**Building High Caliber VET Research Capability through more effective Higher Degree by Research Supervision.**

The radically realigned VET institutional landscape is now confronted by the impact of digital disruption, redefining what businesses, workplaces, work, and skills will be required. VET practitioners have to determine what learning content, processes, and infrastructure will be required for this future. At such critical periods of renovation and rebuilding, examining the available research evidence should be at the core of rational decision making and challenge inevitable ideological responses. However, this requires a new generation of highly capable VET researchers with a sound research apprenticeship and the confidence to assert rational research perspectives. Developing a strong cohort of VET higher degree by research (HDR) students is therefore an imperative for strong VET sector decision-making, and this paper makes a contribution to this goal. This paper reviews the experiences of such students and supervisors from three recent studies conducted by the author, and examines the key emerging issues, and proposes strategies that can add value to VET HDR supervision. The paper provides a framework for constructing appropriate strategies for specific student cohorts in order to maximise resource impact and VET research capability for the future.

**Introduction**

Australian VET has constructed a globally competitive national research network that has come a long way since it was noted that ‘No Small Change’ was required (McDonald, 1993). While the advent of national grants, collaborative teams, NCVER and AVETRA initiatives, and consultancy-based research have all contributed to this development pattern, it is a cohort of higher degree by research graduates who have been instrumental in furthering this agenda and building the related institutional infrastructure. Now, Australian VET must renovate and rebuild following the radical structural and institutional realignment of the past decade and prepare for the digitally disrupted industry needs of the next decade. PhD candidates will form the central core of the next generation of VET researchers, and gaining knowledge about their development should be a priority (ACLA, 2016). The approach of this paper is that the contribution of this next cohort of researchers in providing research evidence will be critical to ensure VET reconstruction is based on effective and valid research evidence, voiced with authority. The purpose of this paper is therefore to focus on providing knowledge that can support more effective VET higher degree by research supervision, so that these candidates will be able to form a central pillar of the future VET reform process.

The domain of HRD candidature can be characterised by three major features. First, it has a lengthy track record as a pedagogic practice (Moses, 1984). Second, it is based on an intense and lengthy mentoring relationship (Bitzer, 2007). Third, it represents the pinnacle of academic learning, and sits at the top of the AQF framework as learning that seeks to produce new knowledge capable of informing system and social change (ACLA, 2016). Despite many decades of candidate management, the critical relations between candidate and supervisor often remain opaque and compartmentalised. In this, VET candidate supervision is no different from supervision in other related disciplines. Novice supervisors often protect their candidates from surrounding institutional pressures to minimise intrusion for the candidate, and to ensure doctoral involvement for their own personal development. While supervision mentoring systems can be effective, often mature supervisors are torn between onerous and multiple responsibilities with candidates then moving into a self-management mode. Unfortunately, the supervisor learning process has a long gestation period, and a decade may pass before a supervisor has developed a range of personal experiences from which to draw. In addition, learning is exacerbated by the individualistic nature of the process (Pearson and Brew, 2002)). There is no class of 40 where you can pitch to the middle and then blend in some differentialisation. Indeed, your advice and feedback is critical in shaping not just the candidate’s learning, but often their future life. It is an onerous responsibility, exacerbated by the fact that that what a supervisor learns from their first mature Australian female TAFE lecturer candidate, is unlikely to provide a model for their second Iranian male Honours candidate, and as such reflects the dilemmas of parenting. The pattern of close, closed and lengthy relations provide a poor experiential learning pattern, especially when most supervisors will only perform for less than two decades. It is often like re-constructing the boat while at sea (Johnson and Duberly. 2006), learning while tinkering with the most important project of the candidate’s life. From a more positive perspective, while much tertiary education still operates from a ‘just in case’ approach in terms of knowledge distribution, the vitality and project focus of the HRD candidature does at least move the student relationship focus towards a ‘just in time’ knowledge approach. However the current training model is increasingly at odds with societal needs. It is a solo effort in a world of research teams, it encourages expertise in one method when great researchers need multiple tools in their arsenal, and it demands a verbose statement when decisions are frequently craft on one side of A4.

It is the intention of this paper to draw on *three studies* to attempt to open up learning from multiple supervision experiences nationally and provide knowledge and a framework to support VET HDR supervision. The first study was a large government funded Australian Teaching and Learning (ATL) national project where 6 Universities collaborated to explore candidature experiences nationwide and produce guidelines and processes for more effective PhD supervision. This study produced national resource guidelines in the form of an E-book for supervisor development with dissemination through multiple collaborative workshops. The second study was funded by the ECU Centre for Innovative Practice and involved local interviews focusing on candidature experiences and exploring the relationship between candidate management and candidate innovation spanning more than two decades. The final study was a personal auto ethnographic reflection on personal experiences with more than 30 higher research students and mentoring of multiple NCVER research scholarship students.

The goal of this paper is to review the evidence and findings from these three sources and to draw from this accumulated experience to conceptualise a framework that can be used support VET HDR supervisors in developing more effective candidate management strategies. This paper reviews the relational findings from the three studies, provides a project management framework to guide such relations; isolates guiding principles relevant specifically to VET higher degree in a model, and provides specific strategies for particular segments of the candidate cohort. The use of this paper is that it will provide knowledge that can be applied by VET HDR supervisors so they can develop a more effective cohort of VET researchers who will contribute to rational VET reformation, and who perhaps, may preserve some of the VET legacy gained from previous research platforms. While this paper is aimed at all higher degree by research students, the emphasis will be on the PhD cohort as they form by far the largest cohort, are the most instrumental, and present the greatest area for return on investment.

**The background of supervising candidates**

This paper focuses the supervision and management of higher degree by research candidates in the VET area. Relevant existing knowledge in this area consists of understanding the background and intent of HDR schemes, the mentoring nature of the candidate-supervisor relationship, the theoretical basis for exploring the practice, and the dilemma of balancing exploration with completion. A recent review of the Australian university higher degree by research training schemes has underlined the importance of the outcomes of this scheme to the economy and for social stability and growth (ACLA, 2016). This is especially true as society increasingly moves towards a knowledge-based economy where innovation is a necessity rather than just desirable. However, the current scheme has been constructed from a long tradition of scholarly practice.

A PhD is the highest degree that a student can attain in most fields, and is an abbreviation of the Latin *philosophiae doctor,* from a time when the concept of “philosophy” had a broader meaning as the *love of* wisdom (Currie, 1994). Universities from the 11th century onwards awarded degrees that confirmed the mastery of *existing knowledge*, but academic research and the quest for new knowledge remained a spare time academic activity often fraught with political danger. It was not until the 1700s that research became a legitimate academic pursuit, and then in the mid 1800s German and American universities began to develop PhD awards that required *original* research (Noble, 1994). In the early 20th century PhD courses were implemented in Britain, and also became more common across Europe. The massive expansion of university capacity after the second-world war saw PhD candidatures proliferate, and PhD degrees become a required academic qualification for university tenure. American universities awarded more than 1.3m PhDs in the last century (NSF, 2010), while in Australia, more than 7000 PhDs are awarded annually.

Due the importance of this scheme for commerce and society, the government makes a significant annual investment. In Australia the PhD remains one of the few qualification where the government subsidises student fees and in many cases provides stipends for living expenses to attract high quality candidates not just from within Australia but drawing students internationally. Therefore, PhD programmes receive regular reviews, and the most recent review in Australia (ACLA, 2016) cites more than 50 recent studies of this sector and builds on those studies of higher degree candidature (OECD, 2012; ACG, 2010; Killey, 2009: Demeritt and Lees, 2005). These studies all stress the importance of the investment in such research schemes and candidate management.

There is a convergence in the reviews and associated literature that while candidate selection and outcome dissemination are ongoing and contested political arenas, the centrality of the candidate-supervisor relationship remains at the core to the process and is the key to outcomes, despite an increasing plethora of supporting structures for candidates (AGP, 2009). Managing research training candidates is a complex and demanding activity due to the highly individual focus, the critical nature of the task, the uncertainty of the pathway, the need to bridge conceptual theory with the pragmatism of data collection, and the length of the quest that has to be sustained while ‘other lives’ impeded and frustrate the central goal (Sinclair, 2004). This positions the supervisor as both conceptual guide and emotional supporter. Recent studies (GRS, 2013) indicate that the supervisor may play up to 23 relational roles within their overall responsibility to support planning, monitoring, development, and the management of candidates. The same source indicates that most students establish at least ten relational connections that feed into their candidature development in addition to the primary supervisor relationship. Increasingly in recognition of the instrumentality and critical nature of the supervisor-candidate relationship, most universities have moved to a team supervision model, although in many cases a sole intense connection between student and supervisor is often privileged, by design or by default. At the centre of these relations lies a cyclic planning, investigation, conceptualisation, reflection, and discussion cycle, now mediated increasingly by social media use (Wadee et al, 2010). At the heart of the interaction lies a mentoring and coaching approach to candidate management (Gurr, 2001).

The mentoring approach, well established as the primary supervisory mode has it’s roots in the 700BC narrative of Homer, describing how ‘Mentor” guided the son of Odysseus. Mentoring has a wide and continued presence in the areas of education and business learning relationships. Many studies outline the pragmatic outcomes of mentoring and provide a guide to successful and unsuccessful practice, and focus on the practice in action (Ehrich, Tennent and Hansford, 2000). However, while this is instructive, it lacks the grounding of an underpinning theoretical or conceptual model. Many authors exploring mentoring draw from their own theoretical discipline bases and have used social learning theory, social exchange theory, Foucaldian theory, human capital theory, social network theory, and structuration theory to provide a framework for understanding and developing effective mentoring practice (Ehrich, Tennent and Hansford, 2001). Lee and Nolan (1998) suggested that academics are particularly drawn to theories that focus on the interactional nature of the relationship where there is continued reciprocal exchange. A model that bridges theory and practice is proposed by Ehrich, Tennent and Hansford (2001) that draws on social exchange theory but recognises the role of organisational power, and focuses on three main components of the relationship: the initiation, the process, and the outcomes.

What is interesting about the previous review of the theoretical investigation of mentoring activity, is the primary recognition of the interactive and contextual nature of the process. Each set of actors construct a pathway relevant to their needs, even through they may follow a broad project management model (Whitelock and Faulkner, 2008). However, a theoretical perspective has to incorporate the central dilemma of research supervision; managing candidate progress while simultaneously enabling innovative practice and learning to flourish. In VET research, the dominant PhD research paradigm is inductive and exploratory, investigating evident issues or reviewing the outcomes of changed practices. While a grounded process is often used to enable key themes to emerge from the voices of the data, there is also the need to enable new and unexpected issues to flourish. Routine project management of candidates can crush inspiration and ‘abductive’ or Ureka moments of understanding. While deduction confirms and induction conceptualises local practice, abduction generates new hypotheses to explaining surprising or unexplained facts (Hoffmann, 2010). The complexity of managing the vagaries of the research process has been known for some time.

*The whole series of mental performances between the notice of the wonderful phenomenon and the acceptance of the hypothesis, during which the usually docile understanding seems to hold the bit between its teeth and to have us at its mercy, the search for pertinent circumstances and the laying hold of them, sometimes without our cognizance, the scrutiny of them, the dark labouring, the bursting out of the startling conjecture, the remarking of its smooth fitting to the anomaly, as it is turned back and forth like a key in a lock, and the final estimation of its Plausibility, I reckon as composing the First Stage of Inquiry (Peirce 1908 cited in Paavola 2004a, p. 248).*

What is known is that research supervision has been constructed over several centuries as the primary bridge between university learning and social and commercial innovation and remains a significant government investment. At the core is a form of mentoring relationship that is critical to outcomes and relies on the quality of lengthy cyclic interactions. What is also established is that due to the individualistic nature of each study and relationship the pathway for each candidature will be different as social exchange theory confirms. There are guidelines for mentoring interactions and candidate progression, but the art of supervision lies in the contextualisation of this advice with every candidate being different. The supervisor balances progression with exploration, and in this way reflects the similar tension that resides within learning network theory between competing productions (Poel et al, 2001). The studies that will now be described explore the narratives of supervision and explore in depth the critical issues for supervision and what differentiated strategies might be applicable.

**Research Methods**

This paper is based on analysing the findings from three exploratory, inductive and qualitative studies. Each of the studies focused on exploring HDR supervision with the goal of developing improved understanding and practice. All were managed from Edith Cowan University with appropriate ethics clearances, and all involved semi-structured interviews and focus group activity with HDR candidates, graduates, and supervisors, with the author of this paper as a principle researcher in each study.

The first was a government funded ATL national grant with six Universities collaborating to explore HDR candidature experiences nationwide and produce guidelines and practices to guide effective HDR supervision. In this study I was a member of the ECU research team. This study focused on the central question of what issues impacted on HDR progress and completion. More than 80 HDR students and supervisors were recorded as they told their personal stories and focused on critical incidents that had shaped their unique experiences. The study drew on candidates from all disciplines but with a bias towards education and organisational projects. This evidence was analysed and a series of workshops and focus groups held to explore the dimensions of the critical issues. Subsequently, the team of fourteen researchers focused on the issues that had emerged to produce an overall project management framework and multiple resource materials that could guide supervisors in candidate management. These materials were then compiled into an Ebook, *Improving HDR Supervisor Practice*, that was the basis for a wide range of professional development seminars at the core and associated universities. The Ebook provided a compendium of supervision support that is being used for personal development, candidate discussion, or workshops and is available online (GRS, 2013).

The second study was funded by the ECU Centre for Innovative Practice to explore what factors mediated innovative practices, aspirations and outcomes in HDR candidate experiences. In this study I was part of a research team of 6 colleagues. More than 40 HDR students and supervisors were involved in semi-structured recorded interviews and encouraged to share their candidature experiences, reflecting on what was innovative about their research project focus, practices and productions, and what factors were instrumental in mediating their research journey. The interviewees were all involved in projects that focused on learning and organisations. The study produced a series of collaborative workshops, University seminars and refereed publications (Dobson et al, 2012).

The third and final study was instigated through personal involvement in the previous two studies and continuously designing and leading supervisory seminars and postgraduate units in research supervision. I reflected that while I had collected, analysed and discussed a wide range of data from candidates and supervisors, I could also draw on my extensive personal experiences as an HDR supervisor, a HDR mentor and in my role managing and lecturing to supervisors. I assembled and reviewed notated materials from each of these sources and conducted an auto-ethnographic review of my experiences. Most of the students involved had focused on VET, pedagogy and organisational change. Most of the supervisors involved were involved in learning and organisational research. The research questions driving this review focused on what management practices appeared to be related to candidate performance, and what characteristics appeared to segment student cohorts. I reviewed experiences with over 30 HRD candidates, 50 NCVER candidates, and 44 HDR supervisors in seminar groups. I reviewed case and seminar notes to stimulate reflection on the two principle questions, using further interactions to confirm and extend recall. The outcomes from this practice built upon the conceptualisation from the previous project to produce a framework for supervision management based on student capability that was trialled locally with academic audiences and is the primary focus of this paper.

**Findings review**

This section will provide an overview of the data from each project that is relevant to the focus of this paper. There have been previous and separate publications that contain the central productions of the first two studies that are already in the public domain. The following paragraphs will focus on the issues that emerged from each study and illustrate each issue with the evidence from participant quotes. There was a wealth of data from the first large *ATL national project* from the researchers at the 6 Universities who collaborated to explore candidature experiences nationwide. The findings from the interviews and workshops provided evidence of the *diversity* of candidate experience but also indicated *10 specific areas* of the candidate pathway where supervision management was critical as the following quotes illustrate.

*I chose my supervisor first and worked with them for months before applying.*

*Its essential to map out a three-year plan – so you know where y’re going.*

*If I help too much with the proposal they expect the same help all the way through – its their PhD not mine!*

*I just didn’t know how to people to give me time to collect my data – it stalled.*

*Finishing was more frightening than just keeping on interviewing as I had got good at that.*

*If you let them leave without a next date it all over.*

*The student was so upset she lashed out at me, but I was too worried what they would do if told anybody about it.*

*Sometimes it seems like it’s a secret job…society… done behind locked doors.*

*I spend a lot of the time on building knowledge that is not really part of their study.*

*You need an exist path or you get trapped in pushing them through.*



**Figure 1 HDR Project management: the ten components (GRS, 2013)**

Within these ten broad areas we identified 126 issues where candidates and supervisors had voiced specific concern and learning. We developed a series of tools for each of these areas and they were compiled into a downloadable E resource book (GRS, 2013). In addition, workshop materials were developed for the following 8 areas and trialled at ECU.

* Managing supervision teams
* Managing distance supervision
* Establishing expectations
* Building candidate skills
* Confronting limited progress
* Changed circumstances
* Managing early exits
* Closing to completion

In terms of the focus of this paper, after three years of data collection analysis, workshops and publications, there were two important findings that consolidated our learning. First, it was evident how *unique* each learning experience journey was for every candidate. However, while there was great diversity, we were able to develop a *project management model* from the evidence focusing on the ten main phases of candidate management. Most candidates experienced the same phases, but their unique characteristics, capabilities and research focus led to very individual outcomes in each area. Second, it became clear that most of the management issues in supervision where focused on *marginal* candidates with specific problems, while good candidates self-managed.

 *I had to do so much of the writing I felt it was my thesis – (supervisor).*

*All I used to do was just go to him and tell what I was doing twice a year – and he said – fine.*

Competent candidates progressed with regular discussions and affirmations, contributed considerable self-management to their own learning in the three major areas of the candidature. In these cases the supervision focus was not just on *thesis production*, but also upon building their *knowledge as a researchers* and *building a research network* for their future career. More marginal candidates did not have the capacity to engage with learning that deviated from the central goal of thesis production. In fact the evidence suggested that if they did, their project often stalled. A key finding was therefore how critical candidate selection was, and also initial assessment and skill building to ensure that resources were used effectively. The first step in learning how to manage marginal candidates was to ensure you did not get them in the first place!

The second study was focused on *innovative practice* in higher degrees. The findings confirmed the evidence from the first study with diverse accounts of experiences, repeated candidature patterns, and polarised experiences of marginal and capable candidates. What was evident in reading the transcripts was that some candidates were fearful of the unknown and wanted a template of the path ahead, while others were excited by the unknown and had a deep desire to generate something new. In addition, supervisors also exhibited the same polarised approaches with some ever pressured by candidate timelines and management expectations, while others were content to throw options in front of candidates and allow then to fly in new directions.

*What I loved about it was the irreverence…he said that strategy was bullshit….it gave me the confidence to map my own path….I just started mailing the top guys and it was only later I realised that this was my data collection.*

*I just wanted to complete as soon as possible – I told him I didn’t want to do all the philosophy stuff, just get it done as quick as possible.*

While candidates had different desires about what they wanted from their HDR experience, it became evident from reviewing the comments against the subsequent outcomes that supervision management was required to restrict the path of less able candidates and to provide space for more capable candidate to innovate in terms of focus, process or outcomes. It was evident that innovation was dependent on candidate capability. Innovative studies were unsurprisingly, constructed by innovative and capable candidates.

Finally, equipped with the knowledge from these previous studies I personally explored the data from my own candidates and those I had been close to through management and mentoring roles. The previous studies had indicated an a-priori framework where candidate capability was a critical factor in the management process. It was also evident that while capability was a primary factor it was not the only indicator of success. I reviewed students in terms of candidature characteristics and subsequent results through an auto-ethnographic reflection process. I found that while capability was instrumental, achievement also required *tenacity*.

*My husband told me not to get another job and just to focus on knocking it off as soon as possible.*

*She was such a good writer that I just knew her final draft was going to be close to the final thing – and it was…she had real focus.*

*It not the writing she needs help with – its her head.*

*Look I know we have come a long way but this new role as CEO is just never going to give me the time I need.*

It became evident as the data indicated that capability and tenacity were critical indicators of candidate success. In summary, the first study underlines the importance of a candidature management plan and candidate selection to ensure that minimal candidate resources are expended on candidates who will not produce outcomes, and provides a project management framework. The second study confirms this approach by indicating that innovative HDR studies require candidates with strong capability, while others require project management approaches. Finally, the last ethnographic study indicates that capability and tenacity are primary indicators of eventual achievement, and that different segments of the HDR cohort require different management strategies. One management process needs to be tailored to different candidate’s contextual needs.

**The Emerging Model**

This paper has indicated that one of the issues with learning about HDR candidate management is the gestation period, with a decade to gain a PhD, and then another half decade to gain the first completion. A further half a decade on and you have a reasonable sample of diverse students to reflect upon, some ideas about profiling students, and some idea about what actions have worked and not worked with various students begin to emerge. However, the VET sector requires the production of high caber VET researchers to replace the greying VET research domain and ensure that evidence based decision restructure VET institutions and delivery for a digitally disrupted commercial world.

The evidence from three studies provides a great deal of evidence about HDR candidate experiences and findings about the critical influences that shape the quality of their candidature. While many of the diverse findings only have peripheral relevance to the focus of this paper, the central thrust is of specific interest to VET HDR supervisors, and have been validated by academic seminar feedback. The key message from these studies is that great candidates self-manage and become collaborators. More limited candidates produce dilemmas, and we need skills and collegial support to manage them, and resources for building their capability. High calibre candidates have the capability to produce innovative PhDs, while others need to follow well-trodden and safer tracks. I reflected on my personal experiences and begun to plot the characteristics of my candidates, the impact of my strategies, and the outcomes that were achieved, to see if any patterns that might help future supervision emerge.

In terms of the focus of this paper and based on the first two research projects, it was evident that there are two qualities emerging that underpin research candidature: *tenacity and capability.* Tenacity is evident when candidates come with a passion for their research focus and then tackle their work with vigour and for outcomes. Capability is evident when candidates come displaying analytical intelligence and equipped with broad knowledge of organisational networks and issues. While recognising this as an over simplification, the weight of evidence encouraged me to privilege these two criteria as the main axis of the emerging model. I then plotted by student cohort into this model and found that four main categories of candidates emerged. There were candidates with high capability and low and high tenacity, and candidates with low capability and high and low tenacity. Finally, I reflected on strategies I had used with these different groups of students and the impact of those strategies. The resulting model that follows, was workshopped with academics and refined, but is limited by the VET, learning and organisational change emphasis of the student cohort involved. Despite this it provides a framework and a tool for other VET supervisors to plan supervisory strategies and tactics.

In terms of academic theory this paper can make two contributions. The first is to confirm that previous assertions about social exchange theory (Ehrich, Tennent and Hansford, 2001) and the relevance of a theoretical approach focusing on initiation, process, and outcomes that appears to be supported in terms of HRD supervisory mentoring in a knowledge economy. Second, this paper supports arguments for a longer-term emphasis on specific research subjects that can be pursued on through more than one study and through more than one method, where the data can be used subsequently to develop further knowledge through reflection on issues of practice.

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| **High Tenacity – Limited Capability*****Focused on Outcome Criteria****Driven producers with a consultancy approach who tend to rush and need a focus on theory and ambiguity.** Focus on skill building through GRS workshops
* Attend Faculty Proposals
* Provide examples and templates for thesis
* Explain using a cognitive apprenticeship (*talk aloud*)
* *Don’t push to publish till examination period*
 | **High Tenacity – High Capability*****Apprentice Academics****Self managing students who often ignore direction but mange the process and the supervisor and require career and network focus** Let them mange meeting agendas
* Provide options and choices
* Encourage attendance at other Faculty workshops
* Provide papers, links and materials
* Extend their network and career options
* Link into external development options/Conf.
* *Don’t force them – but make your advice explicit*
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| **Limited Tenacity – Limited Capability*****Student Compliance****Marginal candidates who do not take charge and set a plan or direction and would benefit from systemised research development programme** Conduct skills analysis and plan development timetable
* Use supervisors manual for support
* Use Research Consultants early and Learning Advisors
* Set writing tasks; set texts and action tasks early
* Engage 2nd supervisor at start
* Provide clear examples and directive instructions
* Enrol in targeted GRS workshops
* Control and limit workshops with action
* Protect until spark appears, setting clear and monitored milestones for candidature.
* *Don’t write their proposal*
* *Don’t engage in publishing*
 | **Limited Tenacity – High Capability*****Career Managers****Capable candidates who do not produce work and often with demanding work roles who my not prioritise their research.** Set regular meeting timetable
* Set regular action meetings and monitor
* Engage second supervisor
* Link to Research Centres
* Use Marginal Progress
* Link Intermit to rigorous return timetable
* Meet during Intermit period
* *Don’t meet on their territory*
* *Don’t let them timetable around work*
* *Don’t protect them*
* *Don’t meet unless they have produced*
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**Tenacity**

**Figure 2 – Model of VET HDR Supervision Strategies**

**Capability**

**Conclusion**

This paper has reviewed the findings of three studies of HDR student candidatures and supervisory experiences. The majority of these experiences were either in the domain of learning and organisational change or closely related disciplines. The evidence and the findings are therefore relevant to VET research needs. In addition, this paper was based on the premise that the reformation of a fractured VET system will need the intervention of high quality VET researchers in the next decade and that HRD programmes will be the primary source of such researchers. Producing capable VET HDR graduates depends of effective candidature management. This paper has confirmed the relevance of mentoring theory in this area, indicated the benefits of complementary studies, and presented VET HDR supervisors with a project management model for candidate management and a framework for engineering supervision strategies that are aligned with candidate capability and expectations. Naturally, although the model has been developed from a significant sample of candidate behaviour is does not purport to be predictive, but rather a tool to inform each unique context of candidate and supervisor decision-making. It is a tool I wish I had discovered two decades ago.

**References**

ACLA, (2016). Review of Australia’s Research Training System. *Australian Council of Learned Academies*, Melbourne.

Noble, A. (1994). *Changing doctoral degrees: an international perspective*. Society for Research into Higher Education, , p. 8; Bourner, T., Bowden, R., & Laing, S. (2001). "Professional doctorates in England". Studies in Higher Education. 26:1, 65–88.

Alvesson, M, Hardy, C. and Harley, B. (2008) *Reflecting on Reflexivity: Reflexive Textual Practices in Organization and management Theory*. Journal of Management Studies. 45(3), 480-501.

Bitzer, E.M. (2007). *Supervising higher degrees as scholarly practice.* [South African Journal of Higher Education](http://journals.co.za/content/journal/high), 21:1, 1010=1019.

 cost of research training. Department of Innovation, Industry, Science and Research, Canberra, ACT.

Demeritt, D & Lees, L. (2005). Research relevance, `knowledge transfer' and the geographies of CASE studentship collaboration . Area 37, 127-137.

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Dobson, P and Barratt-Pugh, L, Fulford, R., and Larsen, AC. (2012). Eureka moments in research: exploring abductive processes. 23rd Australiasian Conference on Information Systems, Gelong, 2/4 December.

Ehrich L, Tennent, L. and Hansford, B. (2001). Closing the Divide: theory and practice of mentoring. ANZAM 2001, Closing the Divide, Auckland, NZ.

Ehrich, L.C**.,** Tennent, L., & Hansford, B. (2000). Mentoring in Context. Paper given at the 8th Annual International Conference on Post-compulsory education and training, Learning together, Working together: Building Communities for the 21 Century, Conference Proceedings, 2, Surfers Paradise, Gold Coast, 4-6 December.

 examination process. Australian Universities’ Review, 51:2, 32-41.

GRS, 2013. Inproving Research Supervision. Graduate Research School ECU.Access from https://www.uws.edu.au/\_\_data/assets/pdf\_file/0004/563620/ebookv1\_ISP\_interactive\_2.pdf

Gurr, G.M. (2001). Negotiating the Raxckety Bridge – a dynamic model for aligning supervisory style with research student development. Higher Education and Research and Development, 20:1, online Taylor Francis,

Hoffinann, M. H. G. (2010). Diagrams as Scaffolds for Creativity. AAAI Workshops, North America. Retrieved from <http://aaai.org/index.php/WS/AAAIW10/paper/view/2O27>=

Johnson, P**.** and Duberley, J (2003). Reflexivity in Management Research. Journal of Management Studies, 40:6, 1279-1303.

Kiley, M. (2009). Rethinking the Australian doctoral

McDonald, R, Hayton, G, Gonczi, A & Hager, P (1992). No small change: Proposals for a research and development strategy for VET in Australia, UTS, Sydney.

Moses, I. (1984). Supervision of Higher Degree students: problem areas and possible soultions. Higher education research and development, 3:2, 153-165.

NSF, (2006). Numbers of earned Doctorates. National Science Foundation, Arlington VA, USA.

OECD, 2012. The Science, Technology and Innovation scorecard. Organisations for Economic Cooperation and Development, Geneva.

Paavola, S. (2004). “Abduction Through Grammar, Critic, And Methodeutic”, Transactions of the Charles S. Peirce Society: A Quarterly Journal in American Philosophy, 40:2, 245-270.

Pearson, M. and Brew, A. (2002). Research training and supervision development. Studies in higher education, 27:2, 135-150, Taylor Francis.

Poell, R F, Chivers, G E, Van der Krogt, F J, Danny, A & Rob F 2000,’Learning-network theory’, Management Learning, 31 (1), 25-50, Thousand Oaks C A.

 Research - Allen Consulting Group, Canberra.

 researchers in Australia, Department of Innovation, Industry, Science and

Robert Currie (1994). "The Arts and Social Studies, 1914–1939". In Brian Harrison. [The History of the University of Oxford: The twentieth century](https://books.google.com/books?id=OP5ePl7i5EIC&pg=PA125#v=onepage&q&f=false). [Clarendon Press](https://en.wikipedia.org/wiki/Clarendon_Press). p. 125.

Sinclair, M. (2004). The pedagogy of good PhD supervision: a national cross disciplinary exploration of PhD supervision. Australian Government Department of Education, Science and Training, Canberra.

Wadee, A.A., Keane, M.,Dietz, A.J and Hay, D, (2010). Effective PhD supervision: mentorship and coaching. Rosenberg Ltd, Amsterdam.

Whitelock, D., Falkner, D. and Miell, D. (2008). Promoting creativity in PhD research: dilemmas and tension. [Thinking Skills and Creativity](http://www.sciencedirect.com/science/journal/18711871). 3:2, 143-153.

**Addendum - Managing VET Research Students:** *the Essential Actions from Experience:*

1. Agree partnership before committing
2. Assess candidate capability and needs
3. Negotiate relational expectations and timeline
4. Workshop the conceptual foundations – aim/sample balance
5. Determine WWWHWW – purpose, justification and outcomes
6. Write early and often
7. Provide clear feedback and options for direction
8. Explore and link to theories
9. Motivate, inspire and give personal support
10. Develop their network and their vision according to capability
11. Monitor the timeline continually and directly
12. Where appropriate engage in an authoring cognitive apprenticeship