generally ...” while S8 noted on the issue of criticality: “... the necessity for doctoral candidates to think critically about their inbuilt assumptions, and naturally for me to examine my own ...”

Question three inquired into participants’ changed study and supervisory practices. Such changes, if reported or observed, may become the prime indicators of change and transformative learning. The feedback from candidates pointed to four pertinent issues of change in doctoral practices: rewriting parts of a PhD thesis, implementing a plan or map related to the end goals of the study, using the doctorate model as a barometer for progress, and reading more widely than initially planned:

C2 identified rewriting some sections of her PhD: “After attending the workshop, I had to incorporate some useful sections into my PhD research planning/mapping – typically, the summary conclusion chapter was expanded. The breakdown of the chapter into various types of conclusion reveals the doctorateness of the researcher. We were exposed to various comments made by examiners for PhD theses – this opened my mind and I then wrote my thesis being aware of what my examiners will be expecting from me.”

C3 highlighted the end product of his thesis: “[The workshop] helped me to plan my reading on my chosen topic; to visualise the doctoral journey and set goals for what I want to achieve and by when; and to keep the end in mind – to visualise where I need to be by the time I get to the viva.”

C4 acknowledged the value and use of one of the thinking tools introduced at the intervention: “I immediately made a huge colour print of the ‘magic circle’, posted it on my office wall and I use it now to guide

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my own students in their studies. I also use it as a barometer for their progress.”

C6 was adamant about her changed reading habits: “The workshop intrigued my interest of reading widely and not confining my mind to my studies only.”

Supervisors reported seven behavioural changes: using the components of doctorateness to explain to candidates what a doctoral degree entails, guiding candidates in providing justification for research decisions, emphasising the importance of theoretical frameworks, assisting candidates in moving beyond descriptive work, more confidence in judging the scope and depth of studies, adopting a more structured approach to guidance, and productively using doctorateness ‘tools:

S1 pointed out that “[t]he components of doctorateness ... make it so much easier to describe to a student what a D is all about that it is not just a glorified M. As far as I can I shall send my students to attend this workshop as more or less a prerequisite before embarking on their D. Overall, this has opened my eyes – even as someone with a PhD.”

S2 explained how candidates were ‘helped’: “[I am now] allowing PhD candidates to provide full justification for their choices of theoretical frameworks, research goals, methodologies and analytical tools; I encourage candidates to focus sharply on the research questions during data collection and analysis and to compare their findings with findings in the literature in the process; I also encourage candidates to use their theoretical/conceptual frameworks analytical lenses and to indicate clearly what gaps in knowledge their studies help to fill – this is an operational way of establishing the originality of the study’s contribution.”

S3 now requires her students “... to write a section on the contribution of their research in the final chapter. I require of my students to move from mere descriptive conclusions to conceptual conclusions and thus add to new understanding on the topic. This is extremely difficult for most students, and impossible for some students. I previously had to spoon feed them and guide their thinking. I think this is where Vygotsky’s zone of proximal development is relevant. This is also where the ‘distance’ in distance education is a hurdle because direct communication is not always possible.”

S4 reported that she was “much more confident in judging the scope and depth of studies’.

S5 claimed to have “a more structured approach in my supervision practices. Students are recommended to adopt various aspects of the doctorateness text during the term of their studies. My insight is that

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although we each have our own way of supervising students, it is great to learn from others to improve practice. Also by sharing the frameworks with students and colleagues we are getting closer to adopting a quality standard that is clearly defined.”

S6 said that the doctorateness text “has become a daily reference for my supervisory activities and I also have shared it with many of my colleagues”.

S7 reported: “Since I attended the workshop I have presented many of the ideas to postgraduate students and to a research supervision community of practice – their feedback are very positive about the value of the ‘magic circle’ and using the auditing instrument. I have used these auditing instruments with two PhD students just before they have submitted their work for examination purposes – it helped to identify gaps in their work or poor alignment between sections. I will definitely continue using this strategy.”

S8 concluded: “I now recommend the text on doctorateness to all postgraduates for its insightful and rigorous clarification of a sometimes mysterious examination process.”

These findings raised questions about their interpretation. One way may be to link changes in the thinking and resultant actions of doctoral candidates and supervisors to elements in the notion of transformative learning as explored adult education (Mezirow 1990, 1991, 1995, 1996, 2003, 2006; Kitchenam 2008).

TRANSFORMATIVE LEARNING

Mezirow (1990, 1991, 1995, 1996) proposes that transformative learning constitutes a process of effecting change in adult persons’ frames of reference. Through adulthood people acquire a relatively coherent body of experiences including associations, concepts, values, feelings and conditioned responses to situations. This accumulates in frames of reference that define the life-world of adults as structures of assumptions by which they understand their lived experiences thereby selectively shaping their expectations, perceptions, cognition and feelings. Thus reference frames determine the everyday actions of adults.

Mezirow’s research shows that most adults tend to avoid or to reject ideas that fail to fit their preconceptions. However, when circumstances permit or necessitate, adults move toward frames of reference that are more inclusive, discriminating, self-reflective and integrative of experience (Mezirow & Associates 2000). A frame of reference, which may encompass cognitive, conative and emotional components, is composed of two dimensions: habits of mind and points of view. Habits of mind are broad, abstract, orienting, habitual ways of thinking, feeling and acting,

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influenced by assumptions that constitute a set of codes. These codes may be cultural, social, educational, economic, political or psychological. Habits of mind thus become articulated in specific points of view embracing a constellation of beliefs, value judgments, attitudes and feelings that shape particular interpretations or understandings of reality.

Adults' frames of reference are changed through critical reflection on the assumptions upon which their associated interpretations, beliefs, habits of mind and points of view are based (Mezirow 2003). Adults can become critically reflective regarding their assumptions when they try to solve problems or participate in deliberate interventionist activities. Such activities may comprise reading a book, hearing a point of view, engaging in task-oriented problem solving (objective reframing) or self-reflectively assessing own ideas and beliefs (subjective reframing). Thus, being self-reflective can lead to significant personal and behavioural transformations (Mezirow 2006).

Mezirow (1985, 1991) had earlier suggested various phases for transformative learning as:

- a disorienting dilemma or experience;
- self-examination;
- a critical assessment of own assumptions;
- recognition of discontent shared by others;
- an exploration of new roles, relationships or actions;
- planning for a course of new action;
- acquisition of new knowledge and skills to implement the plans;
- provisional trying of new roles;
- building competence and self-confidence in new roles;
- the reintegration of a renewed perspective.

Later in his research Mezirow included habits of mind and points of view in his transformative theory and expanded it to include elements of constructivist learning, distortion theory, schema therapy and individuation (Kitchenam 2008:110-113). This expansion acknowledged a renegotiation of relationships within adult learners' schemes of meaning-making as an eleventh phase in Mezirow's theoretical model.

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A key aspect of Mezirow's transformative learning theory is learning through meaning transformation. This process requires that the learner becomes aware of specific assumptions (schemata, criteria, rules or repressions) on which a distorted or incomplete meaning scheme is based. Through a reorganisation of meaning or abandoning such meaning the original assumptions may be challenged and transformed (Mezirow 1985:23). Adult learners could thus encounter a problem or anomaly that cannot be resolved through original meaning-making schemes or through learning new meaning schemes. The resolution may emerge from redefining the problem. Learning transformation can thus effectively occur by critical self-reflection on the assumptions that supported an initial meaning scheme or the contemporary perspective (Mezirow 1985, 1990, 1991).

Mezirow's research proposes that perspective transformation occurs in two dimensions related to changing meaning schemes. Firstly, it occurs through an accumulation or concatenation of transformations in set meaning schemes (Mezirow 1985). Thus, an adult learner may experience a perspective transformation through a series of altered meaning schemes or "the constellation of concept, belief, judgment, and feeling which shapes a particular interpretation" (Mezirow 1994:223). For example, doctoral supervisors may realise that the concept of doctorateness confirms or supplements their own interpretation and application of criteria for doctorateness. Thus they amend their own practices accordingly. Secondly, perspective transformation may be "epochal ... [and] ... painful" (Mezirow 1985:24), whereby meaning perspectives are transformed or by forming new sets of meaning schemes. This dimension involves a more comprehensive and critical re-evaluation of one's own assumptions and practices. For example, candidates may realise that their understanding of the requirements for becoming doctorate is falling short of international standards. Thus, they then review and modify their approach to research and working habits.

Critical reflection

Mezirow argued throughout his later work that a central element to perspective transformation is critical self-reflection (Kitchenam 2008; Taylor & Laros 2014). Figure 13.1 below suggests that according to Mezirow, adult learners adopt new points of view that comprise meaning clusters or schemes that are expressed as newly-formed or transformed perspectives of different kinds (socio-linguistic, moral-ethical, epistemic). These transformed perspectives, in turn, result from new habits of mind based on changed frames of reference.

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Mezirow pointed out that unless deeply held assumptions that accompany original meaning schemes are revisited, perspective transformation may not occur. Similarly, if adult learners adopt new thinking and belief systems via top-down, power-coercive processes, then perspective transformation would be aborted (Mezirow 1994). Adult learners who do not reconcile or change their deeply held assumptions with new meaning schemes may not appreciate the veracity or utility of that learning – this would be non-transformative and surface learning (Marton & Saljo 1976).

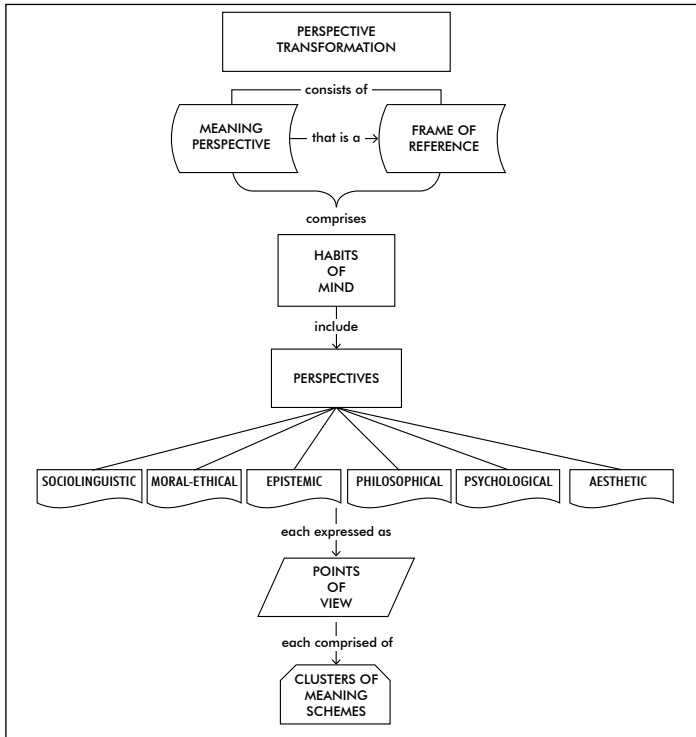


FIGURE 13.1 Mezirow’s reviewed transformative learning model (after Kitchenam 2008:119)

Adult learners are prone to viewing reality in terms of limited inclusion, narrow differentiation, a lack of permeability or openness to other ways of seeing, and a failure to facilitate experience integration. Mezirow thus emphasised three perspectives on adult meaning-making: epistemic (related to knowledge and how adults use knowledge), sociolinguistic (related to language and how adults use language social settings) and psychological (related to how adults view themselves as persons) (Kitchenam 2008). The correction for epistemic, sociolinguistic and psychological distortions is perspective transformation through a revised model accompanied by critical reflective discourse (Mezirow 2006). Therefore, when adult learners start interpreting new meaning perspectives and forming new meaning

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schemes, discursive debate with colleagues provides a vehicle for enacting their transformed learning.

DISCUSSION

Mezirow's transformative learning theory recognises the validity of Habermas's (1984) distinction between instructional and communicative learning (Mezirow 2003). Instructional learning is the acquisition of skills and knowledge that include mastering tasks, problem solving and manipulating the environment – the 'how' and the 'what' of tasks. In contrast, transformative learning is perspective transformation which implies a shift in meaning-making whereby prior interpretations and assumptions are critically reviewed to form new meaning, or the 'why' of tasks. Perspective transformation is thus achieved through disorienting dilemmas, critical reflection, rational dialogue and resultant action (Mezirow 2006).

Accounting for these contrasts, our findings suggest three ways that transformative learning followed from doctorateness interventions that visualised the end of the doctorate as a departure point to undertake doctoral studies. Firstly, workshop interventions appear to have positive transformative learning effects. By challenging candidates and supervisors to think about doctoral research in terms of outcomes rather than process, their views on the doctorate and its supervision usually change considerably. Interventions characterised by discursive and critical reflective learning activities seem to enhance such changes in perspective. Similarly, supervisors' changed views prompted discussions with their candidates regarding the significance of internationally accepted doctoral requirements. These findings support the importance that Mezirow's transformative learning model places on discussion, critical reflection and voluntary participation as reinforcing transforming habits of mind and perspective change.

Secondly, emphasising the end-point of doctorateness right from the start of doctoral studies and the candidate-supervisor relationship appears to generate explicitly expressed perspectives on research education and development. Our findings show that if candidates and supervisors have shared and agreed ideas about the criteria for achieving doctorateness, then chances of achieving it – not surprisingly – rise considerably. Oftentimes doctoral candidates and supervisors start their relationship with relatively fixed ideas based on previous master's studies (candidates) or their own experiences (supervisors) (Bitzer & Albertyn 2011). Feedback from candidates and supervisors in our project indicated the value of viewing doctorateness as a process, but more significantly also as an academically strategic end-product.

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Such a view, in Mezirow's terms (Mezirow 1985, 2003, 2006; Kitchenam 2008), makes for a critical review of personal assumptions, an exploration of new roles, relationships and actions, as well as the reintegration of new perspectives with resultant actions. The 'practical' evidence for this view was provided by candidates who reported on changing their methodological approach, explicating knowledge gaps, viewing the doctoral scope, boundaries and originality differently, and even changing their ontological perspective. For supervisors the changes were in redefining the research approach, thinking differently about examiner requirements and considering the doctoral viva early on, thinking differently about how to advise on the writing of doctoral conclusions chapters and viewing doctoral projects differently in terms of coherent, integrated and synergistic products. Thus, enabling candidates and supervisors to view the end products of doctoral projects both as a means and as an end for planning, auditing and discussion possesses substantial interventional value.

Thirdly, our doctorateness interventions show reported longer term transformative actions by candidates and their supervisors. Indications of learning transformation about doctorateness are worthy of note since few things illustrate positive change more effectively than actions resulting from new understandings, points of view or perspectives. It was obviously not possible for us to observe transformed actions within the context of candidates' study or supervisory practices. However, respondents' accounting for examples of such actions was significant. Their feedback explains the building of competence and self-confidence to make changes in candidates' studies and supervisory practices as well as recognising transformed thinking about doctorateness. Candidates' reported actions are illustrative of substantial revisions to their previous understanding of what doctoral studies entailed. Supervisors' reported actions emphasised using doctorateness text as a daily reference for their candidates and using doctorateness instrumentation to audit theses, thereby addressing issues of scholarship and consequently helping to demystify the doctoral examination process for candidates and supervisors alike.

The evidence from our project highlights at least three implications for doctoral candidates, their supervisors and those involved in promoting doctoral education as a scholarly endeavour.

Implication one: Interventions on doctorateness may benefit from planning and design that incorporates the assumptions and principles of adult transformative learning. It would include considering Mezirow's model for explaining transformative learning and the potential role of critical reflection, discursive methods and voluntary participation.

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Implication two: Viewing doctorateness as a process of becoming, but also as an end product for studies and supervision, seems to be a favourable intervention position for workshop providers to adopt. Recognising the end-point is an opportunity to discuss how it will be reached successfully. Serious and constructive discussion of the options (means) is itself educative and developmental especially if all aspects of undertaking doctoral research are included in those discussions.

Implication three: It seems important to deliberately trace candidates' and supervisors' application of the doctorateness concept and its integration into study, supervisory and developmental practices. In this way the real value of transformed learning in doctoral education may be better understood and valued.

Finally, as reiterated by Välimaa and Hoffman (2008) and emphasised by a relevant UNESCO (2005) report, knowledge societies generate, process, share and make available to all their members knowledge that may be used to improve the human condition. Knowledge societies thus differ from information societies in that the former serve to transform information into resources that allow society at large to take effective action while the latter only generate and disseminate data. The idea of present-day and future knowledge societies is based on the assumption of vast increases in useful data creation and information dissemination. In this sense, our research has shown that the contribution of quality doctoral education and transformative learning about doctorateness may be of major importance and high significance to future knowledge societies.

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