



## work-based learning 5:

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# scope

*Contemporary Research Topics*

**work-based learning 5**

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Contemporary Research Topics

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## JOURNEYING TOGETHER: THE LEARNER AND MENTORS, SIDE BY SIDE

Jan Hendrik Roodt

Mā mua ka kite a muri, mā muri ka ora a mua.

*Those who lead are the eyes of those who follow, those who follow sustain those who lead.*

This is the fifth issue of *Scope (Work-based Learning)* focused on work-based learning situated in professional practice. With much crisis internationally and uncertainty locally in higher education; specifically, Te Pūkenga, the New Zealand Institute of Skills and Technology, we steer by the stars of the knowledge of those that have gone before. Increasingly, we draw upon our own evolving skills, looking to history where it shows us wisdom. We navigate the crises and uncertainties. We learn as we go.

In the world of learning, we are arguably and ideally all equals. Knowledge is forever open and expanding. According to the incompleteness theory of the mathematician, Kurt Gödel, there is always opportunity to explore more; nothing is ever really finished. Exploring, investigating, wayfaring: these are some of our actions in the world of professional practice learning. In our heutagogical philosophy, the learner is the expert in their work domain and the mentors are proficient-to-expert at structuring the individualised learner journey. Every journey is unique and as we build trust and companionship, we face ups and downs together. We have learned the value of compassion as aroha and true resilience in the pandemic's wake. Ours are not solitary journeys with learners; we share a reciprocal wayfaring experience of discovery, or ako.

For this issue, ten submissions were selected to explore the theme of learners leading and mentors as the support act. The co-navigated mahi of the teams are like adventures, exploring unique vistas and seeing old lands anew. In keeping with our willingness to explore and push geographical and metaphorical boundaries, we introduce this volume with a poem by Doctor of Professional Practice candidate, Vicki Rangitautehanga Murray. Vicki explores the striking image of the New Zealand Christmas tree (in the myrtle family) to start the reflection on the journey of discovery. The pōhutukawa carries promises in Māori culture and the myrtle extends into ancient Greece and Christianity and sets the scene for three more reflective pieces.

Team Jeremy Taylor takes us on another professional practice journey of the doctoral learner. Facing the dreaded first empty page of all endeavours, Jeremy considers the role of reflexive practice in the development of the authentic practitioner voice and broader identity. Mentors say "be more reflexive," but how do learners achieve this? On another major learning journey, Clare Morton and team look at continuous learning, dealing with the demands of veterinary nursing and how reflective practice can support well-being in that domain of practice. Emma Welsh concludes the triad with a personal reflection on being a Pākehā mother to a Māori daughter. Facing daily practice, Emma asks how much 'box ticking' happens with regard to tikanga as opposed to process and protocol under te Tiriti o Waitangi. The link is made to the future of her daughter and parental role modelling as we consider acts of decolonisation of education in Aotearoa.



Rachel van Gorp and Glenys Ker embark on a journey to look at the education system from the perspective of the neurodiverse learner. The team's journey draws on the experiential discoveries of self and others to share effective strategies for facilitating learning for neurodiverse learners to ensure greater success and inclusion in the education environment. In the next piece, Jeremy Hanshaw considers the trials and tribulations of getting traction with micro-credentials, once lauded as the next great innovation to higher and vocational education. Being first does not always mean taking the prize, and Jeremy shares insights from his own doctoral learning journey that speak volumes about the tenacity and endurance required to establish new patterns of operation. The story has a positive outcome and points out that the whole effort around micro-credentials is getting national acceptance.

Evan Madden and mentors explore how we can get more people to select a career in engineering where skills in many fields are developed as part of professional growth. What motivates people to choose engineering, especially if we do not know what the broad scope of these careers may be? The team present solid, evidence-based recommendations to widen the vistas of young people in this area. In a similar way, Louise DeanE leads a study that presents us with evidence for a way to improve practice, this time in agriculture and sustainability. Taking a transdisciplinary approach to nutrient pollution in the dairy industry, Louise reports on ways to consider the 'and' of options, rather than 'or,' to make it possible for dairy farms and ecosystems to flourish. To choose 'and' is to embrace complexity rather than think within binaries of a deterministic worldview.

The final two articles bring us back to reflection. Professional Practice Doctorate candidate Rob Nelson introduces the exploration of learner and learning facilitator identity as a distinct consciousness-raising part of the journey or learning process. The tension between the two identities in the journey is perhaps a source of energy for Rob, leading to continuous growth opportunities in practice. The bookend of this issue comes from another doctoral learner, Leigh Quadling-Miernik, exploring reflexivity and criticality in a part of the doctorate journey. Every stage of the journey has a theme song and Leigh uses these songs to lend colour and sound to the journaling activity that is at the core of the professional practice degrees. The article concludes with a new theme song – *Unstoppable* by Sia. *Unstoppable*. That is in essence the theme for the next volume of *Scope: Contemporary Research Topics (Work-based learning)*.

In, or perhaps despite, our ever-changing world, we warmly invite you to contribute to our forthcoming 2024 issue, themed "Research in Workplaces in an Age of Disruption." We are eager to explore how societal, ecosystems, and technology disruptions intersect within workplaces. Each of these concepts can be understood as broadly as writers wish. We value contributions that bridge the gap between theory and practice, focusing on applied research that fosters resilience, mindfulness, adaptive behaviour, and transparency in practical domains. It is likely that in 2024 we will still be negotiating wildernesses and seachanges of one kind or another. Join us again in a collaborative journey, where your insights will shape the discourse on navigating the evolving landscape of work. Your unique perspectives are essential as we collectively strive to understand and address the challenges and opportunities of our ever-changing workplaces.

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## AN ODE TO MY MENTORS

Vicki Rangitautehanga Murray

Dual pods as different as she and thee  
 Chiselled pōhutukawa; staunch; breathlessly peaceful  
 Umbrella kōwhai tree; dashing; daring  
 Flowers full bloom with scents; intoxication!  
 Flow tenderly thine wisdom afore me  
 Each and every season nurtures creativity  
 Lo make envy the *ako* journey  
 Both heart and mind do bend your whim  
 To reach ever-high horizons extend  
 How lucky charms befall my course?  
 Not one but two; fill *kete* sacred  
*Tuakana-teina* spirits inestimable  
 Woven threads to reach assigned destination  
 Quite soon sweet closure divined  
*He mihi aroha* my deepest gratitude for-ever-more  
 Forevermore ...

## AUTHOR'S NOTE

“Ahakoa he iti, he māpihi pounamu” (although it is small, it is a prized treasure) is akin to saying “a picture paints a thousand words.” Mentors are an essential component to success in many aspects of life including academic study. “An ode to my mentors” is a brief but heartfelt acknowledgement by one fortunate Doctor of Professional Practice learner to her two magical mentors, Dr Martin Andrew and Dr Kelli Te Maihāroa.

## GLOSSARY OF MĀORI WORDS

pōhutukawa – a tree with red flowers native to New Zealand  
 kōwhai – a tree with yellow flowers native to New Zealand  
 ako – to teach / to learn  
 kete – a basket (in this context it refers to the baskets of knowledge)  
 tuakana-teina – senior / junior or teacher / student  
 he mihi aroha – warm greetings or acknowledgement

Ko **Vicki Rangitautehanga Murray** ahau, he uri nō Ngāti Pūkeko me Ngāti Awa. Vicki is a tutor, and provides mentoring, cultural training and tangata whenua supervision to Māori clinicians working within therapeutic communities of practice in iwi health organisations and rehabilitation facilities. Vicki is also a director, trustee and committee member for her ahu whenua trusts and marae. Her doctoral research will consider Māori instruments of practice as guides to inspire Māori leadership to thrive in times of dynamic change. Further, she is a learner on the Doctor of Professional Practice with Te Kura Matatini ki Otago.

# REFLEXIVITY AND THE QUEST FOR REFLECTIVE PRACTICE ENHANCEMENT

Jeremy Taylor, Martin Andrew and David Woodward

## INTRODUCTION

CapableNZ's Doctor of Professional Practice (D. ProfPrac) is a programme targeted towards workplace practitioners who wish to use their experience as catalysts for new knowledge creation. The D. ProfPrac has minimum timeframes to complete in three years, although many learners, including the first author, can take much longer than this to complete all of the necessary course requirements. Every D. ProfPrac candidate has a support team of two supervisors, including a lead and secondary academic mentor. Both supervisors are essential in providing feedback on coursework and being there as a sounding board for learners to share their ideas in a supportive forum. The D. ProfPrac programme includes two courses that must be completed as part of the assessment requirements. Course 1 focuses on articulating a practitioner's research and consists of two assessments: the Review of Learning and the Learning Agreement. A learner must successfully pass Course 1 before entering Course 2; Course 2 is focused on the practitioner research enquiry. The practitioner research enquiry is where the project unfurls itself, as every candidate must construct and lead their own project. Across both courses, the D. ProfPrac has a core method of utilising critical reflection for personal growth (Lester & Costley, 2010). At the end of every learner's journey, there needs to be tangible evidence for how the research project has led to improved workplace capabilities and how the newly gained learning has contributed towards improved practice. The purpose for writing this article is to share some of the learning I have gained over the course of my studies to date, specifically how consistently using the techniques of journaling and writing analytic memos can contribute to both learners and practitioners becoming more reflexive.

The following sections are the work of the first author, identifying as Carolyn Ellis's (2004) autoethnographic "I" as prefigured in her article, "Autoethnography, personal narrative, reflexivity" (Ellis & Bochner, 2001). After the lead author's central writing, there follow reflective writings (also autoethnographic in methodological orientation) from the first author's mentors, so that this article is a multi-vocal, triangulatory subjective academic narrative, representing the shared knowledge repertoire of the community of practice of three: the learner and his two mentors.

## BACKGROUND

From my writing desk the biggest fear I usually have is the dreaded blank page, but I am reminded of the old writing adage that you should write what you know with a goal of sharing personal insight. With this approach in mind, I have set out on this journey of writing this article to record my unanticipated learning and the surprise transformative moments that have appeared when I least expected them to; this transformative learning was in my opinion primarily a direct result of being more open to questioning my position. Transformative learning has been described by Mezirow (2009, p. 22) as "learning that transforms problematic frames of reference to make them more inclusive, discriminating, reflective, open and emotionally able to change." A key point to remember

is that transformative learning experiences do not appear out of thin air (Kuhn, 2021); transformative learning experiences, however, come out of hard work where a practitioner takes the time to analyse their assumptions and, in due course, consider their position (Mezirow, 1991). Reflection can be considered as a conduit for having transformative learning experiences, as through practising effective reflection, time and space can be created to make impactful changes to practice (Larrivee, 2000).

A key component for transformative learning experiences is practising ongoing reflection and making a habit of reflexive techniques. I have found Larrivee's (2000) exploration into reflection helpful and impactful on how I have approached the need to capture and reflect on my position during the course of my studies. For example, Larrivee (2000) mentions the need for critical practitioners to examine their personal and professional beliefs and consider their position's ethical consequences and impact on practice. Furthermore, Pavlovich (2007, p. 284) argues that effective reflection should be thought of as "as much a state of mind as it is a set of activities, with the end process being not so much resolution of an experience but rather better understanding of it." Extending these concepts further, a reflexive practitioner needs to become a more active inquirer in their domain. In this sense, it is helpful to consider what a practitioner can do to ensure that their reflection is impactful on learning.

## REFLEXIVITY

Before exploring some of the specific practices I have used throughout my studies, it is helpful to first make a distinction between reflection and reflexivity. In my experience, both concepts are integral to being successful on the D. ProfPrac. Dewey (1916) defines reflection as trying to understand something from our experiences or a specific situation. Reflection is most concerned with examining what has happened and the person undertaking the reflection working through their thoughts about the experience (Bolton, 2010). Effective reflection involves a person considering what had happened and considering what could be done differently in the future with the intent of generating more positive outcomes (Bassot, 2016). If successful, the process may lead to new insights about what had happened or provide answers to where something had been missed (Bolton, 2010). Reflexivity, on the other hand, goes one step further than reflection, as practising reflexivity requires a person to step back and consider their position more thoroughly; in a practical sense, reflexivity requires a person to cast the mirror on themselves and dissect their prior judgments thoroughly (Pässilä et al., 2015). It is helpful to consider the differences between reflection and reflexivity in the learning process, as this will help to illuminate the most significant difference between the two concepts:

Whereas reflection encompasses learning by reflecting on the experience, a reflexive approach embraces learning in experience. Reflection is generally characterised as a cognitive activity; practical reflexivity as a dialogic and relational activity. Reflection involves giving order to situations; practical reflexivity means unsettling conventional practices. (Cunliffe & Easterby-Smith, 2004, p. 2)

There are, of course, significant similarities between reflection and reflexivity, namely in encouraging critical thinking (Pässilä et al., 2015), but reflection without reflexivity does not necessarily require a practitioner to dissect their deeply held assumptions (Brookfield, 2017; Cunliffe & Easterby-Smith, 2004). Furthermore, reflexivity is commonly considered to be a process where a person considers how their position might have a bearing or impact on themselves and those around them (Berger, 2015). Taking the spotlight on oneself can be highly confronting, but it is still necessary to promote more impactful learning (Argyris, 1991). Such actions have been recognised as necessary for generating new knowledge within qualitative research projects (Ahmed et al., 2011).

Reflexive techniques can lead to a learner's research project having increased levels of trustworthiness (Finlay, 2008; Kingdon, 2005; Sullivan-Bolyai & Bova, 2021). This is because being reflexive requires learners to engage in continuous critical reflection throughout the research process and document their thought processes, actions,

and choices taken (Orange, 2016; Ortlipp, 2008). Reflexivity is a vital practice, in any qualitative research project, as a method to augment the critical appraisal of the researcher in their analysis, particularly around the dynamics between a researcher and participants (Sullivan-Bolyai & Bova, 2021). Effective reflexivity, though, requires ongoing critical self-reflection; specifically, how a researcher's social background, assumptions, positioning, and behaviour are all challenged during the research project (Finlay, 2008; McCabe & Holmes, 2009). Therefore, the learner and, in particular, acknowledging a learner's position, is implicit in safeguarding the integrity of a study (Creswell & Poth, 2018).

## JOURNALING

A key practice I recognised early in my D. ProfPrac journey was maintaining a reflexive journal. Braun and Clarke (2022) have argued that keeping a reflexive journal is one of the most important practices a learner can undertake throughout their research journey. Nowell et al. (2017, p. 3) have described a reflexive journal as “a self-critical account of the research process.” Although biases cannot ever be entirely removed from a qualitative project, Tamayo et al. (2020) remind learners that greater rigour can be injected into any qualitative project through ongoing journal entries. Becoming more deliberate about making ongoing reflections has been a key goal of mine. Nadin and Cassell (2006) have guided me in attaining this goal through their comments that reflexive journaling invites and encourages ongoing questioning about research practices and personal assumptions throughout any research project. One of the key benefits I have gained from the reflexive journaling process has been the opportunity for alternative interpretative possibilities. For example, through regular journaling, I have identified how my prior knowledge has impacted on the assumptions that I had about learning and the ways that I had previously interacted with some of my previous learners.

For additional ideas on how keeping a regular journal can assist in promoting greater reflexivity, Bassot's (2020) resource, *The Research Journal*, provides an excellent roadmap for learners just starting out on their journey. Bassot (2020) provides seven compelling reasons behind the importance of regular journaling, including:

- **It can help us to slow down** – Everyone needs enough time to develop their critical thinking, and through writing a journal, the process helps us to collect our thoughts and have a private space to be able to do this effectively.
- **It helps to externalise things** – Speaking from personal experience, you can spend an inordinate amount of thinking time on the D. ProfPrac; this extended thinking time can lead to feeling overwhelmed and confused. Writing a journal can assist with the ordering of thoughts and prioritising of tasks; such a process eventually leads to feelings of progression.
- **It is a place for offloading** – The D. ProfPrac has its ups and downs, and through writing a journal, a space can be created to document our thoughts when things do not go to plan. Such an approach can assist someone in dealing more effectively with stress created by studying on a programme with significant personal demands.
- **It helps us to keep on track** – A challenge that I have had on the D. ProfPrac is managing competing demands and ensuring that my time is spent being productive. I have found that keeping a journal is an excellent way to keep me grounded and focused on what is most important.
- **It provides us with a record that we can go back to** – At the start of my learning journey I believed that I had a better memory than I did, which meant that I tended to forget some key events; journaling has helped me to provide a tangible record of significant events and has ensured that I do not need to keep everything in my head.
- **It helps us to question our assumptions** – Regular journaling provides a safe space to address our biases and personal subjectivity that could be entering our projects.
- **It can make us more accountable** – Perhaps most importantly, I have found that regular journaling can make things more transparent and ensures that we keep our commitments towards timeframes.

Braun and Clarke (2022) argue that although there are no fixed rules for how to keep a reflexive journal, it should still be a space to push oneself rather than simply a space for description. In my journal, I have followed a reflexive approach by asking challenging questions about my thinking and position. Such an approach aligns with Braun and Clarke's (2022) approach of being brave enough to ask tough questions, such as why I had a specific

response or why an idea or theme might or might not be appropriate for inclusion. More importantly, Altrichter and Holly (2005) have argued that learners need to find their own style when writing their journals and to ensure that personal characteristics are included in any of the writing; if such an approach can be taken, this, in my experience, ensures far more meaningful writing can be produced.

## **ANALYTIC MEMOS**

Besides keeping a journal, the other technique I have identified to enhance reflexivity is writing analytic memos (Kaczynski et al., 2014; Rubin, 2021; Saldaña, 2014). Analytic memos can be considered small write-ups or conversations with oneself and typically will document how a learner's understanding has evolved through the data collection stages (Satter, 2014). Saldaña (2014) mentions that an analytic memo is an example of a think piece of reflexive free writing, creating a space for a learner to clarify their interpretations of what is unfolding before their eyes. Analytic memos can also be used as summaries of significant findings (Satter, 2014); I have personally found the writing of analytic memos helpful for documenting the evolution of my research (Linneberg & Korsgaard, 2019). Analytic memos can also provide an essential piece of evidence regarding the role learners have in their professional practice research projects (Linneberg & Korsgaard, 2019). Additionally, a conversation I had with my supervisors during the writing of the analytic memos and, in particular, through using the memo function in the NVivo software programme, was that memos need to be considered cumulative and are meant to be personal in order to develop practice (Schram, 2003); analytic memos are also not meant to be polished pieces of writing, as they need to be considered as capturing an event in real-time, reflecting the development of thinking (Birks et al., 2008).

The writing of regular analytic memos enables learners to work with their project in unexpected ways, particularly engaging with the data to a depth that would otherwise be difficult to achieve (Birks et al., 2008). Additionally, broader literature shows that perhaps the most significant reason for writing analytic memos is that they can be a space for documenting the decision-making trail and recording the various research phases from conceptualisation through to the final write-up (Speziale & Carpenter, 2011). Analytic memos have helped me to document the progression of my study, and I consider their use a vital component of the audit trail that I am creating, particularly the change in direction I have noticed with my thinking. Regarding the mechanics of writing analytic memos, I identified that no single approach would be perfect. What was more important was what I was capturing rather than whether a memo was long or short (Rubin, 2021). For example, Rubin (2021) states that many impactful one-sentence memos can be created. Therefore, although one-sentence memos are not by themselves overly impressive, they still can be used towards developing insights. I also agree with Kaczynski et al.'s (2014) comment that when writing analytic memos what is most important is to write early and to write often. Writing early and often can be a challenge with life's demands, but I recognise the suggestion's value, and I have tried to find some space in my working week for uninterrupted writing.

## **Mentor I's contribution**

As an experienced mentor in doctoral programmes, I contend that criticality remains the greatest challenge for professional practice postgraduate learners. I concur that key strategies and techniques for achieving critical reflexivity, such as reflexive journaling, analytic memoranda and mapping our intersectionalities (the place where different aspects of ourselves – our race, age, background, gender, ideological and political positions, and so on – come together) can and should be employed during professional practice learning trajectories.

A professional practice doctorate uses reflexive methods variously to apply and demonstrate key facets of the learning process in professional practice. The critically reflexive place is initially one for entertaining doubt around the questions, why me? Why this? Why now? Who am I to be conducting this enquiry? What are the drivers for this research, and whose interests does it need to serve? Why is now the right time to engage in such



a project? The critically reflexive space is the site of critically reflexive praxis: questioning, challenging, thinking and re-casting. The seeds of this work are sown throughout both courses on the D. ProfPrac.

More specifically, critical reflexivity is a space for learners to understand their authentic researcher voice within the discourse community of their practice.

Secondly, it is here where doctoral candidates establish and present a position from which to have a voice, and to situate their autoethnographic "I" into their practitioner spaces. They also interrogate (that is, continuously question from multiple perspectives) that position, imagining the range of alternate positions that might challenge them. Thirdly, reflexive methods serve to ensure rigour in the analysis and presentation of 'data', or whatever, as appropriate, stands in place of 'data' in the work of practice. Strategies for reflexivity enable us to see how our data are social constructions, and are presented and represented to a readership in a particular way with a particular purpose. To argue a rationale for each particular decision in the research process is to employ critical reflexivity.

Ultimately, applied reflexivity affords practitioners a more intimate understanding of their professional identities and the intersectionalities of facets of these identities, as they develop into the world of research (Coburn & Gomally, 2017). The first author of this paper, for instance, is ideally placed to understand the complex intersection of Chinese and Aotearoa New Zealand perspectives on pedagogy appropriate for transnational contexts due to his educational, personal and experiential life trajectories. He is simply the right person, in the right place, at the right time, and can furnish valid rationales for this claim. Such understandings promote agency, the power to make a difference, and enable practitioners to make transformative differences in their communities.

## **Mentor 2's contribution**

Reflexive practices examine one's own feelings, reactions and motives to situations and acknowledge the role of the researcher in the research process. Qualitative researchers may also consider themselves an 'insider' researcher who shares attributes with the participants of the study (Braun & Clarke, 2013); these are important components of the D. ProfPrac. Like a mutating COVID-19 virus, a teaching practitioner needs to constantly re-evaluate, reposition and adapt in order that their teaching philosophy or framework of teaching practice is current and meets the needs of learners. Jeremy aims to evaluate current teaching practice by undertaking semi-structured interviews with learners and educators while making unstructured observations of teaching practice. Chinese tertiary education is a fluid, ever changing dynamic of blended delivery models with constant barriers, such as COVID-19, and enablers, such as on-line teaching delivery, arising. Employment of journaling and analytic memos, while being both reflective and reflexive are important tools in developing a framework of pedagogical practice for Chinese transnational educators, that meet the needs of learners, in the future delivery of joint tertiary education programmes.

## **CONCLUSION**

Although practising reflexivity is not easy, as it requires ongoing personal discipline and ring-fencing time, the rewards are significant, and its use is essential for any workplace learner. Reflexivity is a strategy in professional practice that elevates professional and experiential accounts into the realms of the critical and the transformative. Reflexivity is a necessity in so far as it is a means of achieving the rigour required of doctorate study. Two strategies that engage the learner in reflexivity, analytic memoranda and journaling, represent the kinds of ways of handling metacognition that enable candidates to demonstrate reflexive capacity and employ it to consolidate their professional practice. It should be remembered that learners who do not engage with reflexive practices put themselves in the unenviable position of what Freire (1970) calls living in a state of magical consciousness or

taking circumstances at face value. I am no Harry Potter, so I remind myself that it is best to keep things grounded through practising ongoing reflexivity. I am also hopeful that through completing my D. ProfPrac learning journey, I will continue to gain additional insights for developing my practice.

**Jeremy Taylor** is a facilitator and assessor with Capable NZ (GDTE, BAM, MPP and GDPP) and is currently studying towards his Doctor of Professional Practice. His research interests include international and comparative education, Chinese transnational education programmes and how to use critical reflection to improve teaching practice.

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**Martin Andrew** operates as a creative mentor in postgraduate programmes, including Master and Doctorate degrees in Professional Practice. Prior to his four to five years supporting the College of Work Based Learning in Otago, New Zealand, he had sojourned away from his hometown of Ōtepoti/Dunedin with two honorary posts at Melbourne universities in Creative Industries and Transnational Education (TNE). His work and research have become increasingly focussed on doctorate education and supporting learners to reach their own personal best through critically reflective practice and writing. A trans-disciplinarian, he emphasises that his past disciplines have included Education, Drama, Linguistics and Writing, Creative and otherwise. He holds honorary positions in Australia, Vietnam and Indonesia.

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**David Woodward** is head of apiculture programmes and principal lecturer at Otago Polytechnic's Central campus and an academic mentor and assessor at Capable NZ (MPP, DPP). With a background in botany and zoology, he has been a research scientist, state advisor and head of apiculture, with 25 years' tertiary teaching experience.

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# REFLECTIVE PRACTICE FOR VETERINARY NURSES AND THE USE OF REFLECTIVE JOURNALS

Clare Morton, David Woodward and Jeremy Taylor

The following sections are the work of the first author. After the first author's content has concluded, there follow two reflective accounts from the first author's mentors.

## INTRODUCTION

Reflective practice critically examines one's experiences and actions to learn from them and create an action plan to improve future performance. It involves analysing and evaluating situations, experiences and the decisions made, considering the impact, and deciding on action plans for moving forwards. This practice can lead to developing new skills and insight, although it takes skill and learning to undertake a genuine and meaningful reflection. Reflective practice is the ability to reflect on one's actions to engage in the process of continuous learning (Schön, 1987).

The reflective practice process typically involves the following steps:

1. Describing the situation or experience on which you are reflecting.
2. Analysing your thoughts, feelings, and actions during the situation.
3. Evaluating the impact and outcomes of your actions.
4. Identifying areas for improvement and considering alternative courses of action.
5. Developing a plan for implementing changes in your future practice.

As veterinary nurses, we use this skill both in clinical practice to learn and develop our nursing skills, and as veterinary nurse educators to develop our teaching practices. My research looked at reflective practices in the classroom and the veterinary industry. I wanted to find out what educators thought about reflective practices and how they taught them to students. This led to looking at how veterinary nurses use reflective practices to help with stress and anxiety, which can lead to compassion fatigue. Compassion fatigue can be described as the loss of ability to care due to emotional and physical exhaustion and is characterised by a loss of empathy or compassion towards co-workers and patients (Foote, 2020). My research found that reflection is a skill underutilised both within the veterinary industry and by educators. More teaching is needed so stakeholders can fully engage with reflective practices; this learning needs to happen now.

From 2024, veterinary nurses, including veterinary nursing educators, will be required to carry out Reflective Continuing Professional Development (RCPD) as part of their registration as a veterinary nurse, a model similar to what the veterinarians undertake with the Vet Council of New Zealand (VCNZ). They will need to complete professional development (PD) in a field relevant to their practice and then complete reflective writings showing the learning gained from that PD. This reflective way of completing continuing professional development (CPD) is not a new concept. This process is undertaken in other fields such as pharmacology and health; however, this will be new for the veterinary nursing industry. Reflective journals are one way of introducing reflective practice to our learners and educators and developing that positive learning and knowledge of what it means to be a

reflective practitioner. I referred to our learners as students when undertaking this research over two years. As I have researched this topic further and throughout this article, I shift to the word “learners,” as one does not need to be in a formal educational institution to be a learner. Instead, a learner is someone who has the mindset to engage in their learning to help them develop and grow their knowledge and skills well after they have left the classroom (Bagranoff, 2020).

## METHODOLOGY AND METHOD

Ethical approval was sought and approved by the Capable NZ Ethics Panel, application number 91. I used a grounded theory approach (Glaser & Strauss, 1967), unsure where my research idea would take me. This flexible method allows the researcher to see and develop new ideas as the information and evidence are collected and analysed (Dawson, 2019). I developed and sent out surveys to educators who teach the New Zealand Diploma in Veterinary Nursing Level 6 to learn about the use of reflective practice within the classroom. My second survey went to veterinary nurses in the industry to find out their thoughts and whether they used reflective practice in both their place of work and their personal life. I also conferred with other veterinary nursing educators within my own organisation about their thoughts on reflective practice in regard to assessment and teaching to their students.

## FINDINGS

The data collected gave me insight into both parts of the industry, from teaching to clinical veterinary workplaces. The information gathered throughout my research showed a lack of understanding from educators around reflective practices. While veterinary nurses out in practice did have some understanding and practised some form of reflectiveness, there was a lack of support from workplaces which contributed to high levels of stress and compassion fatigue. These responses told me that educators and veterinary nurses do not fully understand reflective practice concepts and steps. More teaching is needed so that the positive benefits of being a reflective practitioner are known and understood.

## DISCUSSION

From my research, the assessing and marking of learner reflective writing created the most differing thoughts and answers from educators I surveyed. Many educators treat reflective writing as an assessment and design marking rubrics that mirror other written assessments without any understanding of the reasons behind why we ask the learner to undertake reflective writing.

Reflection is the raw material of an experience and exploring that to make sense of what happened (Boud, 2001). Reflective writing then takes that raw learning material and turns it into a place where that experience or event can be recorded and processed (Boud, 2001). Moon (2004) suggests this could be the same as the notes taken during a lecture or study before writing an essay. The learner could use this basic information to help complete their assignment, as part of a group team reflecting session, or to help promote new learning.

Reflective writing can take many forms from journals, diaries, and logbooks to peer review and self-assessment (Tsingos-Lucas et al., 2017). It can be useful to use the one that best suits what we want from the learners; however, any form can be used if the concepts of reflective practice are followed. For our veterinary nursing students, a journal can easily be used to record weekly or monthly entries throughout the semester. This could be a Word document or an online blog posted in restricted areas on a learning platform such as Moodle.

A reflective journal can be defined as a personal record of thoughts, feelings, and experiences that encourages self-reflection and growth. It is a tool that can document and examine learning and personal development over time.

The concept of using reflective journals to encourage learners to learn reflective practice is used in different sectors, such as health and teacher training, to maintain communication with learners and grow and develop their skills and reflective practice. The aim is that reflective journals will form the pathway toward their assessments and be used as a formative exercise and not be assessed. We could use reflective journals to provide feedback and feedforward to learners and help them see a learning transformation during their studies (Mezirow 1978a, 1978b).

For our veterinary nursing students, practical/clinical skill learning makes up a large part of their training, as veterinary nursing is a practically based vocation. It can be hard to assess clinical skills when tutors are not present with the learners at work placements or vet clinics. So, I suggest we use reflective journals as part of their practical/clinical skill learning and one that can be used by both the tutor and the workplace supervisor in a three-way collaboration with the learner. The goal here would be to use this to communicate between the three parties to help the learner as they learn and reflect on their practical skills. Donald Schön (1987) talks about effective practitioners being able to reflect on their actions in their day-to-day lives. He called this reflection-in-action the ability to think on your feet and use observation and listening to solve problems (Schön, 1987). Our veterinary nurses need to learn this practical skill in a fast-paced and busy veterinary hospital. I also recommend teaching our learners to stop at the end of a busy day and reflect on their experiences. This “reflection-on-action” (Schön, 1987) ensures that the day’s experiences are thought about and actions are examined. This form of reflecting is associated with reflective journal writing and ties in well with our learners as they attempt to work through the day’s events and learn and grow from this (Boud et al., 2013).

As educators, we need to understand that new learning is based on the learner’s past experiences and that each learner will bring new perceptions to that experience which will differ from those of other learners. Making reflective practice a student learning approach, with questions about why they are doing this and what they are learning, shifts it away from a teacher-centred approach. This can help to encourage learners to have a deeper reflection on their experiences and make a connection between their experiences and understanding (Kim, 2013). Using effective feedback from the educator and the clinical supervisor at this stage can help to promote this learning. “Feedbacking is essential for students as it helps them identify their strengths and weaknesses during the learning process” (Alt et al., 2022).

As suggested above, reflective writing should not be assessed or graded, but if we are to assess reflective writing, we must consider the challenges this poses. Firstly, learners who are uncomfortable with academic writing or for whom English is not their first language can struggle to write reflectively. We should be offering different ways of reflecting, whether verbal or online. Secondly, if reflection is meant to be a personal experience, are we taking this away by defining the exact standards and requirements for an assessment?

Designing an assessment to cover this will be tricky, and not one singular assessment task will suit everyone, as both educators and students can struggle to define and understand reflective practice. Some will cope better than others when asked to write reflectively. As educators, we need to consider the purpose of the reflective task, whether it will promote reflective practice, and how we will judge the reflection (DePaul University, n.d.).

If we must assess reflective writing, we should use a model of reflection to help with grading. Reflective writing has four progression levels (Hatton & Smith, 1995). The first stage starts with descriptive writing, followed by descriptive reflection and then dialogic reflection. This third stage is when the learner looks at what they themselves are thinking, considers others, and develops an awareness of what is going on around them. This is the step that is needed to be taken to have an awareness of being reflective (Hatton & Smith, 1995). The fourth and final stage is critical reflection. We can design a marking rubric based on these four levels, with each level showing a deeper understanding of reflective writing. This marking rubric can be divided into sections that separate the areas needing assessment. Sections such as “demonstrates reflective writing and writing standards” could be used. It should be clearly stated and defined in the assignment’s criteria what is being assessed, so learners are aware of what is needed.

However, this type of reflection could be called academic or professional reflection. This differs from a personal reflection as the learner is being asked to write at an academic level and present it for assessment. This type of writing could include evidence-based practice, a formal writing structure with no mistakes, and be appropriate for the audience reading it. It would feed from the raw personal reflection written first and used to complete the formal assessment. Providing and citing references as part of this academic reflective writing is best placed in the evaluation or action plan step. This is the step where research can help create an action plan for moving forward or help evaluate what has happened compared with the research.

To ask for this type of reflection as educators, we must re-evaluate what we want from the learner regarding reflective practice. If it is a summative assessment requirement for them to produce formal academic reflective writing, then we need to provide precise assessment guidelines on what is required and design a marking rubric that reflects this. If it is a formative assessment for the learner to learn and grow by providing feedback/feed forward, we should not assess reflective writing. If we want the learner to provide evidence, they can draw from experiences, verbal discussions, and work placements without the need to provide formal referencing.

## CHALLENGES TO TEACHING REFLECTIVE PRACTICES

One of the challenges facing educators in undertaking reflective practice is the ability to undertake reflectivity at work. A workplace must accept and embrace reflective practices to make educators comfortable with the process. Encouraging and providing guidance around reflective steps and how to move through them will foster a more positive relationship between doing and teaching reflective practices. Lack of support from the workplace is a common reason why educators are unsure or unwilling to be reflective, as it is viewed as an unnecessary part of our day. To overcome this, workplaces should encourage reflective practices, especially in the tertiary sector, where teaching reflectiveness is becoming more common. Educators can use reflective practices as part of a team to look at teaching practices, look back at assessments, and plan for future teaching. Embracing it within a workplace will have the roll-on effect of making our educators more comfortable with reflective practices. This familiarity should then transfer into the classroom and increase their ability to teach reflective concepts to our learners.

Using a reflective model with steps and prompt questions will significantly help educators who are perhaps unfamiliar with, or lack confidence in, the concept of reflective practice. A model of reflection or a framework of reflection is a structured process or steps that guide you through the description, analysis, evaluation, and improvement of an experience (Brush, 2020). A wide variety of models can be used, and an individual must decide which model or combination of frameworks suits them best. It is also essential to add that not everyone needs to use a model as long as the reflective thinking process is used (Brush, 2020).

For beginning reflective practitioners, a simpler model such as Rolfe et al.'s (2001) reflective model, "What? So What? Now what?," a three-step approach to reflecting, can make it easier to understand and undertake the reflection process. For more experienced practitioners, a model such as the Gibbs reflective cycle (1988) with its seven steps could promote a more in-depth reflection. This model introduces the learner to thinking about analysing and evaluating their own feelings and to start developing awareness and perception of those who were involved in the reflective situation. Both models can have prompt questions added at each step to help practitioners. These questions can be tailored to suit the learning or situation.

It is important to emphasise that the reflective process is a learning cycle where one thought or experience can lead to new learning ideas (and the cycle starts again). It can change an individual's ideas and involves looking at issues in various ways (Brush, 2020).

To ensure reflective practices are taught to learners, we first need to make the educators comfortable and familiar with reflectiveness by encouraging and promoting the positive benefits of being a reflective practitioner.



In turn, educators should then promote the benefits of reflective practice to our learners. This will lead to reflective practices becoming more widely accepted and used in the classroom and the broader veterinary industry.

## **BENEFITS OF REFLECTIVE PRACTICE**

Being a reflective practitioner benefits your growth and development when learning new practical skills or coping with new situations and experiences. It can have a positive outcome in our personal and work relationships. Being reflective teaches you to describe a situation, to look at how this affected you and potentially others around you, and then make an action plan for moving forwards should a situation or similar happen again. This technique can be applied to any part of one's life; being reflective is a tool that can help with stress and anxiety, which in the veterinary industry, if left unchecked, can lead to compassion fatigue and burnout (Fontaine, 2018; Foote, 2020).

Reflective teaching has many benefits for both educators and learners. Educators can use reflectiveness to help grow our practice with improved teaching techniques, assessment skills, and teaching content. We can teach our learners to use reflective practices to help their skills and knowledge and to develop critical thinking skills. It can also help build the relationship between educator and learner plus build on the team relationships with fellow work colleagues. For our veterinary nursing students, this allows them to take and use reflective practices in their workplace once they graduate (York-Barr et al., 2016).

A reflective journal has many benefits in improving a learner's writing skills and personal development and helping them make sense of an experience. It has also been suggested that it can help with a student's negative emotions throughout a course (Waggoner-Denton, 2018).

## **CONCLUSION**

To gain the full benefits of being reflective, we still need to understand or know the concept of reflective practices. Spending time outside or with loved ones is the first step; however, one must ensure reflective steps are followed by thinking about the problem or verbally discussing the problem and looking for solutions and moving forward. A reflective model with prompt questions can significantly benefit beginner reflective practitioners and help them start their reflective journey. To gain a deeper insight and understanding, reflective writing in a journal or blog can help reflective practitioners take that next step into reflective practice.

With the new RCPD that veterinary nurses will be undertaking from 2024, we need to look at how we teach our veterinary nursing students so they are prepared for when they graduate and head out into clinical practice. They will need to perform reflectively as part of the new registration scheme, but we should also reinforce the positive benefits of being a reflective practitioner. The veterinary industry is under incredible pressure and stress, with high mental health issues and burnout rates. Using reflective practices is one small tool in a much larger toolbox that can help lower stress and reduce compassion fatigue and burnout.

As Te Pūkenga and the subsidiaries merge to create and teach unified programmes, this is the opportunity to ensure reflective practices are part of this change. With the new programmes being developed and written within Te Pūkenga for veterinary nursing and animal healthcare across Levels 4 and 6, now is the time to ensure reflective practices are part of these new qualifications. Embedding reflective practices at the undergraduate level can ensure that future reflective practices are familiarised and facilitated (McCarthy, 2011).

The veterinary industry involves a high level of practical skills; it is here that reflective practices can help improve our learners' growth and development of these skills. This would have several aims, to help grow and produce

well-skilled veterinary nurses and to ensure that they can undertake the new RCPD requirements for veterinary nurse registration. In addition, they will understand the concept of reflective practice to use this to help with the ever-increasing stress and anxiety within the industry.

My research shows it is a circle of learning from educators to our learners, for graduates to carry this knowledge when working in clinical practice in the veterinary industry, and then feeding back to vet nursing educators. By making reflective practice more understandable, accessible, and positive, we can aim to increase people's confidence to become reflective practitioners.

### **Mentor 1's contribution**

Clare has highlighted the need for educators in the veterinary nursing profession to develop competency in the use of reflective practice so that this practice becomes embedded in learners working in this profession. Just as 'an apple a day keeps the doctor away' so the use of reflective practice, not only in the vet nursing profession, enables educators and learners, including clinical practitioners, to become more effective in their (often stressful) work and in life in general. To this end, Clare has been able to develop her own reflective practice skills while on her research journey. The importance of journalling and maintaining a reflexive journal was highlighted by Braun and Clarke (2022), as a key practice while on a research journey and is essential for developing a critical commentary for the Master of Professional Practice qualification. Clare has used journalling to be both reflective and reflexive and to develop a revised framework of pedagogy and professional practice that embraces an evidence-based use of reflection as an effective and powerful tool for her veterinary nursing profession.

### **Mentor 2's contribution**

Through Clare's insightful account of summarising some of the most important findings from her recent research project, as well Clare taking precious time to explore the benefits associated with reflective practice, the reader is taken on a journey of discovery. In this regard, Clare has not only advanced her own understanding of reflective practice but has made a worthwhile contribution, particularly within her domain of veterinary nursing. Lucas (1991) provides a useful definition of reflective practice when he argues that the process should be considered as a systematic inquiry centred around developing our understanding of practice. Although we live in an age of increasing demands around our time, the implication is still clear: if veterinary nursing practitioners desire ongoing improvements, then time will not only be needed for personal reflection but techniques such as journalling will need to be considered. As Bassot (2020) reminds us, journalling is a very conscious action and provides a permanent record for the writer that makes them accountable for any progress that needs to be made. Without such deliberate actions being taken, there is the ever present danger of reflection leading a practitioner down the garden path, without any meaningful changes being realised. Clare's position though provides a useful roadmap for inquiring practitioners to learn and take their practice to more advanced levels.

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# CONTINUING THE DECOLONISATION CONVERSATION IN EDUCATION: REFLECTIONS OF A PĀKEHĀ MOTHER OF A MĀORI DAUGHTER

Emma Welsh

Mehemea ka moemoeā ahau, ko ahau anake. Mehemea ka moemoeā tatou, ka taea e tatou.

*If I dream alone, I can achieve something, but if we all dream together, we can achieve more.*

Te Puea Hērangi (1883-1952)

After 17 years in various leadership and management positions within the hospitality industry in Ōtepoti, I ventured on a new career path: academic administration at Otago Polytechnic. Being surrounded by the buzz and excitement of academia, I succumbed to temptation and enrolled in the Bachelor of Applied Management at Capable NZ. From the outset, I wanted my work to be authentically me. I was doing this as a 40-year-old mother of four who had no formal qualifications. I aimed to be a role model for my children and to show them that you are never too old to reach your goals. My portfolio truly reflects who I am: stories of my whānau, personal reflections from my life and photographs showing my lived experiences are scattered throughout. Task five of the Bachelor of Applied Management asked me to identify an area of new learning and to reflect, analyse and evaluate this new learning. The gap I identified was education legislation and Te Tiriti o Waitangi.

This article seeks to provide an understanding of the relationship between Te Tiriti o Waitangi (Te Tiriti) and education legislation in Aotearoa New Zealand. By examining and reflecting upon the historical contexts and current legislation, my goal is to contribute to the ongoing dialogue and efforts towards achieving educational equity, cultural inclusivity, and the realisation of Te Tiriti's principles within Aotearoa's education system. Conventional research approaches often overlook the personal experience and emotions of researchers, leaving gaps in our understanding of lived realities. This article adopts an autoethnographic approach to illuminate the intricate interplay between Te Tiriti o Waitangi and education legislation from a personal perspective. When writing this article, I found myself reflecting through three different lenses. Firstly, from the perspective of a professional working with Aotearoa's education system; secondly, as a Pākehā woman born in Ōtepoti Dunedin and raised in the Bay of Islands; and finally, but perhaps most importantly, the perspective of a Pākehā mother of a Māori daughter. With the support and approval from my whānau, they have allowed me to share personal aspects of their lives. My eldest daughter Lily has permitted me to share her story and her photographs in this article. My whānau's trust and cooperation inspire me to present this story with authenticity and respect.

## HISTORICAL CONTEXT OF MĀORI EXPERIENCES WITHIN THE COLONIAL EDUCATION SYSTEM

Te Tiriti o Waitangi is the founding document of Aotearoa New Zealand. Te Tiriti reflects the relationship between Māori and the Crown. Signed from 6 February 1840, Te Tiriti affirmed tino rangatiratanga for Māori, allowed the Crown to govern Aotearoa, and provided Māori with the same rights as British subjects (Orange, 2015). The two versions of Te Tiriti are not precise translations (Orange, 2015). Te Tiriti o Waitangi remains a space of tension resulting from the various interpretations of both the Māori and English versions. Much of what

was promised to Māori in Te Tiriti has been dishonoured, resulting in inequitable treatment and marginalisation for Māori. One means by which the Crown dishonoured Te Tiriti was through legislation and this underpins the education system experienced by Māori (Calman, 2012).

The British colonial authorities introduced the formal education system of New Zealand during the colonisation of Aotearoa. The founding legislation of education created inequities for Māori and breached Te Tiriti o Waitangi by disregarding the wealth of Māori education traditions and practices that had been in place for centuries. Māori children were encouraged to abandon their language, cultural customs and traditional knowledge in favour of Western ideals (Calman, 2012). Education legislations were critical drivers in assimilating Māori into a Westernised culture. They did not reflect the Crown's guarantee to enable Māori to continue living as Māori and protect Māori culture (Orange, 2015). The following legislation outlined in Figure 1 set the tone for the Māori experience in education until the early twenty-first century when Te Tiriti was explicitly included in the Education and Training Act 2020 (Ministry of Education, 2019). The table provides a high-level overview of how legislation and policy was used to assimilate Māori up to the present time, where legislation is now reflecting the obligations of Te Tiriti o Waitangi.

Year	Key education events and legislation
1816	First Mission Schools open. Missionaries teach in te reo Māori.
1840	Signing of te Tiriti o Waitangi.
1847	Education Act is enacted to create publicly funded education. This Act outlines the principles for education in New Zealand.
1867	Native School Act – Schools for Māori that focus more on manual instruction than academic subjects. This Act requires only the English language to be spoken or written.
1880	Te Aute College produces its first Māori graduates but is pressured to abandon the academic curriculum and teach agriculture.
1903	National policy to ban te reo Māori being spoken in the playground. Introduction of corporal punishment for children speaking te reo Māori at school.
1930-1931	The Director of Education blocks an attempt by the New Zealand Federation of Teachers to introduce te reo Māori into the curriculum.
1960	Hunn Report shows the educational disparity between Māori and Pākehā.
1963	Currie Report emphasises Māori educational underachievement and initiates various compensatory education programmes.
1970	Ngā Tamatoa and the Te Reo Māori Society lobby for the introduction of te reo Māori in schools.
1981	First kōhanga reo established.
1985	First kura kaupapa Māori established.
1986	Waitangi Tribunal asserts te reo is a taonga and guaranteed protection under Article II of te Tiriti.
1987	The Māori language is recognised as an official language.
1989	Education Act 1989 formally recognises kura kaupapa Māori as educational institutions.
1990	Education Act 1989 is amended to recognise wānanga as educational institutions.
1998	Te Puni Kōkiri report identifies underachievement for Māori. The first Māori education strategy is developed by the Ministry of Education and Te Puni Kōkiri.
2013	Māori Education Strategy, Ka Hikitia – Accelerating Māori Success is introduced, aimed to reduce educational disparities and ensure Māori success.
2020	Te Tiriti o Waitangi legislated into education through the Education and Training Act 2020.

Figure 1. Timeline of education developments in Aotearoa (Calman, 2012).

In traditional Māori society, tohunga (experts in traditional lore) taught children in groups to prepare them for their roles within the iwi. Whare wānanga (houses of learning) provided different spaces for tohunga to teach specialised topics such as astronomy, whakapapa, and warfare (Alsop, 2016).

Colonial education was first offered to Schools Māori in the 1810s by missionaries. These schools taught basic reading, writing, and religious education, delivered primarily in te reo Māori. The introduction of the Education Act 1847 (New Zealand Government, 1847) supported mission schools to provide religious instruction, industrial training, and instruction in the English language (Calman, 2012). The Tohunga Suppression Act 1907 (New Zealand Government, 1907) stopped tohunga from providing traditional education.

The Native Schools Act (New Zealand Government, 1867) built on the mission schools, providing limited government funding and stipulating that Māori students attending the schools must live in a boarding situation away from their kāinga (home). The native school system, which ran from 1867 until 1969, established a national system of primary schools where Māori were required to donate land and contribute to the cost of building and teachers' salaries. The curriculum primarily focused on teaching Māori manual labour and domestic skills. From 1894, schooling was compulsory for Māori (Calman, 2012). Secondary education became accessible in the 1930s, but few Māori had access to attend. From 1941, some native schools added a secondary department to accommodate secondary education for Māori (Calman, 2012). Overall, the early education legislation in Aotearoa was designed to assimilate Māori into a Westernised culture and way of life. This had significant and long-lasting effects on Māori education, opportunities and communities and was in breach of Te Tiriti.

Jack Hunn was commissioned by then Prime Minister, Walter Nash, to complete a review of the Māori Affairs Department. This report comprised a series of studies on the Māori population, housing, education, employment, health, crime, and land titles (Hunn, 1961). The Hunn Report, released to the public in 1961, was a crucial document in holding the Government accountable for the significant inequities in Māori education. This report showed that Māori education achievements (but not their capacity) were below average and stated that assimilation had not worked; integration was the answer (Hunn, 1961). Following the release of The Hunn Report, the remaining native schools came under the control of regional education boards in 1969.

The most significant development in Māori education has been the establishment of kōhanga reo (preschool), kura kaupapa Māori (primary school) and wānanga (tertiary), partly a response to the Hunn report and Māori no longer willing to accept the reality that had been dealt to them. As a result, the establishment of these schools was driven by Māori and had an emphasis on the Māori language, tikanga, and involvement by whānau (Calman, 2012).

Disparities in educational outcomes between Māori and non-Māori persist and there is an ongoing need to address systemic barriers, ensure equitable access to resources and opportunities, and strengthen the partnership between the education sector and Māori communities. Since the 1980s, education legislation in Aotearoa has begun to recognise the importance of Māori language, culture and identity within the education system. There is still work to be done to achieve equity and excellence for all Māori learners. Despite education legislation, Māori communities have shown immense resilience and determination in reclaiming their cultural identity and revitalising Māori language and knowledge systems within contemporary education systems. The incorporation of Te Tiriti o Waitangi into educational policies and curriculum frameworks has been instrumental in recognising the importance of Māori perspectives, history, and experiences. Through these collective efforts, Māori communities are beginning to reclaim and revitalise their cultural identity within education settings.



## *A personal reflection*

When starting this piece of writing, I believed everyone in Aotearoa was afforded the same opportunities in education. The generic curriculum was offered until Form 3 in High School, and one could choose subjects that interested them or assisted with their chosen career path. Reading the Education Acts that have been passed since the inception of the New Zealand Government has encouraged hours of reflection and discussion with my whānau. It has changed my beliefs about equal opportunities within the State education system. When discussing the details of this task and how to approach my new learning, I entered discussions with my partner and my eldest daughter. In our house, when the instigator of the conversation has solidified their point of view, there will be a shift to an opposing point of view from the other party. Some call this playing Devil's advocate; in our house, we call it a regular conversation.

My daughter believed that Māori had been marginalised within our education system. My partner, despite his own beliefs, played Devil's advocate and took the position that everyone in Aotearoa, regardless of ethnicity, was afforded equal opportunities in education. We discussed how current legislation leans more towards equal opportunities. However, my daughter and I argued that generations of Māori that have come before us had little educational aspirations due to the failure of the State education system and how education legislation breached Te Tiriti. At the end of the discussion, I could see something had shifted within my relationship with my daughter. She was proud of what I had learnt, how I could come to the debate to reinforce her point of view, and how I had begun to understand her worldview.

I had expected critical conversations with my whānau while undertaking this journey. However, I had not anticipated or realised how important my understanding of the Māori worldview would be to my daughter.

My daughter chose which high school to attend based on the school's ability to provide cultural opportunities. At the time, I thought this was a mistake; curriculum and academic success were more important to me than extracurricular activities.

In four years of attending high school, she has been allowed to learn using a Māori worldview and has been provided opportunities that have allowed her to succeed as a Māori learner. She has joined her school's kapa haka rōpu and has become one of the leaders within the group. She leads karakia before school assemblies and mentors her house group in the school's haka competition. She is a member of Kāhui Kōrero (Māori student council) and is a tutor for "Teach a teacher to kōrero." She was recently named Manukura Māori (Māori Prefect) for Otago Girls High School for 2023. For the first time in the history of Aotearoa, the New Zealand Qualifications Authority has offered Te Ao Haka to selected schools. She has achieved full credits for this programme. She has also obtained the Mana Pounamu scholarship twice. Once as teina (junior) and more recently this year (2022) as a tuakana (senior).

My daughter had five goals when entering high school: to make it into the performing squad of Wairua Pōhou, to make the front line of Wairua Pūhou, to become a member of Te Kāhui Kōrero, to become Māori Prefect and to achieve these goals whilst embracing and acknowledging her culture. She has achieved all five goals.

My daughter is fortunate to be attending high school in an age where Te Tiriti is legislated into education. The intergenerational systemic failing of education legislation has not affected her ability to reach her goals and achieve successful outcomes. Her school, and in particular the Māori staff, have supported my daughter throughout her high school education, upholding her mana as a Māori learner.

Will she have the same support and guidance in tertiary education, or will she become a number in a lecture theatre? Māori participation in tertiary education is crucial for promoting equity, cultural preservation, leadership, economic development and fulfilling Te Tiriti obligations. It empowers individuals, strengthens communities and contributes to a more inclusive and prosperous society.

As a Te Tiriti o Waitangi partner, the Crown is responsible for actively promoting and protecting Te Tiriti, ensuring equitable treatment and the protection of Māori rights and fostering meaningful partnerships with Māori communities (Ministry of Education, 2019). Te Tiriti o Waitangi was legislated into the Education and Training Act 2020. The Act aims to “give all learners a high-quality, culturally responsive, seamless and inclusive education, from early learning through schooling and into tertiary education, vocational training and employment” (Ministry of Education, 2019). This Act legislates the responsibility of education providers to actively participate with local iwi to ensure their plans, policies, and local curriculums reflect local tikanga, mātauranga Māori and te ao Māori (Ministry of Education, 2019).

### **A personal reflection**

*Te Tiriti o Waitangi was signed 182 years ago but only recently adopted into education legislation. Most of my education was held in Kerikeri, Bay of Islands, in the 1990s. Throughout my primary and secondary education, the curriculum was heavily influenced by our place in the world and its history. My school field trips were to Urupukapuka Island, Waitangi, Russell, the Stone Store basin, Te Ahurea and Kororipo Pā. These allowed me to experience first-hand the places written in history books. Social Studies and New Zealand History were my favourite subjects. They were a driving factor in why I chose to double major in Social Studies and New Zealand History at Teachers College.*

## **OTAGO POLYTECHNIC AND TE PŪKENGA: THE INSTITUTE’S RESPONSE TO TE TIRITI O WAITANGI**

Otago Polytechnic Ltd (OP) has been responsive to Te Tiriti o Waitangi before legislation with their Māori Strategic Framework application. Launched in 2006, with reviews in 2012 and 2015, OP is currently on the fourth iteration of their Māori Strategic Framework (MSF) 2022 (Otago Polytechnic, n.d.b). The MSF (2022) is a crucial pillar supporting OP’s strategic direction and guides the institution in giving effect to Te Tiriti o Waitangi and meeting the aspirations of mana whenua (Otago Polytechnic, n.d.b). The MSF (2022) has six priorities, listed in Figure 2.

<p><b>Priority One</b> Te Tiriti o Waitangi – An effective partnership with mana whenua</p>
<p><b>Priority Two</b> Kā aimahi – Attracting and developing Māori staff and the cultural capability of all staff</p>
<p><b>Priority Three</b> Ta Taumata Angitu Māori – Māori learners succeeding as Māori</p>
<p><b>Priority Four</b> Kia Eke Panuka – High quality and culturally relevant programmes</p>
<p><b>Priority Five</b> Kia Kōtahi Tātou – Culturally inclusive learning and working environment</p>
<p><b>Priority Six</b> Te Rakahau Māori – Māori research</p>

Figure 2. Māori Strategic Framework (2022) priorities (Te Komiti Kāwanataka, 2020).

## **A personal reflection**

*As part of induction into Otago Polytechnic, each new staff member must attend the Introduction to Te Tiriti o Waitangi workshop. During this workshop, I realised that the education I had received during my primary and secondary schooling differed from the experiences of others from around the motu. Upon reflection, I can only put this down to geography. The curriculum I was taught was localised, and my place in the world is rich in Māori history. With the new knowledge of the Education and Training Act (2020) I have obtained, I now realise that what I was taught was not legislated; however, relationships between the schools I attended and local iwi were strong, and the schools were Te Tiriti responsive.*

## **HOW DOES OTAGO POLYTECHNIC GIVE EFFECT TO THESE PRIORITIES?**

### **1 – An effective partnership with mana whenua**

The Memorandum of Understanding, MOU, aims to assist Kāi Tahu and Māori learners achieve their educational aspirations. The MoU has four priorities: Treaty Principles, Alignment with Ngāi Tahu Vision 2025 and Te Ruataki Mātauranga, Relationships and Expectations (Otago Polytechnic, n.d.a). The MoU is between OP and mana whenua which consists of four local Papatipu Rūnaka.

### **2 – Attracting and developing Māori staff and the capabilities of all staff**

*Certificate of Bicultural Competency* is available for all staff to attend at no cost. The courses within this programme include *Introduction to Te Tiriti o Waitangi*, *Tikanga Māori in the Organisation*, *Te Reo Māori for the Workplace*, and *Bicultural Competency*.

*Te Tiriti o Waitangi* workshop is a compulsory component of staff induction at OP.

New staff members are welcomed with a mihi whakatau that is held at either college or organisation level, depending on the position of the new staff member.

### **3 – Māori learners succeeding as Māori**

Te Punaka Ōwheo offers Māori taura a dedicated space and a range of services, support, and advice. Their goal is to help Māori taura feel safe and included and to succeed (Otago Polytechnic, n.d.d).

Pre-Graduation ceremonies – Otago Polytechnic holds a Māori pre-graduation ceremony before each college has its pre-graduation ceremonies. Māori pre-graduation allows Māori learners across the Kura to unite and celebrate their success as a collective.

Iwi cohorts have been established within the College of Work Based Learning. An independent learning pathway recognises the skills and experiences of Māori who have had extensive leadership experience but have not engaged in Tertiary Education. Iwi cohorts were developed to realise a kaupapa Māori approach – for Māori, by Māori, with Māori, with the intent to offer quality programmes designed to be culturally responsive, imbedded in te ao Māori, embedded in mātauranga Māori, and that provided Māori learners with world-class qualifications that could transform their lives (Victoria, 2019). Māori facilitators for Māori learners encourage a kaupapa Māori approach for Māori learners during their study.

## 4 – High quality and culturally relevant programmes

All programmes at OP are audited by the Office of the Kaitohutohu (KTO). The audit includes the content of the programme and programme delivery. All programmes have mātauranga Māori and tikanga Māori embedded throughout the curriculum and programme documents to ensure a sense of belonging for Māori and aim to build a bicultural narrative for Aotearoa (R. Bull, pers. comm, 12 October 2022).

## 5 – Culturally inclusive learning and work environment

Otago Polytechnic has started cultural inclusivity within the working and learning environment using te reo Māori greetings and farewells in emails, encouragement to include Māori phrases, te reo Māori, and he kiwaha in our everyday conversations, and by beginning and ending meetings with karakia.

Te Wiki o te reo Māori – Celebrations and events for all learners and staff include free activities such as morning karakia and waiata, kai, te reo pronunciation classes and a ceremony honouring the raising of the Tino Rangatiratanga flag.

On Monday, 12 September 2022, OP raised the Tino Rangatiratanga flag, making it a permanent fixture.

## 6 – Māori Research

The Office of the Kaitohutohu (KTO) supports the implementation of the MSF (2022). KTO offers staff and taura assistance of consultation with Māori, Treaty of Waitangi, and ethics applications (Otago Polytechnic, n.d.b).

The Māori Research Symposium is held bi-annually and provides a valuable opportunity for kairakahau Māori (Māori researchers) and scholars to present research and connect (Otago Polytechnic, n.d.a).

*Kaupapa Kai Tahu* is a bi-annually published *Scope* journal that features contemporary research topics for Māori (Otago Polytechnic, n.d.a).

### ***A personal reflection***

*I am analysing and reflecting upon how I, as an individual and OP as an organisation, give effect to these six priorities. This has made me somewhat uncomfortable. Some of these priorities are outside the scope of my daily tasks as an administrator, and others gave me a feeling of tokenism. Yes, I write “Kia Ora” and “ngā mihi” in my emails, and I say “Mōrena” to my colleagues and “e mara” to those I know more personally. Yes, I have attended the Tiriti o Waitangi workshop and enrolled in te reo Māori in the workplace and Tikanga Māori in the organisation, but is this enough, or is it the very least I could do? Posing this question to myself, I engaged with members of the more comprehensive OP network to understand how the priorities of the MSF are being met. After reflecting on various conversations, I have concluded that this is a start. OP has developed a relationship with mana whenua and has the MSF in place to hold the organisation accountable for ensuring that the educational aspirations of mana whenua are met. As an organisation, OP has taken the first steps to indigenise the organisation and to encourage, promote and support Māori. Some MSF priorities rely on the organisation, some on the leadership team, and others on individuals. Still, for all these priorities to be successful, I feel it must be understood that there is always room for improvement, reflection, and change.*

On 1 November 2022, Otago Polytechnic Ltd merged into Te Pūkenga. Te Pūkenga is to become Aotearoa's institution of vocational education, bringing together 16 Institutes of Technology and Polytechnics into one organisation (Tertiary Education Commission, 2023).

Te Pūkenga has five educational priorities:

- A relentless focus on equity and ensuring participation – we honour and uphold Te Tiriti o Waitangi in all we do.
- Delivering customised learning approaches that meet the needs of learners and trainees wherever they are.
- Using our size and scale to strengthen the quality and range of education delivery throughout Aotearoa. Excellence in educational provision for all.
- Services that meet the specific regional needs of employers and communities.
- Transition educational services in a smooth and efficient manner.

Te Pūkenga has developed *Te Pae Tawhiti*, a Tiriti o Waitangi excellence framework (Te Pūkenga, n.d.). *Te Pae Tawhiti* provides Te Pūkenga guidance on how to be responsive to and meet their obligations to Te Tiriti o Waitangi. Figure 3 shows that *Te Pae Tawhiti* has two objectives and five goals.



Figure 3. Te Pūkenga – Te Pae Tawhiti (Redrawn after Te Pūkenga, 2021).

*Te Pae Tawhiti* acknowledges that it is not Māori learners that need to change to fit the education system; instead, educators must ensure that services lift and accelerate educational success for Māori. *Te Pae Tawhiti* proposes to accelerate Māori success by affirming Māori identity through improved access, developing practices that are responsive to the needs of Māori, and ensuring more equitable outcomes for Māori (Te Pūkenga, n.d.). *Te Pae Tawhiti* promises to support Māori learners and their whānau to achieve excellent education outcomes, to recognise and build on the strengths of Māori learners and their whānau, and to ensure Māori and their whānau have a strong sense of belonging.

## A personal reflection

*As my professional role has not transitioned into Te Pūkenga yet, I cannot reflect on how Te Pae Tawhiti is upholding Te Tiriti and enhancing the mana of Māori taura or how it will impact my practice. The objectives and goals are honourable and, in my opinion, achievable. Inclusivity and equity for Māori are imperative for Māori success and the future success of Aotearoa. Te Pae Tawhiti provides a framework for Māori success within the vocational education system. By prioritising the well-being of Māori learners, providing culturally responsive education, fostering a supportive environment, and upholding the mana of our Māori learners, Māori will be afforded the same rights and opportunities as Te Tiriti promises.*

## SUMMARY

From its inception, the New Zealand Government has continually passed legislation detrimental to Māori and furthered the Government's agenda of assimilating Māori into a Westernised culture. One of the main mechanisms in which the Government pushed their agenda of assimilation was through an education system that intended to remove Māori from traditional community-based living and cultural practices and prepare Māori for a life of domestic duties and manual labour. Considering that Te Tiriti guaranteed Māori rangatiratanga and that they would be granted the same rights as British subjects, this was not honoured in the education system and, in effect, divided Māori from Pākehā. Immediately after education was legislated in Aotearoa, it transitioned from knowledge being collectively passed down to becoming a commodity. Early legislation assisted in promoting Māori as a subordinate culture in Aotearoa, reflected in the curriculum offered to Māori students. Following the establishment of kōhanga reo, kura kaupapa, and wānanga, we have seen shifts in education for Māori, by Māori, for Māori. The Education and Training Act (2020) tells us that educational institutions must honour Te Tiriti by participating with local iwi, providing inclusive education, being culturally responsive, and offering a local curriculum reflective of local tikanga.

Throughout this journey, I have questioned my practice. I have questioned whether I am subconsciously ticking boxes or exercising meaningful integration of te reo Māori and tikanga into my practice. To prepare for the content of this task, I read *White Fragility* (DiAngelo, 2018). Reading this changed my mindset and allowed me to be honest with myself. I know that I am ticking boxes. The discussions that I have had with my whānau have allowed me to be vulnerable and accept that this is so. I thought I knew more about Te Tiriti and understood some of the inequities that Māori have previously faced.

I felt that as I grew up in the Bay of Islands, had Māori friends, a Māori daughter, a Māori brother-in-law, and Māori relatives that, of course, I understood and appreciated the position of Māori. The fact that I have just learnt that Te Tiriti was not legislated into education until 2020 shows that I do not know and do not understand; however, it does show that I am learning.

I cannot remember where I heard the phrase, what is good for Māori is good for all, but this has resonated strongly with how I adapt my personal and professional practice. My daughter is Māori. My family are Māori. My closest work colleague is Māori. Am I doing all that I can for them? Am I upholding the mana of the Māori I encounter?

The below picture is of Wairua Pūhou, my daughter's kapa haka rōpu. They are on stage, performing and succeeding as a collective. These adolescents, some non-Māori, work collaboratively to achieve an outcome. The Crown guaranteed Māori the ability to continue living as Māori and protect Māori culture. I have learnt that the Māori worldview is based on the success of the collective. The Education and Training Act (2020) is legislated with a Westernised lens. Education in Aotearoa provides an outcome for an individual. Why is the education system in Aotearoa individualised? To me, this shows that although the Government has taken steps to acknowledge and understand what Te Tiriti means for Māori, the Crown's guarantee of protecting Māori culture and of Māori having the ability to live as Māori is still not being upheld.



Figure 4. Lily (centre front) performing in Wairua Pūhou (Otago Girls and Otago Boys Kapa Haka rōpū) (Source: Author).

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# EMBRACING NEURODIVERSITY: SUPPORTING LEARNERS TO SUCCESS

Glenys Ker and Rachel van Gorp

## INTRODUCTION

In today's diverse educational landscape, educators often encounter learners with neurodiverse traits such as autism, ADHD, dyslexia, and other cognitive differences. These learners have unique perspectives, strengths, and challenges that require thoughtful and inclusive approaches to teaching and learning.

In this article, we will present the story of Rachel, a neurodivergent learner as well as an educator, and Glenys, an experienced facilitator of tertiary level learning, as they navigated Rachel's Master of Professional Practice journey to a successful conclusion. We will provide an overview of neurodiversity theory, Rachel's interviews with learners and staff, and key findings from her study. These encompass emergent themes, strengths of neurodiverse learners, benefits for individuals and the community, and practical tips for facilitating and supporting neurodiverse learners' success.

## RACHEL'S AND GLENYS'S BACKGROUND

Rachel, a learner with neurodivergent traits including Irlen syndrome, dyslexia, and ADHD, had experienced and overcome challenges in her own learning journey during her undergraduate qualifications. She often felt confused as to why she found aspects of learning challenging, but she discovered that she benefitted from visuals, pictures, and smaller bites of information.

When she started her Master's study, Rachel was encouraged to undertake the comprehensive Cognitive and Educational Assessment for dyslexia, which involves a thorough preparation and background assessment, followed by two testing sessions that can take up to six hours in total. The testing procedures typically include a variety of standardised tests that assess cognitive and academic abilities to identify dyslexia and to inform educational and intervention planning.

Glenys, an experienced facilitator, had worked with diverse groups of learners for years and was well-versed in a wide range of teaching and learning methodologies. She had developed her own model of effective facilitation (Ker, 2017) but also sought to learn and understand more about neurodiverse learners, knowing that there was no one-size-fits-all approach.

As Rachel and Glenys began working together, they quickly realised that each had much to learn. Rachel decided to focus on two key areas that learners often presented with, namely ADHD and dyslexia. They approached their journey together with an open mind and a willingness to learn from each other. They recognised that Rachel's neurodiversity presented both opportunities and challenges, and they embarked on a collaborative and inclusive approach to support her unique needs.

## UNDERSTANDING NEURODIVERSITY

According to Clouder et al. (2020), neurodiversity encompasses a wide range of learning disabilities such as dyspraxia, dyslexia, ADHD, dyscalculia, autism spectrum disorder, and Tourette syndrome.

Neurodiversity theory posits that neurological differences are a natural and inherent part of human diversity, just like other forms of diversity such as race, gender, or culture. The theory suggests that learners with ADHD, for example, can excel in creative tasks and problem-solving when given opportunities to use their unique cognitive abilities.

Therefore, it is essential for educators to recognise and appreciate the strengths and talents of neurodiverse learners rather than focusing solely on their challenges.

According to Otago Polytechnic's database, there are approximately 1,055 learners in 2022 who declared a disability, including learning challenges under the neurodiversity umbrella, but only 413 have requested some form of support (Singer, 2016). Thus, Rachel's research is invaluable in shedding light on the challenges faced by neurodiverse learners and identifying ways to encourage them to access support.

Brimo et al. (2021) highlight that the challenges faced by neurodivergent individuals are complex and multifaceted, including coexisting conditions such as ADHD, learning and language disabilities, sleep disorders, impulse control personality disorders, anxiety disorders, intellectual disabilities, substance use disorders, mood disorders, and autism spectrum disorders (Antoniou et al., 2021).

However, information regarding the exact number of overlaps between these disorders is limited (Brimo et al., 2021). Some challenges may occur independently, while others may coexist. For example, ADHD and autism are often closely linked and share numerous similarities, including attention issues, emotional impulsivity, a lack of self-awareness, and difficulty reading social cues (ADHD New Zealand, n.d.; Antoniou et al., 2021; Brimo et al., 2021; Sewell, 2022).

van Gorp (2022) asserts that neurodivergent learners face significant obstacles when it comes to accessing higher education, as historically, it has been perceived as a space reserved for the privileged. Despite an increasing number of learners from diverse backgrounds enrolling in universities, those from privileged backgrounds still have higher rates of progression to higher education. Research conducted in New Zealand and Australia has shown that learners with neurodiverse conditions, such as dyslexia, are underrepresented in higher education and face significant challenges due to a lack of support and resources. This lack of representation poses a significant challenge for educators and employers worldwide as the number of learners with learning disabilities linked to neurodiversity continues to rise.

van Gorp (2022) concludes that there is a need for a more inclusive and supportive approach to higher education. Learners with neurodiverse conditions should not be excluded from higher education due to barriers that are often beyond their control. Higher education institutions must provide tailored support and accommodations to ensure that these learners can succeed and reach their full potential. This is not only important for individual learners but also for society, as neurodivergent individuals have unique perspectives and strengths that can contribute to a more diverse and innovative workforce.

Kirby (2021) identifies several reasons why some learners may choose not to disclose their neurodivergent condition(s). Some learners may not be aware of their diagnosis or may be hesitant to disclose due to negative past experiences or bias against them. Additionally, some learners may not view themselves as disabled or may simply be uncomfortable sharing personal details. Hayes (2020) and Jansen et al. (2017) argue that calling on learners who do not voluntarily participate in class, despite the perceived advantage of engaging learners who may otherwise remain silent, is not appropriate.

## RESEARCH PROJECT

van Gorp (2022) was inspired by Saunders et al.'s (2019) "research onion" as a simple method to approach the project by peeling back the layers, which involved breaking it down into manageable parts. This approach involved examining the choices made at each layer and explaining the rationale behind them and the research methods used for data collection and analysis. Qualitative methodology and autoethnography were employed to gather and interpret data from participants, allowing for a deep understanding of the challenges and capabilities of neurodiverse learners and the strategies used by staff to create successful learning experiences for them. The findings of this project now contribute to the field of neurodiversity and inform the practice of staff and emerging practitioners in creating inclusive learning environments for neurodiverse learners.

During her Master's journey, Rachel conducted extensive research and studied various theories and ideas to enhance her educational practices for better support of neurodiverse learners. She conducted 13 semi-structured interviews as follows:

- Five interviews with self-identified neurodiverse learners recruited through flyers and the student hub.
- Six interviews with educators from different Colleges within Otago Polytechnic.
- Two interviews with specialised staff from Student Success, one of whom identified as an expert in the field.

Rachel organised collected data in Excel, de-identifying participants and using colour-coded highlighting (for example, pink for relationships, blue for challenges) to identify themes while taking notes.

The study identified several emerging themes related to neurodiverse learners in higher education, including the value of early disclosure, the challenges faced by neurodiverse learners, building relationships and support, and strengths brought by neurodiverse learners. The approach used in the project allowed for the identification of patterns and themes through a six-phase process of thematic analysis using Braun and Clarke's (2013) framework. Semi-structured interviews prompted participants to reflect on their experiences (ethics approval no. 928), and transcription helped ensure the accurate interpretation of their responses.

## THE THEMES THAT EMERGED FROM THE INTERVIEWS

### 1. Early disclosure – identifying needs at the earliest point is essential.

Participants emphasised the importance of identifying the needs of neurodiverse learners as early as possible in their academic journey. This included encouraging learners to disclose their neurodiversity, such as autism, dyslexia, ADHD, and other conditions, to relevant personnel, such as faculty, support services, or counsellors.

Learner participants found disclosure beneficial as it allowed them to seek help without hiding their challenges. Lecturer participants acknowledged that every learner has a different way of learning and found it helpful when learners disclosed their neurodivergent status. Expert participants emphasised that early disclosure is crucial for support staff to provide effective support. However, some neurodiverse learners may refrain from disclosing due to fear of stigma or concerns about privacy. Overall, the findings highlight the importance of creating an inclusive learning and teaching environment that promotes early disclosure and supports the unique needs of neurodiverse learners.

Early disclosure was seen as a crucial step in accessing appropriate accommodations and support, and in preventing potential academic challenges or setbacks later in the academic term. Participants highlighted the need for a supportive and non-judgmental environment that encourages learners to feel comfortable in disclosing their neurodiversity early on and emphasised the role of educational institutions in creating such an environment.

## **2. Challenges facing a neurodivergent learner in higher education.**

The theme of challenges faced by neurodiverse learners in higher education emerged as a significant area of concern in the interviews. Participants identified various challenges that neurodiverse learners might encounter in the higher education setting, including academic, social, and emotional challenges. Academic challenges included difficulties with time management, organisation, note-taking, and processing information. Social challenges included difficulties with social interactions, forming relationships, and participating in group activities. Emotional challenges included managing stress, anxiety, and self-esteem. Participants highlighted that these challenges could impact the overall well-being and academic performance of neurodiverse learners in higher education. They emphasised the need for appropriate support and accommodations to address these challenges effectively.

These challenges include difficulties with reading, writing, and assessments, as well as sensory overload. Learner participants in the study mentioned self-awareness, reflection, and strong communication skills as strategies they used to overcome these challenges.

Lecturer participants emphasised the importance of acknowledging learners' challenges and creating individual learning plans to identify and accommodate neurodivergent learning styles and strengths. Lecturers can adapt lessons using visual aids, detailed instructions, and coloured overlays to ease visual stress.

However, it was noted that neurodiverse learners are unique individuals, and educating lecturers about their specific challenges rather than just about neurodiversity in general, is important. Developing a plan to alleviate challenges, based on the learner's preferences and needs and involving them in the decision-making process, can be beneficial. Success can be achieved by equipping neurodiverse learners with skills and strategies to develop their independence and influence their results. The importance of building connections, finding safe people for neurodiverse learners to engage with, and fostering communities of practice among interested individuals was also highlighted. Undertaking more research with staff and promoting a change in educators' perspectives towards empathy and knowledge about neurodiverse learners can help improve their learning and teaching experiences.

## **3. Building relationships and support with neurodiverse learners – making connections and acknowledgements to build an inclusive environment.**

This theme also emerged as a key factor in creating an inclusive environment for neurodiverse learners. Participants emphasised the importance of establishing positive relationships and connections with neurodiverse learners to understand their unique needs, strengths, and challenges. This included acknowledging and valuing neurodiversity as a form of human diversity, and creating a supportive and inclusive learning environment that fosters belongingness and acceptance. Participants highlighted the need for faculty, staff, and peers to be educated about neurodiversity, develop empathy and understanding, and actively engage in building relationships and providing support. This included adopting inclusive teaching practices, using appropriate communication strategies, and creating opportunities for neurodiverse learners to connect with peers and engage in meaningful ways.

Learners, lecturers, and support staff all agree on the value of creating connections and acknowledging neurodiversity to foster an inclusive learning environment. Learners feel more relaxed and confident when they have a genuine connection with their lecturers and support staff, and they appreciate when lecturers show compassion and care towards their needs. Lecturers aim to create a safe space for neurodiverse learners, build quality connections, and understand individual strengths and challenges. Expert participants also emphasise the importance of building relationships to establish trust and provide appropriate support. When the relationship between neurodiverse learners and lecturers is strong, it creates a welcoming environment and encourages learners to feel valued and supported in their studies. Communication, understanding, and commitment to learning differences are essential for building effective relationships between neurodiverse learners and educators.

#### **4. Strengths neurodiverse learners bring to the learning and teaching environment encourage discussion about the strengths of neurodiversity.**

Participants recognised that neurodiverse learners bring unique strengths to the learning and teaching environment, such as creativity, attention to detail, problem-solving skills, and diverse perspectives. They emphasised the need to shift from a deficit-based perspective to an asset-based perspective when discussing neurodiversity in higher education. Participants highlighted the importance of celebrating and leveraging the strengths of neurodiverse learners and integrating them into the academic curriculum and classroom activities. This included fostering a positive mindset towards neurodiversity and promoting a culture of inclusivity that recognises and values the contributions of neurodiverse learners in the learning and teaching environment.

These strengths include:

- **Creativity:** Neurodiverse learners often have a very creative side, such as drawing, vision, or imagination, which can contribute positively to group activities and projects.
- **Self-awareness and reflection:** Neurodiverse learners tend to have increased self-awareness and the ability to reflect deeply, which can help them better understand their learning preferences and strategies.
- **Unique strengths and talents:** It is important to ask neurodiverse learners about their strengths and how they would like to use them, as they may have unique talents and abilities that can contribute to the learning environment.
- **Different perspectives:** Neurodiversity brings diverse thinking and perspectives to the learning and teaching environment, which can enrich discussions and interactions among learners and educators.
- **Engagement in different teaching methods:** Neurodiverse learners can benefit from incorporating various teaching methods into the learning environment, such as audio and practical examples, formative and practical assessments, and interactive engagement, to cater better to their individual strengths and preferences.
- **Assistance from experts:** Expert participants, such as educators and professionals, can provide assistance to neurodiverse learners based on their individual needs, such as note-taking support, to help them focus on the lecture or lesson content.

Overall, acknowledging and maximising the strengths of neurodiverse learners is essential for creating an inclusive learning environment that values and utilises their unique abilities, talents, and perspectives. Collaborating with neurodiverse learners, other educators, and professionals can help develop tailored learning plans that leverage their strengths and address their challenges effectively.

#### **BENEFITS AND IMPACT**

The collaborative learning approach embraced by Rachel and Glenys had numerous positive effects on both individuals and the wider educational community. First and foremost, Rachel experienced a sense of belonging and inclusion in her studies. She felt that her unique perspectives and strengths were acknowledged and valued, which boosted her self-esteem and motivation to learn. Rachel also developed agency and self-determination, as she actively participated in decisions about her own learning process. This helped her build confidence in her abilities and fostered a positive attitude towards learning. As a result, Rachel continued to refine her teaching style in her own classroom, constantly seeking ways to adjust and engage with her learners.

Glenys also benefited from working with Rachel. She gained a deeper understanding of neurodiversity and the unique needs of neurodiverse learners. She learned to appreciate the diverse ways in which learners process information and engage with the material. Glenys honed her facilitation skills, incorporating new strategies and approaches to better support neurodiverse learners in her future practice. She also developed a strong sense of empathy and understanding towards neurodiverse learners, which informed her interactions with other learners she worked with.

## CHALLENGES AND LESSONS LEARNED

Rachel and Glenys also encountered challenges along their journey. There were times when Rachel struggled with certain tasks or activities, and Glenys had to find alternative ways to support her without compromising Rachel's autonomy and agency. There were also moments when misunderstandings or miscommunications arose, and both Rachel and Glenys had to work together to overcome these challenges and find solutions. However, they approached these challenges with a collaborative mindset, recognising that they could learn from each other and find creative solutions together.

One crucial lesson that Rachel and Glenys learned was the importance of open and honest communication. They actively engaged in conversations about Rachel's preferences, needs, and challenges, and sought to understand each other's perspectives. This allowed them to build a strong rapport and trust, which formed the foundation of their successful working relationship. They also recognised the importance of flexibility and adaptability, as they had to adjust their approaches based on Rachel's unique needs and preferences, alongside the expectations of the Master's programme's requirements. This flexibility extended to Rachel's work in the wider classroom environment as well, as Glenys adjusted her own facilitation model to better accommodate neurodiverse learners.

## HINTS FOR FACILITATING LEARNING FOR NEURODIVERSE LEARNERS

As Rachel and Glenys navigated Rachel's learning journey of supporting neurodiverse learners, there were several effective strategies that could be helpful for educators in similar situations, including:

1. **Creating a supportive learning environment:** Neurodiverse learners often thrive in an environment that is inclusive, accepting, and supportive. Educators can create such an environment by establishing clear expectations, providing structure and routines, and offering opportunities for personalised learning. It is also important to create a safe space where learners feel comfortable to share their thoughts, ideas, and challenges without fear of judgment.
2. **Using multi-modal teaching strategies:** Neurodiverse learners often have different learning styles and preferences. Using a variety of teaching strategies that appeal to different senses can help engage learners and facilitate their understanding. For example, incorporating visuals, hands-on activities, and technology-based tools can be effective in conveying information to neurodiverse learners.
3. **Providing clear and concise instructions:** Neurodiverse learners may struggle with processing and following complex instructions. Providing instructions that are clear, concise, and presented in multiple formats can help learners better understand and follow the tasks or assignments. Using visual aids, written instructions, and verbal explanations can be effective in supporting their learning.
4. **Encouraging learner agency and self-determination:** Neurodiverse learners often benefit from having a sense of control and autonomy over their learning. Educators can empower learners by involving them in goal setting, decision making, and self-assessment. This promotes learner agency and self-determination, which can boost their motivation and engagement in the learning process.
5. **Providing frequent feedback and reinforcement:** Neurodiverse learners may require additional feedback and reinforcement to reinforce their learning. Educators can provide frequent and timely feedback that is specific, constructive, and positive. This helps learners understand their progress, identify areas of improvement, and build their confidence.
6. **Practising flexibility and adaptability:** Neurodiverse learners may have unique strengths, challenges, and learning paces. Educators need to be flexible and adaptable in their approach, taking into consideration the individual needs of each learner. This may involve modifying instructional strategies, providing additional support, or allowing for accommodations as needed.

## INCORPORATING STRATEGIES FOR NEURODIVERSE LEARNERS INTO THE FACILITATION FOR LEARNING MODEL

Utilising strategies for neurodiverse learners aligns with Ker's (2017) effective facilitation for learning model, which is vital for benefitting neurodiverse learners' unique needs and experiences:

**Improved engagement and motivation:** When neurodiverse learners feel supported and understood, they are more likely to be engaged and motivated in the learning process. Effective facilitation models that cater to their unique needs can help boost their interest and participation, leading to improved learning outcomes.

**Enhanced learning outcomes:** Neurodiverse learners may require different approaches to access and process information. Effective facilitation models that align with their learning styles and preferences can enhance their understanding and retention of information, leading to improved learning outcomes.

**Increased self-efficacy and confidence:** Neurodiverse learners may face challenges and barriers in their learning journey. Effective facilitation models that promote learner agency and self-determination can help neurodiverse learners develop a sense of self-efficacy and confidence in their abilities, leading to increased self-esteem and motivation to learn.

**Greater inclusivity and diversity in education:** Incorporating effective facilitation models for neurodiverse learners promotes inclusivity and diversity in education. It acknowledges and values the unique perspectives, strengths, and challenges of neurodiverse learners, creating a more inclusive learning environment that celebrates diversity.

Ker stresses the importance of understanding the nature of learners and acknowledging that every learner presents with their own unique challenges and understandings. She believes that facilitating learners is not a simple set of technical tasks but requires high levels of skill and understanding of the learners. Ker argues that facilitators need to exercise judgment, understand the relational role, and co-construct knowledge with learners through reflection and reflexivity. Her model takes into consideration the challenges and strengths of all learners, and in this instance, the neurodiverse, as they may require additional support and accommodations to ensure their success.

Effective facilitation requires an understanding of the unique learning needs and preferences of neurodiverse learners, and the facilitators must create a safe and supportive learning environment to facilitate their success. Ker's learner-centred facilitation of learning model is crucial for supporting the success of neurodiverse learners, grounded in an understanding of the unique learning needs of learners.



## TIPS FOR LEARNER SUCCESS

van Gorp (2022) believes that the neurodivergent learner is also responsible for creating and sustaining an inclusive learning environment, and suggests some tips for learners:

- I Inclusion – as a learner, creating a supportive environment where everyone's differences are recognised and valued, allowing us all to reach our full potential.
- N Neurodivergent – showcase your own skills/talents so that other learners and educators know what your strengths are.
- C Classroom – work with others in the class and the educators to ensure that the classroom is safe for everyone and to create a positive and accepting learning environment.
- L Learning – ask for support as you need it. Reach out to others, there is no shame in needing support.
- U Understanding – in order that everyone understands, building relationships with staff and classmates can help you succeed.
- S Success – achieving in your studies is key to your success therefore reach out for support when needed.
- I Individualised Instruction – is crucial for learners with diverse needs. Advocate for yourself and ensure your learning needs are met.
- V Valued – it is important that everyone in the class environment feels valued and knows that they matter. Watch out for those who may be struggling quietly.
- E Education – should be inclusive for all learners, regardless of their differences. Speak up if you notice a lack of inclusivity in your learning environment.

## CONCLUSION

Supporting neurodiverse learners in an educational setting requires a thoughtful and inclusive approach. This involves early disclosure of needs, recognising and accommodating individual challenges, building strong relationships, and emphasising the strengths of neurodiverse learners. The benefits of such an approach include improved self-esteem, agency, and motivation for the learners, enhanced understanding, effective facilitation skills, and empathy for the educators. Rachel and Glenys's journey provides several effective strategies for facilitating learning for neurodiverse learners, including creating a supportive learning environment, using multi-modal teaching strategies, providing clear and concise instructions, encouraging learner agency and self-determination, providing frequent feedback and reinforcement, practising flexibility, and adaptability. Implementing these strategies can positively impact neurodiverse learners, leading to greater success and inclusion in the educational setting.

**Glenys Ker** is a highly experienced work-based learning and professional practice facilitator and assessor, drawing on an extensive and highly successful background as a teacher and career practitioner in both university and polytechnic settings, at undergraduate and postgraduate levels. She is also an active researcher in the field of work-based learning, integrating her research into the development of facilitators of independent learning.

Glenys is the primary architect of the independent learning pathway (ILP) approach to qualifications offered through Capable NZ, Otago Polytechnic's work-based and practice-based learning school. Glenys is an experienced leadership and management practitioner, again in multiple educational contexts, including academic and service departments and leadership of independent learning programmes. In her 18 years' experience in this field, she has worked with and supported many neurodiverse learners – something she is hugely grateful for and has learned so much from.

Glenys has co-authored with her colleague Dr Heather Carpenter a book on her work: *Facilitating Independent Learning in Tertiary Education – new pathways to achievement*.

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**Rachel van Gorp** is an accomplished Senior Lecturer with a wide-ranging background, including experience in banking, personal training, massage therapy, business ownership, mentorship, and volunteering. As a member of the Otago Polytechnic School of Business, Rachel brings a wealth of knowledge and expertise to her undergraduate teaching programmes.

Rachel is a dedicated advocate for neurodiverse individuals in vocational education and serves as the chair of the Neurodiversity Community of Practice. She is committed to promoting inclusion and equal opportunities for individuals with diverse learning abilities. Her recent completion of her Master of Professional Practice reflects her focus on the essential topic of Neurodiversity in Vocational Education: facilitating success.

With her unique combination of experience, Rachel is able to bring a practical perspective to her teaching, engaging students in real-world scenarios and helping them to develop the skills they need to succeed in their future careers. Her dedication to the field of vocational education has made her a highly respected member of the academic community, and her commitment to promoting neurodiversity is making a significant impact on the lives of her learners and the wider community.

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# LEVERAGING, AND NOT LEVERAGING, MICRO-CREDENTIALS – AND A GLOBAL PANDEMIC

Jeremy Hanshaw

## INTRODUCTION

In this article I uncover the voices of practitioners and stakeholders in the micro-credentials space of Ōtepoti in Otago, Aotearoa New Zealand. The research period spans the time before and during the recent COVID-19 pandemic, when Otago Polytechnic, Aotearoa New Zealand, took an innovative approach to learning and assessment, developing micro-credentialing, with mixed success.

This research, which was approved by the Otago Polytechnic Research Ethics Committee in 2021, is presented through the lenses of *kaiako*, the educator, and is intended to provide consideration of the needs of *ākongā*, the learner. The voices in a narrative can wake us up to new possibilities (Connelly & Clandinin, 1994), and it is hoped that *ākongā* and *kaiako* can benefit from the voices in this narrative.

## RATIONALE

When I first encountered micro-credentials (MCs) at Otago Polytechnic (OP) in 2018, there was much excitement at their potential. I heard from various colleagues and stakeholders that they were the next big thing in education, the new learning design model for traditional qualifications, ahead of their time, and a disruptor to the status quo. However, two years later, as the world was entering a global pandemic, the narrative in 2020 had changed: MCs were now the biggest innovation in education that never was, they had failed to gain traction, learners or employers were not yet convinced, we had not figured out how to use them, and we needed to work out how to give them traction. The two years that passed between those statements of optimism and resignation had seen *EduBits*, which was the Otago Polytechnic branding for micro-credentials, fail to become the success that was hoped of them. I was tasked with researching *why* MCs had not gained the traction we had hoped for at OP, and *what* was needed to give them that much needed traction.

When I started this project there were many concepts we were unclear on: we did not know how to use micro-credentials, we did not agree on whether they were stackable as larger units of study/achievement, we did not even know what they were: we disagreed on definitions of MCs. I recall we even lacked terms to describe these 'things' and those other 'bits and pieces' that 'make them up' and 'quality assure' 'them.' UNESCO cited this frustration in its micro-credentials definition launch, commenting that we are "bound by our own language" (Oliver & UNESCO, 2022); and bound we were.

Let us start by dealing with the most rudimentary of these issues: what are micro-credentials?

## DEFINITIONS

The New Zealand Qualifications Authority (NZQA) defines micro-credentials as “a sub-set of training schemes that certify achievement of a coherent set of skills and knowledge and that have evidence of need by industry, employers, iwi and/or the community” (NZQA, 2020). The key words here, for me, are *sub-set*, *certify achievement*, *coherent skills and knowledge*, and *evidence of need*. A *training scheme* is the learning that goes into achieving a micro-credential in Aotearoa New Zealand. The European Commission has quite an extensive definition of micro-credentials:

A micro-credential is a documented statement awarded by a trusted body to signify that a learner upon assessment has achieved learning outcomes of a small volume of learning against given standards and in compliance with agreed quality assurance principles. Micro-credentials express credit volume and they are referenced to the national qualification framework and the EQF [European Qualification Framework]. A micro-credential may be offered independent of the method of provision (face-to-face, online or blended learning) or the nature of learning (formal, non-formal, informal). Micro-credentials are owned by the learner and are sharable and portable in the format of a stand-alone certificate, a digital badge, or as part of a portfolio. (European Commission, 2020, cited in Beirne et al., 2020, p. 7)

This inclusive definition does not contradict the NZQA's words, indeed it adds to them with useful characteristics, such as trust, quality assurance, credit volume, national frameworks, multiple delivery options, agency and learner ownership.

At first there was confusion over what differentiated a micro-credential from a digital badge. Much of the literature refers to digital badges, badging, and micro-credentialing interchangeably (Mah et al., 2016), or in lieu of MCs altogether (Ellis et al., 2016; Willis et al., 2016; Lockley et al., 2016). One can attempt to distinguish between MCs and badges through the lens of assessment. It is common for writers to refer to badges when that is exactly what they are: something to display to others, where no assessment takes place, for example Grant (2016). It is common that these badges recognise participation in an event or activity (Glover, 2016), or develop trust networks (Everhart et al., 2016). Where the credentials are awarded as the result of the recognition of an assessed skill or ability, the term MC is invariably used. Examples of this are particularly common in the teacher-education space, where MCs are employed in the professional development arena (Berry et al., 2016).

Beirne et al. (2020), in a commissioned report, posit that there exists “The Credential Ecology,” which is MCs of the following nature:

- bundled (they can be stacked together),
- unbundled (standalone),
- credit-bearing (credits are awarded that can be used towards a larger qualification, when bundled/stacked),
- non-credit-bearing (or not)

and any combination thereof. They can also contribute to making education more holistic to learners (Elliott et al., 2014).

The term “bundled” can also be replaced with the term “stacked” or “stackable.” Other authors refer to the ability or the need to stack credentials; for example, Lockley et al. (2016); Gibson et al. (2016); Diamond and Gonzalez (2016), who term this “sequence progression” (p. 408); the European Commission (2020); MicroBOL (2020); Gallagher and Maxwell (2019) and Lewis and Lodge (2016). The NZQA later announced that MCs can be stacked in the NZ framework (NZQA, 2021). UNESCO (Oliver & UNESCO, 2022) in its definition launch has defined MCs as needing to:

- be human-centric
- promote equity (United National Sustainable Development Goal Four)
- promote digital transformation and bridge the digital divide (highlighting that reportedly 50 per cent of the world population has no access to the internet and 100 million people lack digital skills)
- have diversity in stakeholders
- form agreement on the scope and definition of MCs
- agree on how to quality assure them, recognise, regulate, and incentivise
- have the affordances of flexibility, portability, transferability and transparency with agreed learning outcomes/ achieved competencies; and, what will prove most prescient,
- “not limit it through over-regulation” in a “varied and challenging landscape.”

## RESEARCH METHODOLOGY AND METHODS

My overarching methodology in this inquiry is case study, and the method of data collection, data analyses, and data presentation is narrative inquiry. This is therefore a hybrid study, in which I uncover a case and attempt to uncover both good news and bad news stories about micro-credentials and their success or failure as educational and training vehicles in Aotearoa New Zealand. From these stories, I attempt to provide “narrative meaning” (Polkinghorne, 1988) to answer, if only in part, my initial research question, which is: what is needed to give micro-credentials the traction that was hoped of them?

I conducted semi-structured interviews with key stakeholders in an attempt to “mediate stories” (Kim, 2016, p. 151) into being. The participants, numbering seven, are (or were at the time) leaders, academics, and professionals at Otago Polytechnic who were at the heart of the MCs journey, selected for their expertise in MCs, higher and vocational education and training.

For data analyses, I used reflexive thematic analyses as a tool to code and theme my data set (University of Auckland, n.d.). Finally, I present my findings as stories and attempt to derive learnings from these so that, looking backwards, we may go forwards; much like a report with vignettes (Stake, 1995). I am reminded that the “complexity of some lived moments” is not conveyed with theories. “You don’t do that with a system of ideas. You do it with a story” (Coles, 1989, p. 18). Narrative inquiry will enable these stories that might, otherwise, have fallen between the cracks (Hanshaw, 2020, p. 97). Narrative inquiry will enable these stories to be told.

## EDUBITS

Otago Polytechnic started to develop micro-credentials in 2018. It called them EduBits, as they were bite-sized bits of learning (though they were not initially, as discussed further below). Leader A was one of the key thinkers behind EduBits. He explained that they were developed as part of his growing interest in an alternative to mainstream education, for a sector that was increasingly viewed as unresponsive. Its aim was to increase people’s engagement with learning and make education more accessible: “The answer just seemed sort of obvious to me. And so, basically, that led to me putting a little working group together at the Polytechnic, to come up with a concept of micro-credentials.”

The concept and the brand were formed. Leader A explained that one way to get into market was to ‘credentialise’ skill-sets that people already possessed:

That seemed like a good idea at the time, but it turned out not to be ... we started off by stocking the shelves ... with probably 40 or 50 micro-credentials that didn’t have any micro-learning behind them ... But there was very little interest for assessment-only micro-credentials.

Therefore, it would seem that learners, perhaps by their very definition, do not value a credential when there is no learning attached, thus the learning is at least as important as the earning. Manager A said that the assessment-only route was “a flawed model”:

I haven't seen one assessment go through without requiring further information ... the assessment only process is not functional. People need guidance ... it needs to be learning and earning, can't just be earning ... It's a model that can't work if you don't have support.

Manager A said that she thought ākongā, the learners, as well as needing support, did not see the value in an assessment-only micro-credential. The lack of interest by learners in assessment-only MCs, with no learning attached, supports this assertion.

## **BUILD IT AND THEY WILL COME (ER ... NO)**

At a conference in Beijing, China, Academic A and Academic B offered the five-credit Level 3 *Plan and Deliver an Effective Presentation EduBit* (with no learning) to an audience of teachers. There was a QR code and an access code for the teachers to complete the EduBit for free. The EduBit involved uploading evidence onto the EduBits platform, and demonstrating competence in presentation planning, design, and delivery, in the form of documents (for example, PowerPoint) and a video of the final presentation. Successful candidates would be awarded the EduBit and a digital badge to display on their email, LinkedIn, WeChat, and similar places. No one took advantage of this opportunity. Why? Evidently, they saw no value in it. Academic A commented that a micro-credential must be “useful.” Manager A said that it simply “lacked currency with employers.”

If you are an educator, kaiako, of some standing and probably some years, you are no doubt respected as a practitioner, as a communicator, and as a conveyor of ideas. Thus, a five-credit micro-credential attesting to your ability to plan and deliver a presentation contains no usefulness, no value, and little if any currency. The EduBits shelves were stocked with many of these products.

Leader A explained that when in a hole, one should stop digging, but they continued to develop the assessment-only MCs in blind faith that they would gain traction. They did not. A change in strategy was thus called for, and it was decided to include learning, not just assessment, and to specialise in building and recognising emergent knowledge and skills, in a just-in-time training model: new stuff just when it was needed. One EduBit was just such a beast.

A key MC at OP in the early stages, the electric vehicle maintenance EduBit was designed to plug a gap (excuse the pun). There was an increasing need to service electric vehicles (EVs) in the growing EV market in environment-conscious Aotearoa New Zealand. However, your average garage had no knowledge of servicing these EVs. Electric vehicle maintenance was therefore an emergent space and it ticked the just-in-time training model box. Electric vehicle maintenance was included in the bachelor degree programme in motor engineering at OP; however, if you wanted your EV serviced on Friday rather than in three years' time, there needed to be a more immediate solution.

A powerful solution was developed in the form of EV maintenance MCs, as Leader A explained:

I think I would still say that the most powerful uses around the emergent skill-set being on how you defined that powerful use, but from the point of view, that enabled exactly, exactly the requirements of the day, and to be captured.

Therefore, at last, the goose that laid the golden egg. Sadly, not:

We trained up staff. We sent them to Australia to get specific training in electric vehicle maintenance. Worked it all out and did some target launch ... we had it covered. Because the instructions to the staff were [that] there are no resources to be spared here. Get yourself sorted out. Get workshops nationwide. And nothing happened ... Why didn't that happen? Oh, we can't find anyone to replace them [staff]. Taught me another learning. If you've got to run a micro-credential business, set it up as a separate business. And indeed, that lesson led to that happening.

Therefore, EduBits was developed into a separate legal entity in order to give it the capacity it needed in terms of resources, particularly human resources.

## TIED UP IN KNOTS

The organisational and legal structure was thus created to give EduBits the breathing space and the traction it needed. However, the regulatory framework was not so simple. The New Zealand Qualifications Authority was yet to recognise MCs. It certainly did not believe they could or should be stacked into larger offerings at this time, though it has come round to acquiescence on this point over time.

Manager A explained:

We had the tension also of NZQA, not picking this up. And so ... you're unable to get that support or have them validated. So that has added to them not having the value that was anticipated. And also [the NZQA] originally stopping that idea of [their] being able to be stackable.

This limited their usefulness. "I think they [MCs] were probably ahead of their time," Manager A commented, a viewpoint echoed by a number of kaiako. Another issue was the NZQA insistence on regulating training schemes. Leader A explained the NZQA insisted on regulating the content, the learning that goes into a MC, as well as the assessment component. The regulator does not do this for other programmes, such as degrees, however, with MCs it was playing a heavy hand of regulating assessment and content. The regulatory processes involved were over-burdensome. Professional A explained:

I think it's massively holding it back. Because it's a huge amount of bureaucracy. The level of application, the level of detail you have to go into for a micro-credential application to NZQA is almost as much as you need for a full degree ... And the training schemes are the same ... So what I find frustrating is that they are the same amount of work, you have to put in for five credits as 120 credits, it doesn't make any sense. And also the fact that some of these micro-credentials are courses within existing degrees, that are useful by themselves, I mean ... they've already been approved ... there doesn't seem to be to me a lot of point in going through another application. Why can't you just credential something that already exists within the degree?

## INTERNAL KNOTS

Death by red tape was not confined to the regulatory landscape. Leader A said that Otago Polytechnic "over-cooked the process ... we made it all too complex, even the assessment-only was too complex." He provided the anecdote of MCs he had developed to run alongside a Commonwealth of Learning project to develop a leadership programme for developing nations:

And guess what? I started this exercise with what I want the graduate to look like. That was easy. Then I said, Okay, looking at this, I see four discrete parcels of learning. I write my micro-



credentials, one page each. And I've been using them to sit on the left-hand side of my desk as I work on the programme, and they integrate, and they build to the whole for the whole project. Works a treat.

Thus, quite simple in their creation, yet constructively aligning the graduate outcome, the assessment, and the learning. Leader A commented that at OP there were "seven or eight pages of instructions for someone to get a five credit micro-credential," whereas with his own MC, the instructions "even with the evidence ... two of them are three quarters of a page long [and another] one and a quarter pages. There's quite a lot of white space on the pages." Consultation requirements were also slowing the process. Professional A explained:

I think one of the main things is the level of consultation that you have to do for any kind of NZQA application. So you have to consult with industry, community, Iwi and learners and provide evidence that what you're doing is fulfilling a requirement. And that takes quite a long time. But not necessarily a lot of hours, it's just because people don't get back to you, they don't provide you with enough information or you have to wait for the volume to come in. And then you have to synthesise it all. And that's really what a large amount [of the work] is. If it exists within an existing course, and you've got learners from outside [already] going, they want to do this course. That really should be enough information. So, reducing the requirements of the consultation would probably be good stuff.

Perhaps it is naive to expect the regulator to do anything else but regulate. Leader B commented: "I think the problem is, it's counterintuitive, because they live for approving stuff and having it on the desk and mulling it over. And I mean, that's their job. One has to acknowledge them." Leader A reflected that "unfortunately, we just seem incapable of getting micro-learning products on the shelf. So having made the mistake of assessment-only Edubits, we just needed to get one thing. We just couldn't get product, good meaningful product." The overburdensome quality demands "killed it stone-dead" according to one leader.

## FINAL TWO NAILS

Fate hadn't finished with EduBits quite yet. There were two final nails in its coffin. "The restructure of the vocational education sector has put everything up in the air ... micro-credentialing is being lost," reported one professional working for Te Pūkenga. They went on to say, that COVID-19 was the "final nail in the coffin" for EduBits.

## POSITIVE AFFORDANCES

However, it was not all bad news: some MCs gained traction, and these contained learning as well as earning, had value, and were useful. Professional A commented that "the ones that have been successful are ones where the company doesn't offer the training themselves, but they want to upskill an entire population because of a strategic goal." Examples of this successful upskilling include a care home organisation that wanted to upskill staff in dementia care. Another was a MC in wound care. There was also a successful MC in speaking up about site health and safety for minority workers working on construction sites. These are undoubtedly useful, meaningful small chunks of learning and assessment. It would seem that upskilling and learning at some point in time is more important for employers and ākonga than the more beautiful but more limiting development and recognition of emergent skill-sets, just in time.

Leader A reflected that focusing on the emergent knowledge and skill-sets only was likely a mistake, and the EV EduBit blinded them on that. It was "a strategic limitation" and if there was a next time, he would focus on upskilling and integrating MCs into the polytechnic's programme offerings without NZQA accreditation.

## DISRUPTIVE AND PUTTING LEARNING IN THE HANDS OF THE LEARNER

One of the more powerful affordances of micro-credentials is that they empower the learner. Professional A explained:

It puts the learning in the hands of the learner ... They have much more control over what they're choosing to learn, as opposed to the institution – that's extremely disruptive ... if you're learning in the workplace, you do know what you need to learn, you know, you're an adult, you can identify your strengths and weaknesses, you know exactly what you need to learn to get where you're going. So, I think it could be pretty powerful. But, it could be very threatening to existing power structures within education.

Micro-credentials therefore afford great freedom to the ākonga, the learner, to choose their path.

## FEAR OF FAILURE

A number of respondents commented that possible failure was one of the major determiners of learners never enrolling on, or completing, a programme of study. On the effectiveness of micro-learning, Leader A said:

The fear of no success keeps a lot of people out. Failure to get success drives them out. And I think that there's no doubt in my mind at all of the ability to put together packages of learning that are smaller in scope, not necessarily in time.

Though time is a factor, he explained:

The other aspect is this, that, to the extent that micro-learning is taking place over a shorter chronological time, then one minimises the risk of life's events getting in the way. And, and often again, that's the case for our priority learners. They're either coming, not well prepared without experiencing success, or they're in the context, where the life is constantly being disrupted ... So, I think we have got a tool for success. And for success, which helps, because we're looking at stackable design. And people know, I do this. I can look in the mirror and see success. And then I do the next bit. And I can see success ... and that's why I think the next step is to be in a discerning way, go back and start to look at redesigning some of our programmes of learning. And particularly, where we're finding very high levels of priority groups' success or very low levels of priority group participation.

Therefore, micro-credentials are both the disruptor and afford opportunity by placing learning in smaller, bite-sized chunks, which are also more affordable, and enabling disadvantaged groups to succeed. The idea of re-designing the polytechnic offerings in this respect, and through this lens, is an exciting one and a challenge yet to be enacted.

## MEASURING MICRO-CREDENTIALS AGAINST AGREED DEFINITIONS AND AFFORDANCES

It will be helpful to see how a number of Otago Polytechnic micro-credentials stack up (again, excuse the pun) against some of the agreed measures of a MC. Some of the measures referred to earlier (for example that a MC is a documented statement, owned by the learner, with agreed learning outcomes) are not included in Figure 1. They are common to all in the list and are therefore not a valuable differentiator. The same could be said of the characteristic of stemming from a trusted body, however, it is good to remind ourselves of that key quality.

	Planning and Delivering an Effective Presentation	Electric Vehicle Maintenance	Caring for Those With Dementia	Wound Debridement	Speaking Up in the Workplace: Construction Site Health and Safety
Training Schemes/ Learning attached	X	✓	✓	✓	✓
Trusted body	✓	✓	✓	✓	✓
Evidence of need	X	✓	✓	✓	✓
Agreed Quality Assurance Principles	✓	✓	✓	✓	✓
Building and recognising emergent knowledge or skills	X	✓	X	X	X
Just-in-time training/ recognition	X	✓	X	X	X
Upskilling	X	✓	✓	✓	✓
Commissioned by client	X	X	✓	✓	✓
Useful	X	✓	✓	✓	✓
Gained traction (some learner completion)	X	X	✓	✓	✓

Figure 1. Otago Polytechnic Micro-credentials measured against agreed measures (Author generated).

Micro-credentials that gained traction all possessed the following characteristics:

- ✓ the training Scheme/Learning was attached to the MC,
- ✓ they were administered by a trusted body, with
- ✓ agreed Quality Assurance Principles,
- ✓ they involved upskilling in the workplace,
- ✓ they were commissioned by a client, and
- ✓ they were deemed useful.

The MCs that did not gain traction had one thing in common:

- ✗ they were not commissioned by a client.

Electric vehicle maintenance literally ticked every box, except that it was not commissioned by a client. Human resources at OP were not deployed to create a client base despite instructions to do so. Building and recognising emergent skill-sets and just-in-time training/recognition were not success factors in these cases. However, that does not suggest that these are not powerful affordances of MCs.

## CONCLUSION

At the start of this inquiry, there was no clear definition of micro-credentials (MCs), and no agreement on how they should be regulated, or whether they could be stacked into a larger credential. Now there is largely consensus on these matters.

In this study, we have followed the trajectory of micro-credentials at Otago Polytechnic. I was tasked with answering the questions: why MCs had not gained the traction that was hoped of them at OP, and what was needed to give them that much-needed traction.

### Why micro-credentials have not gained traction at Otago Polytechnic

The first error was developing assessment-only micro-credentials, as leaders and managers admit. Ākonga, learners, evidently saw no value in something that had no learning attached and assessed them in knowledge or skills that ākonga evidently already possessed. Despite this, OP continued to develop assessment-only MCs.

The Electric Vehicle (EV) Maintenance MC had much more promise: it was developing and recognising emergent skill sets in just-in-time mode. However, despite instruction from leadership, human resources were not deployed in promoting these MCs to the market.

The regulatory landscape greatly hindered the development of MCs, which took much longer to develop than anyone at OP had expected. The slowness of the regulator to agree to recognise MCs, or accept they could be stacked, further slowed matters. Many respondents said EduBits was ahead of its time. The internal quality control structures at OP further thwarted progress, which one leader described as “exquisitely complex.” The distraction that has been the formation of Te Pūkenga and the effects of COVID-19, have also had a deleterious effect on MCs at OP.

Positive affordances of MCs have been identified, such as their disruptive nature in putting ākonga at the heart of their learning and re-packaging learning into more manageable, more affordable chunks. One leader spoke of the power of integrating MCs into the polytechnic curriculum, and re-writing existing curricula into a series of stackable MCs.

Measuring a sample of MCs against agreed definitions/measures of them demonstrated that there was traction in the form of learner engagement when learning was attached to the MC; it involved upskilling in the workplace, they were commissioned by a client, and therefore deemed useful.

### What is needed to give them traction

The stories told in this narrative lead us to understand that in their future development in Aotearoa New Zealand, micro-credentials can be better leveraged if and when they contain value and are useful. This is when

- learning, as well as earning, is attached to the MC,
- the MC involves upskilling, and, ideally, is commissioned by a third party,
- resources are appropriately deployed and appropriate internal structures created to afford the timely development of MCs,
- there is a lighter touch to regulation, both within polytechnics and with the regulator; including,
  - reducing the amount of information and consultation required to register a MC, and
  - not requiring an existing qualification being micro-credentialed within an institution to undertake the same approvals and consultations, from scratch, as a new one,
  - not requiring the contents of a MC (the training scheme) to be regulated in the same way as the credential,
  - reducing the length and complexity of learner/assessor instructions in a MC, and
- existing programmes are re-packaged into a series of stackable MCs to afford participation, equity and access to all, not just “the lucky few” (Oliver & UNESCO, 2022).

Perhaps EduBits were ahead of their time. However, nothing is wasted. In the words of Leader B: "I don't think we should feel we've failed; I think we were the incubators, the ideated and the incubators. And we have succeeded because they're going national." How that future endeavour proceeds, will largely depend on how, or whether, we can learn from the lessons of the past.

## FUTURE RESEARCH IN MICRO-CREDENTIALING AND DISRUPTIVE INNOVATIONS

Further study into the power of micro-credentials in building and recognising emergent skill-sets and just-in-time training/recognition will be valuable, as will studies into integrating MCs into the mainstream curriculum and re-packaging the curriculum to make it more accessible to learners. Greater consideration should also be given to consultation with employers, as the employer voice seems pivotal to the future success of MCs.

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# IDENTIFYING MOTIVATIONAL FACTORS TO INCREASE THE SELECTION OF A CAREER IN THE ENGINEERING PROFESSION

Evan Madden, David Woodward and James Harrison

The following sections are the work of the first author. After the first author's content has concluded, there follow two reflective accounts from the second and third authors, the first author's mentors.

## INTRODUCTION

The shortage of skilled workers, specifically engineers, in New Zealand is well documented (Freeman-Greene, 2020) and further recognised by Immigration New Zealand, where an ongoing and persistent shortage of engineers and engineering technicians exists (Ministry of Business, Innovation and Employment, 2018). In addition to the graduates of the contemporary training programmes across New Zealand, further recruitment remains necessary to maintain industry survival and supplement the long-term skills shortage list (Immigration New Zealand, 2019).

The identification of the needs, influences, and motivators unique to engineering careers is a logical beginning to unlocking potential and increasing the capability of the workforce sustainably. Consequently, a comprehensive appreciation of these factors was undertaken on a Master of Professional Practice programme (Madden, 2022), with the key findings and discussion presented in this article.

Founded in social cognitive theory (Bandura, 1986), this research illustrates what specifically influences subsequent career decisions and considers what prior learning experiences may provoke that initial interest in engineering careers. Furthermore, it investigates the motivations essential for engineering to be considered as a desirable career choice and delves into the cause-and-effect relationship that supports the development of relatable learning experiences from the early cultivation of formative interests. These learning experiences are critical in career decision-making and emerge as the core category of the analysis (Madden, 2022).

## MOTIVATIONAL THEORIES

In this paradigm, researchers have utilised a variety of theoretical approaches and methodologies. Although these approaches have differed, there remain underlying aspects and concepts of applied psychological motivation theories founded in social cognitive theory. Further associated relevant theories to this research have included the theory of self-determination, goal content theory and social cognitive career theory (Bandura, 1986; Lent et al., 2002).

The principle of triadic reciprocity is central to social cognitive theory. This principle describes the continuous interplay that occurs between the three key variables of self-efficacy, outcome expectation and life goals. Developed from these formative principles of social cognitive theory (Bandura, 1986), the social cognitive career

theory model enables us to envisage the motivations behind the complex experiential decision-making processes that occur as young adults migrate from secondary school and into further tertiary education or directly into the workforce (Lent et al., 1999). Every case is unique, and each will have a similarly unique set of intrinsic and extrinsic motivations that can be observed as decisions and behaviours.

## EDUCATIONAL PHILOSOPHY

The orthodox approach of our contemporary education philosophy utilises epistemology and ontology to select and support our elite talent in further academic pursuits exclusively (Lum, 2009). The effect of this epistemological filtering confines those that have been less academically successful into vocational training. This delineation dramatically influences perspectives and the decision-making process required to select a learning pathway supporting a subsequent career choice.

A similar demarcation exists between the knowing 'how' and the knowing 'why' within New Zealand engineering careers. Knowing 'how' is the application of engineering practices and principles, and is within the domain of vocational training. This level of training has several progressive levels and associated qualifications. However, an academic pathway into professional engineering at university explains the application of engineering principles in alignment with knowing 'why', as illustrated in Figure 1.

**Model of Contemporary Engineering Career Progression**

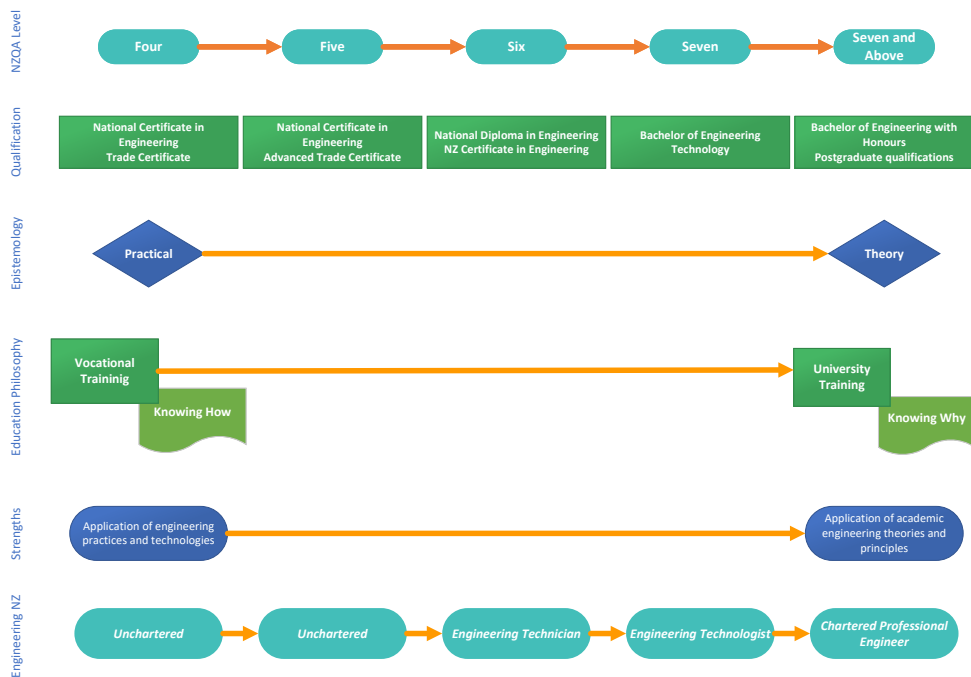


Figure 1. Model of contemporary engineering academic and vocational progression (Madden, 2022, p. 72).



The stereotypical view of the contemporary engineer is often imagined as a mathematician, a scientist, or a hybrid of both. Without surprise, this perspective is consistent with the educational pillars of the traditional learning journey preceding an engineering career. However, the prioritisation of these staple subjects has been slowly suffocating creativity, collaboration, and initiative; essential in meeting both student and social expectations (Goldberg et al., 2014).

The desire for corporates and public institutions to become more creative in thinking, behaviours and outcomes is becoming exponentially more urgent. We are more socially advanced and have more complex problems requiring more creative solutions (Robinson, 2011). Problem-solving remains at the heart of engineering careers and creativity is the deficient ingredient necessary to unleash the power of innovation in engineering.

Nevertheless, there are many capable young people across New Zealand suitable for education and subsequent employment in engineering vocations and other more advanced or complex career pathways. Individuals who can innovate, solve problems and have some self-efficacy in science, technology, engineering, and mathematics (STEM) fields are described as “capable” in an engineering career context (Reynolds et al., 2009). However, the attitudes toward the contemporary education philosophy remain, as does the workforce shortage of specialist and skilled employees.

## RESEARCH INVESTIGATION

The project was initiated to investigate why capable people reject an engineering career for alternative pathways, to identify the motivational levers unique to engineers and to understand how interest in engineering careers could be promoted to address the shortfall. The purpose of this research was to provide a recipe, enabling the accurate application of resources to cultivate interest and attract home-grown talent into the engineering profession. Specifically, the research question was: what are the motivational factors influencing the selection of engineering as a sustainable career pathway?

Motivation remains a key ingredient in effective team leadership and management (Jensen, 2018). The knowledge of what uniquely motivates engineers in their career journey will enhance the leadership of engineering teams and promote engineering as a desirable and sustainable career choice.

## METHODOLOGY

A process of elimination concluded that a grounded theory methodology was the most appropriate for this investigation. The purpose of a study using grounded theory is to explain the patterns and relationships that emerge from the collected data with bespoke substantive theories that provide insight and new knowledge of a process or action (Creswell & Poth, 2016). In alignment with the intent of this investigation, a constructivist grounded theory methodology (Charmaz, 2014) is both flexible and adaptable: it is less structured in data collection enabling the use of semi-structured interviews with open-ended questions to ask questions about the phenomena or process and the associated influences and circumstances (Willgens et al., 2016).

A total of 19 participants for the data sample were selected to achieve theoretical saturation (Birks, 2015). Participants were selected to provide a diverse representation of New Zealand society in age, gender, ethnicity, and geographic location.

## FINDINGS

### Primary theoretical categories

During the data analysis phase of the project, it became apparent that the data and consequent emergent themes were comparable to the contemporary view of the social cognitive career theory choice model as illustrated in Figure 2.

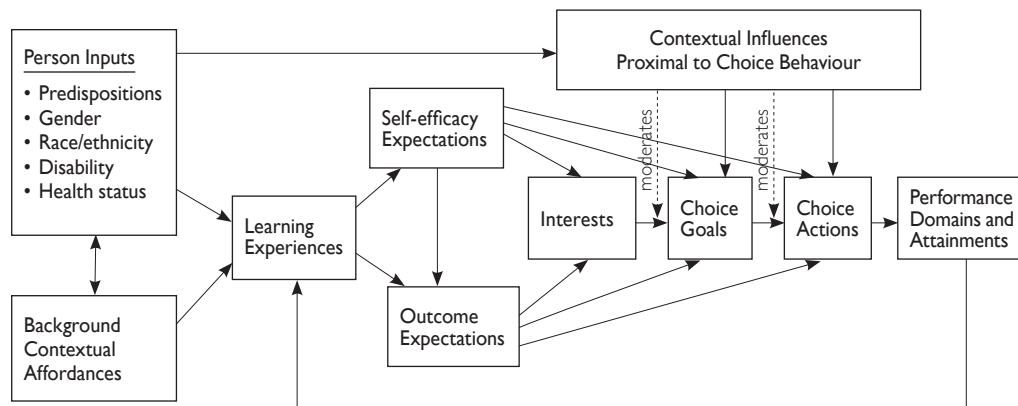


Figure 2. Model of person, contextual, and experiential factors affecting career-related choice behaviour (Lent et al., 2002, p. 269).

The individual components of this model are grouped into three areas of theoretical influence:

1. Cultural influences include background contextual affordances, person inputs, and proximal choice behaviour.
2. Cognitive influences include self-efficacy expectations and outcome expectations.
3. Contextual influences include interests, choice goals, choice actions and performance domains and attainments (Truyens, 2019).

Data analysis corroborated these three streams of influence, and they were consequently confirmed as primary categories.

### CULTURAL INFLUENCES

In the context of this investigation, a cultural influence is described as a condition or circumstance that the participant or individual has little or no control over. These considerations reflect their unique position in both life and society and influence their career journey. This includes gender, cultural beliefs, ethnicity, and parental influences.

The career selection and decision-making process of parents and immediate family members are closely monitored as a vicarious learning experience. Children observe closely to assimilate a detailed appreciation of the career choices made by parents. Correspondingly, an engineer is most likely to emerge from a family where a parent or immediate family member can demonstrate the benefits and pitfalls of either professional or vocational occupations.

Tertiary education offerings supporting comprehensive engineering career pathways are both inconsistent and limited throughout New Zealand. Although in some instances students prefer to travel away from their home locations to access study, the majority prefer to study locally. These geographic constraints complicate or restrict potential students' access to engage in their study preferences.

For Māori, the importance of whānau is deeply ingrained. This adds to the already complex demands of leaving home and distancing the connection to associated support networks. Consequently, it is reasonable to suggest that this factor specifically impedes involvement in engineering careers for this group.

Where a lack of comprehension regarding engineering careers exists in students, similar deficiencies will be present in associated support and guidance roles (Bowen et al., 2003). In the context of this investigation, career advice and research include learning acquired through self-motivated inquiry. Participants consistently indicated they received limited or no guidance on potential engineering career choices during their time in secondary school. Additionally, information is difficult to source and interpret independently and any guidance they did receive was generally considered to be of little value.

Sadly, a participant was able to recount a series of events in which sexism hindered her involvement and advancement in engineering careers at the trades level. Although sporadic at the trades level, female professional engineers did not perceive a strong gender-based stigma.

Attending a vocational training institute to pursue studies towards a trades-level engineering career, incurs the social stigma of failure to succeed. Consequently, a trades-level career is viewed as secondary and suitable for those who are incapable of learning anything else. This sentiment was overwhelmingly consistent across the data sample.

## COGNITIVE INFLUENCES

A cognitive influence is a learning experience that regulates responses and behaviours. The diversity, access, and value these learning experiences hold are unique to the individual. Moreover, cognitive experiences regulate outcomes including the decision-making process. Therefore, this investigation describes a cognitive influence as a learning experience that occurs either inside or outside of the educational sector that influences the characteristics of the individual.

An individual's outcomes from the contemporary secondary education system have an enduring impact on subsequent career choices and direction. An individual's reflection upon a failure to achieve academically limits their opportunities upon departure from secondary school and can become a lifelong barrier to further educational experiences.

Contemporary education offers the student much more flexibility and ownership in their learning. A student can direct their learning and studies towards a particular career through subject selections. These subject selections are crucial and can potentially limit access to an engineering career. These selections, in many instances, are made as early as Year 8, often devoid of any informed support.

Many of those who eventually follow an engineering career pathway have not been immediately successful academically. Conventionally, this is portrayed through poor outcomes from secondary school. However, these outcomes cannot be attributed to academic ability or potential for an engineering career in every instance. Some individuals simply lose interest in school, while others may have explored different subject areas without fully appreciating the long-term career implications. Furthermore, others may have encountered life challenges outside their education that have a significant impact. A multitude of distinctive learning and life factors can impede successful outcomes.

Although the traditional expectations to select a career pathway after secondary school have been debunked (Carpenter, 2010), for the majority an opportunity to pursue a professional engineering career pathway will occur once in a lifetime. A critical intersection in career decision-making exists before the accumulation of additional responsibilities such as financial obligations, family commitments and lifestyle costs. The importance of this stage cannot be understated.

At first glance, contemporary engineering education in New Zealand appears to be well structured, aligned, and progressive. However, the limited offerings and negligible integration between professional and vocational engineering education discourages advancement and endorses delineation at this point. The current suite of programmes is disjointed and restricts advancement for vocational students.

Prior exposure to STEM learning experiences and interests incorporating positive feedback building into a mastery experience promotes self-efficacy (Rittmayer & Beier, 2008). This concept is most relevant in professional undergraduate engineering pathways but has less significance for those seeking a vocational engineering career. In those instances where self-efficacy for some specific STEM components may be deficient, a confident learner with a strong sense of self-efficacy in general terms can overcome these challenges.

### **Contextual influences**

A contextual influence is an additional dimension reflecting a participant's beliefs and perspectives of the world we live in. In this investigation, the participants' aspirations and interests are explored in conjunction with individual motivations to appreciate fully their impact on the development of career goals and the enabling choices required for success.

Early interest and curiosity are the initial first step. Commonly, engineers have had relevant prior learning experiences and extracurricular interests or pursuits that relate to sciences. Examples of these include drone racing, internet of things, Minecraft, science fairs or working on the family car.

Those who select an engineering career seek a challenging role that enables them to utilise their specialist skills and knowledge in meaningful work. Continuous improvement in learning and development is essential for an engineer to remain at the forefront of their profession and ahead of rapidly advancing technologies. Additionally, continual learning and the opportunity to engage in a rewarding and enjoyable career are key intrinsic motivators and remain integral components of an engineering career.

Extrinsic motivation is an external factor that includes incentives, recognition, or penalties. A balance that includes both intrinsic and extrinsic motivation is the ideal approach. Consistently, across disciplines, engineering career pathways are perceived to be well remunerated. There is a further expectation that professional engineers should be additionally rewarded to recognise additional academic progression and responsibilities.

### **LEARNING EXPERIENCES**

The core category is the overarching theme or concept that emerges from the data and subsequent analysis. It is both obvious to the researcher and apparent within the data (Mills et al., 2006). The data analysis indicated 400 instances where learning experiences have been illustrated in initial substantive codes and subcategories. Learning experiences are the core category for this investigation and are clearly representative of the links and relationships between codes, subcategories, and categories.

Learning experiences and learning outcomes are causal factors of self-efficacy. The learning experiences presented in this research have fallen into three streams: individual, educational and workplace. It is exposure to relatable and associated learning experiences that provokes initial interest in engineering and is later drawn upon

in career decision-making. Social cognitive career theory illustrates how these prior learning experiences are evaluated to support future decisions and actions in the context of career decision-making (Lent & Brown, 2019).

## DEVELOPING A MODEL

The model shown in Figure 3 has been established to illustrate the cycle of continuous improvement that engineers seek throughout their careers. Learning experiences are cumulative and directly impact the cultural, cognitive, and contextual influences referenced for career decision-making. As time elapses and banked learning experiences increase, the consequent decision-making is further refined. The importance and influence of extrinsic and intrinsic motivators such as salary projections, employment in challenging roles, access to learning, and progression of professional knowledge are inconsistent and fluctuate throughout a career.

Career development and progression are further elements illustrated in Figure 3. The progressive career pathway available for engineers is incremental. An engineer's position on this pathway is reviewed in conjunction with its associated learning experiences and influences future career decisions.

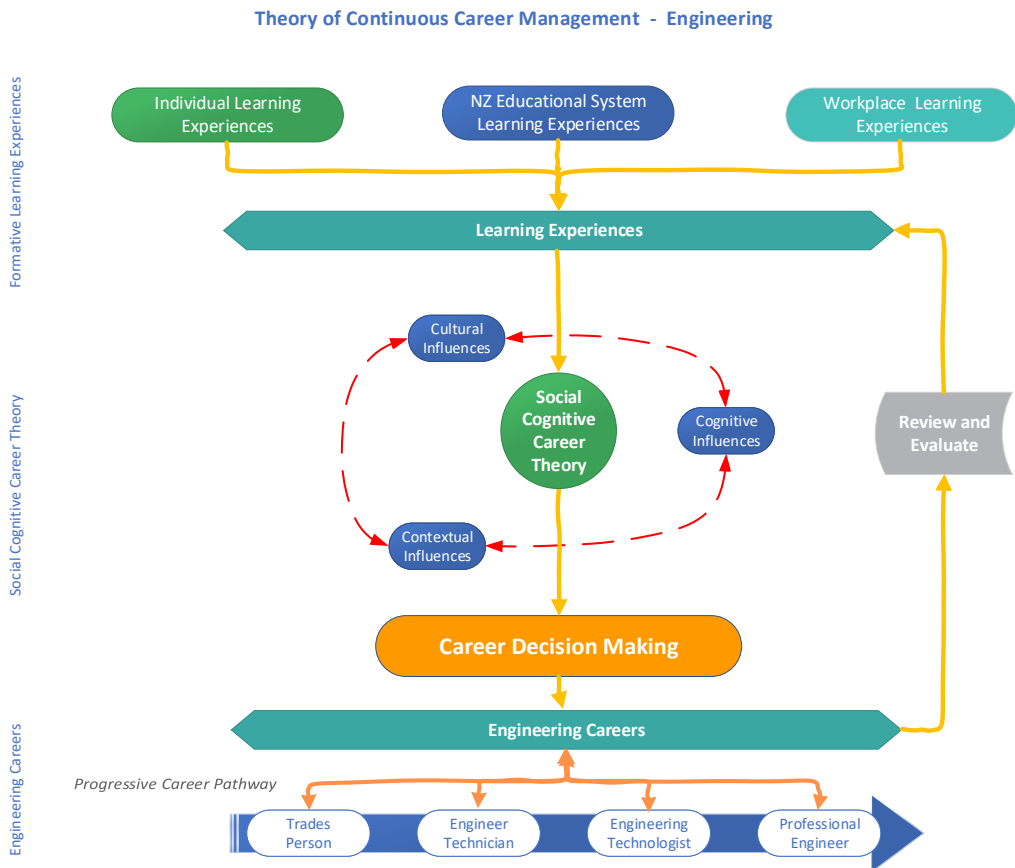


Figure 3. Theory of continuous career management – Engineering (Madden, 2022, p. 91).

## DISCUSSION

### Engineering career pathways

Although training for an engineering career can begin through a university professional engineering programme, for many those initial steps are taken through vocational engineering programmes. The existing model of contemporary engineering career progression (Figure 1) suggests that career advancement and growth is a linear process that is integrated and progressive. However, upon closer investigation, it is evident that this is merely an implication. Whilst the educational framework exists, the significant sacrifices necessary to progress through the recognised stages can be complicated and pose considerable challenges. Inconsistent offerings of programmes, and delivery modes that require of students full time on-campus attendance, further restrict engagement.

To increase engagement in tertiary engineering education, we need to review and improve the delivery modes at all levels. The orthodox preference for on-campus delivery of theoretical components remains; alternative delivery modes, including mixed and distance delivery, should be available for those who are more geographically isolated. The focus should be on what can be delivered remotely, rather than why it cannot.

The journey to commence a professional engineering career at university is precarious, and most people will have one opportunity to reach the start line. This highlights the importance of this intersection, where one must choose between an academic or a vocational path in engineering.

### A fully integrated engineering career pathway

The current suite of engineering programmes requires a comprehensive review that considers all potential career paths in the field. An integrated linear career pathway that provides various entry and exit points, which begins with practical knowledge and advances to theoretical understanding, is necessary. Progression is built upon prior knowledge, and easily accessible through multiple delivery methods. This approach encourages engineers to continue learning and evolving throughout their careers, with education serving as a key intrinsic motivator. By integrating these pathways, we can eliminate the divide between professional engineers and trades, thereby reducing any associated stigma.

## CONCLUSIONS

### Stigmas

Although a pervasive perception of engineers being male remains, the culture that has supported sexism within the engineering profession is changing for the better. Engineering New Zealand has committed to increasing its female membership by 20 per cent in alignment with its commitment to the Diversity Agenda initiative (Engineering New Zealand, 2020), setting a benchmark for the profession. However, in the absence of comprehensive professional bodies, the various associated trades remain divided, and some of the behaviour reported by members is unquestionably discriminatory. Much work is still needed in this area to attract and support women into engineering careers as equal and valued employees.

### Career decision self-efficacy

In comparison with alternative careers such as nursing, accountancy or teaching, the application and relevance of a professional engineering career is socially ambiguous. Furthermore, experienced engineers in New Zealand are underappreciated, and their problem-solving skills are often concealed from those outside the profession.

While tradespeople are more visible, the link between advanced engineering skills and their associated roles and occupations is generally invisible.

Access to the career advice that is needed to fill this gap in understanding is generally inadequate. In the absence of intervention to provide comprehensive informed guidance and direction, from organisations such as Engineering New Zealand with initiatives such as Young Engineers, the problem will persist. Provision of and engagement in relatable learning experiences remain key strategies to socialise engineering careers.

### **Aspirations and interests**

The analysis clearly illustrates the links between the development of interests relatable to engineering and consequent aspirations. Development of these interests during the formative stages is essential. At this stage, parents can also play a significant role in supporting and encouraging their children with technical experiments, construction projects, automotive repairs, and other learning experiences that will be referenced in future career decisions. They can do so by sharing their knowledge, investing in resources, and providing guidance to help their children develop the necessary skills and confidence.

If early interests are encouraged and associated learning experiences are nurtured, along with further support from STEM educators, a student's perspectives on engineering careers will be vastly more refined, which could potentially inspire aspirations in this field.

### **Ethnic minorities**

The momentum towards achieving a more diverse workforce has led to an increased focus on engaging and supporting individuals from a range of ethnic backgrounds. However, in this investigation, the sample size was not sufficient to collect definitive data on smaller ethnic groups. For those who identify as Māori, the preservation of their connection to their whānau and associated support network is a crucial factor in their decision-making process. For some, the desire to maintain this connection and remain close to their hau kāinga takes priority over any travel requirements for tertiary study.

## **RECOMMENDATIONS**

### **Subject selections**

Beginning in Year 8, it is recommended to engage students in a basic careers programme which presents a diverse range of potential occupations supporting these early selections. This should include opportunities such as career expos and outreach initiatives.

### **Promotion of engineering careers**

Contemporary engineering students aspire to develop their careers further as technology entrepreneurs, cool technologists, or social entrepreneur/activists (Goldberg et al., 2014). (A "cool technologist" has an interest in, and preference for, the most recent gadgets and technology trends (Madden, 2022)). However, without knowledge of its existence, access to the start line of an engineering career is nearly impossible. Targeted promotion and socialisation in these domains to the widest possible audience is both necessary and a logical first step. A logical potential leader and advocate in this area is Engineering New Zealand, the professional body for engineering in New Zealand.

## Further, promote outreach style programmes

In other regions, outreach programmes have effectively countered the declining enrolments in engineering courses. To achieve similar results, it is necessary to increase the number of current programmes, broaden their variety to reach a wider audience, and continually update the content to align with emerging interests and best practices (Bowen et al., 2003). Organisations like the New Zealand Cadet Forces are well-positioned to provide supplementary training in this field. Moreover, a review of the national curriculum should be conducted to incorporate practical activities that support the application of STEM concepts. This investment in the development of STEM-related learning experiences will promote engineering careers and increase the self-efficacy of individuals in making informed career decisions.

## AUTHOR 2 CONTRIBUTION

Engineering is not well promoted or understood by adolescent learners, and these learners need to be encouraged into STEM related activities at primary school, as this appears to be when learners formulate career decisions (Madden, 2022). Madden's research suggests a number of cultural, cognitive and contextual influences of adolescent learners; including modelling behaviour (Bandura, 1986) of parents and the mentoring behaviour (Daloz, 2012) provided by role models such as teachers and cultural leaders, together with practical engineering related activities undertaken at school, cadets, scouting or related learning environments, that may formulate engineering career decision-making. Madden's model for engineering career decision-making suggests an incremental progression towards an engineering career, rather than a 'one opportunity career decision.' This poses a significant issue for engineering career progression in the New Zealand context, illustrated in Figure 1, due to the huge chasm that exists between practical vocational learning (Levels 4 to 6) and theoretical university learning (Level 7 and above). The difficulty in a smooth transition for learners wanting to pathway from a diploma to a degree in engineering, is seen as a major barrier for engineering career advancement, especially for some learning groups, such as Māori, who are reluctant to move away from the support network of their local whānau. Providing a more nationally accessible, blended delivery learning environment for all learners wishing to transition from lower level to higher level engineering education, would seem a major priority for Engineering New Zealand.

## AUTHOR 3 CONTRIBUTION

Madden's (2022) findings provide some clear reasons as to why science and engineering career options are challenging for a number of demographic groups in New Zealand.

There are however two other significant issues which are outlined but need further research going forward:

1. Firstly, access to technological resources in primary and secondary education that span the increased range of engineering disciplines for young people to be able to use in current science and technology curricula.
2. Secondly, the artificial educational barrier that prevents easy progression between vocational and professional qualifications at any career stage. This persists between craft and technician roles that use practice-based development compared with professional roles that require extended academic preparation ahead of practice. This is well described by Lum (2009) and personal doctoral research which show how a generic problem-solving process can provide seamless progression between such work roles. This cyclical and iterative structure underpins many design, quality and agile project processes that define modern work practice (Harrison, 2019).



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# EXPLORING THE COMPLEX ISSUES OF NUTRIENT POLLUTION IN THE DAIRY FARM CONTEXT: A TRANSDISCIPLINARY JOURNEY

Louise Deane, Celine Kearney and Jan Hendrik Roodt

In this article, we illustrate how Nicolescu's (2010) axioms of transdisciplinarity underpinned a pragmatic study (Deane, 2023) conducted by one of the authors (Louise), into the issues of surplus nutrients from dairy farms and food waste and which worked towards a practical resolution to these issues. This article is based on Louise's thesis for the Master of Applied Innovation, and the ongoing projects grounded in recommendations from the thesis. Writing this article in the first person is a choice made by Louise to make the article accessible to stakeholders and those who contributed to the research. Celine and Henk were supervisors on the thesis and have added their commentary. Transdisciplinarity gave us access to knowledge and insights that we could not have gained from a single disciplinary approach.

Literature about the problems of nutrient pollution confirms that they are significant. Nutrient overshoot is a serious issue in New Zealand that needs to be addressed because surplus nutrients generated by dairy farming impose substantial environmental damage on land and waterways and emit greenhouse gases with consequent costs, many of which are not carried by the dairy industry. Economists refer to these costs as externalities. Foote et al. (2015) concluded that the environmental externalities associated with dairy farming may exceed the value of dairy export revenue and its contribution to gross domestic product (GDP), totalling NZ\$16.6 billion. The Ministry for Primary Industries (2023, p. 16) estimates the 2023 contribution of dairy farming to GDP to be \$25.12 billion. There are multiple perspectives on the causes and effects of this issue, as well as the extent to which environmental considerations should be factored into economic activities. The complexity deepens as we uncover the intricate interrelationships between soil types, soil microbes, plant variety, rainfall, and temperature. These factors collectively influence a farm's ability to utilise nutrients, adding to the challenge of resolving this complex, intransigent problem.

## METHODOLOGY

In our globalised, interconnected world, inquiry-based research is reaching across disciplines to bring together the voices of academics, professionals, knowledgeable individuals, and differing world views on pressing issues of lived experience. In this case, the one theoretical framework to achieve this is transdisciplinary research, or simply transdisciplinarity.

Transdisciplinary ontology suggests that there are multiple levels of realities that interact within, and are mediated by, what quantum physicist Nicolescu (2010) calls the Hidden Third (Morin, 2002, cited in McGregor, 2015). This is a place of potential within the consciousness of the researcher/observer where contradictory views and understandings can co-exist, thus enabling the construction of new understandings and insights. The invitation through transdisciplinary theory and methods to engage through the Hidden Third holds opportunities for addressing pressing issues through facilitating new consciousness in the researcher which allows new ways

of thinking and being in the world (Rigolot, 2020). Drawing on epistemologies of complexity, integrative transdisciplinarity offers opportunities to “integrate different world views, knowledge sets and mindsets, drawing on creative cognition” (Montuori & Donnelly, 2016, p. 756).

We chose a transdisciplinary research strategy because of the complexity of this problem and the belief that the holistic approach that transdisciplinary research offers would be far more likely to address the root of the problem than a siloed, disciplinary approach alone; a view which is supported by Montuori (2013) and Shrivastava et al. (2022). Nicolescu “believed that transdisciplinarity is about the interaction between humans and the sciences (Subject and Object)” (McGregor, 2015b) and allows for multiple perspectives, at different levels, to be considered, on both the problem and potential solutions (Nicolescu, 2010). Consequently, I sought knowledge from a wide range of stakeholders and experts including dairy farmers, the Thames Food Waste Resource group, AgResearch, black soldier fly larvae farmers, scientists, worm farmers, iwi, and experts in systems dynamics and modelling, considering Rieple and Snijders’ (2018) suggestion that using an approach that respects the different realities of stakeholders is necessary to get buy in.

We chose Pragmatic Action Research (PAR) as a methodology because it enables the use of multiple and mixed methods in the research (Feilzer, 2010), encompassing both qualitative and quantitative data collection, to validate and/or help interpret it (Leavy, 2016; Roulston, 2010). Reflection and reflexivity are key processes for PAR as they are in transdisciplinary research (Greenwood, 2007; Lawrence et al., 2022). A pragmatic methodology allowed for changes to be made to the methods in response to insight or as negotiated by stakeholders with their diverse agendas. Significant insights came from informal conversations and from using methods that were not in the original plan but seemed intuitively appropriate.

## THE RESEARCH JOURNEY

The research path was a zigzag one, taking full advantage of the flexibility of PAR and transdisciplinary research by following leads and adapting to the limitations encountered. My objectives of reducing nutrient pollution, conserving resources, and mitigating greenhouse gas emissions led me to focus on dairy manure (DM). I needed to identify an innovation with low enough risk to be acceptable to dairy farmers. This led me to explore the potential of using black soldier fly larvae (BSFL) as a means of co-processing DM with food waste. Positioned outside of the usual farming organisations, I chose an enterprise approach and spent time learning about the BSFL, business models and research methods for the Postgraduate Certificate of Innovation. I started the Master of Applied Innovation thesis with the following research question: How might we work with dairy farmers to manage the impacts of surplus nutrients on the environment in such a way as to benefit the dairy farmers and the environment?

A comprehensive, wide ranging literature review, which I revisited throughout the research as part of a reflexive process, had two primary data strands which were essential for my investigation. The first strand was about issues of surplus nutrients for the dairy farmer and the environment. It revealed an industry that is unsustainable in its current form, both financially (Howard, 2022) and environmentally, and one which contributes to New Zealand overshooting its biophysical boundaries. The second strand was around the proposed solution and how to make it work in the New Zealand dairy farm context. I evaluated how BSFL processing of waste would compare to other ways cow manure and food waste could be processed. I considered greenhouse gas (GHG) emissions and other environmental benefits and costs and evaluated income potential and the technology that would be required.

Black soldier fly farming clearly had potential benefits for the environment and the dairy farmer, and additional environmental benefits for other animal farming industries as part of a circular economy. Global demand for insect-based products is accelerating (de Jong, 2021) and making inroads with the BSFL approach might be beneficial in future for the business.

After a low-risk human ethics application was approved (No. WTLR40010921), the next step was pilot interviews. I wanted to explore current solutions to understand how they fitted into the farm context and why they currently did not seem to be solving the problem, despite significant legislative change and farmers' investments of time and money into waste systems. A conversation with the farmer at the first of my two pilot interviews, about how they pay the high costs for their waste systems, totalling over a million dollars, by putting more cows on the farm, yielded the insight that the system could not work, because the waste systems collect only a small proportion of the DM and urine. A serendipitously timed workshop (J. Connolly, personal communication, 2022) directed me to Systems Dynamics, a precursor to transdisciplinarity, to consider what leverage points could be adjusted to help resolve these issues. Further insights came from studying Peter Senge's (1990) system archetypes, a "set of system structures that produce common behavioural patterns across many different fields" (Systems & Us, n.d.).

An online survey, with 10 respondents, gathered quantitative data to support the finding of the price point of an innovation, and to get an idea of the capacity needed to manage the volumes of waste. It also yielded qualitative data, including how farmers felt about their waste systems. Their reported satisfaction with their systems seemed to me at odds with their stated reasons, that they were compliant with legislation. I thought they might have been experiencing similar feelings to those I had had when getting eco buildings signed off as compliant. Before the buildings were signed off, I felt angry and frustrated at the prescriptiveness of the rules and because some were not serving any purpose in my context but were adding significant expense and complication. After the buildings were signed off, I felt relief. I decided to investigate this further with follow-up interviews.

For the two follow-up interviews, both farmers wanted to meet on their farms to ensure I would represent them fairly. I found out that they love their lifestyle, particularly independence, working together with their families and working with machines. They were mostly satisfied with their waste systems at the functional level, particularly with using the wastewater for irrigating pasture and feed crops. Nonetheless, at the big picture level, they felt the costs imposed by the legislation around nutrients, and the stress of compliance, were threatening their lifestyles. Both confirmed that they recover these costs from the sale of milk solids, hence the need for more cows, which is surely counter to the intention of the legislation. They were vocal about lack of government understanding of the farm context and inflexible regulations, "unfit for purpose" and changing too often. One farmer stated, "they (the government) want to replace all cows with trees."

Thematic analysis assisted me to explore the data from the follow-up interviews, to synthesise data from the pilot interviews, questionnaires, and informal conversations with dairy farmers and triangulate my insights with evidence. Braun and Clarke's (2022) suggested process of creating codes enabled me to cluster the data around the relevant code labels, with some data items being clustered in multiple codes, then to re-examine the data to find shared meanings, which were then refined into themes, used to formulate insights and to consider implications.

While exploring the issue I also worked on the proposed solution. In this aspect, the principles of classical science would be beneficial. However, without easy access to laboratory facilities, and initially unable to find a science student to accompany me on the project, I built a semi-controlled environment in a greenhouse, with a breeding cage, setting up my own black soldier fly colony so that I could conduct some basic experiments at home to gather quantitative data that would help answer questions such as:

1. How long does it take BSFL to reach the pre-pupae stage (indicated by self-harvesting from the feed substrate) when fed on different feeds?
2. What is the increase in BSFL biomass over the feeding period from eggs to pre-pupae on different feeds?

Data from the experiments would be compared to results from other studies that investigated similar feed substrates, to determine what environmental conditions would need to be maintained in any BSFL-based adaptation to the dairy farm waste system.

There were several barriers to scientific study, including breeding the black soldier flies. Firstly, I needed to buy black soldier fly eggs to start experiments with batches of larvae of the same age, but these were unavailable in New Zealand. So, I bought mixed-aged larvae, grew them until they were pre-pupae, and bred the flies that emerged from the pupae. This took most of the growing season and since I could only collect three clusters of eggs, there were insufficient larvae to conduct more detailed experiments and test a prototype with farmers.

Secondly, the combination of COVID lockdowns which reduced my access to farmers, and problems with establishing a Black Soldier Fly (BSF) colony meant I needed another way to test the potential of BSFL farming. Henk Roodt proposed system dynamics simulation modelling to explore the proposed alternative. With support from Henk and an AnyLogic computer modelling software expert (C. Dempers, personal communication, 2021), I programmed a computer simulation model of the systems dynamics of the proposed BSFL biodigester on a dairy farm, analysing how the results changed as multiple parameters were adjusted. Through entering parameters from existing scientific studies, combined with the dairy farm information from my survey and literature review, I simulated experiments faster than in real time, and will continue to update the model as I gain more accurate information. This model could be used to inform future development of the technology and processes, and to demonstrate the idea to farmers and other stakeholders.

The potential to sell BSFL for animal feed adds an extra layer of complexity as this requires legislation, which is currently not in place in New Zealand (Bruce Mason, personal communication, 2021) and extra management to ensure the safety of the animal feed produced. Selling the BSFL would also provide additional income.

## OUTCOMES

The research processes discussed so far resulted in key insights into the issue of surplus nutrients from dairy farms, and whether and how my proposed black soldier fly larva-based biodigester could be part of a larger movement to “a conservation and rehabilitation approach” to dairy farming (Wikipedia, 2023); in other words, regenerative agriculture.

Senge (1990) states that “today’s problems come from yesterday’s solutions” (p. 57). The causal loop diagram in Figure 1, drawn as part of a systems analysis of the above pilot interview, illustrates how stricter legislation, a government intervention in response to increasing nutrient pollution from dairy farming, inadvertently causes the nutrient pollution to increase. This is because increasing the herd size has implications beyond the waste systems as they often only capture a small percentage of the waste: 18 percent (Rollo et al., 2017). The increase in dairy cow numbers from 3.4 million in 1990 to 6.3 million in 2019 (StatsNZ, 2021), along with a six-fold increase in fertiliser use in the last 25 years (Pinxterhuis, 2019) and increases in the use of supplementary feed, add validity to the analysis in Figure 1.

My investigation into whether this situation fitted any of Senge’s (1990) system archetypes, found that the “Limits to growth” archetype was in play, demonstrated by the environmental degradation and consequent reduction in financial viability currently impacting dairy farming (Howard, 2022). The “Shifting the burden” archetype offered deeper insights into what is driving the unintended consequence of increased nutrient pollution (see Figure 2).

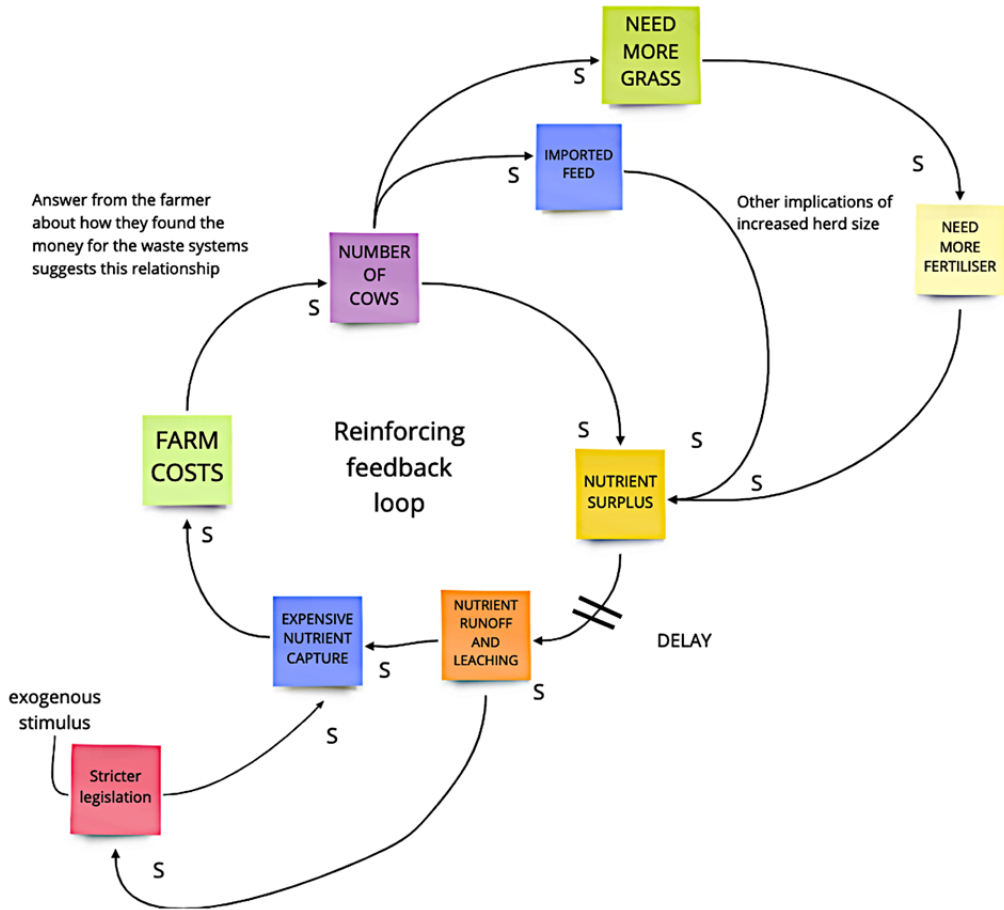


Figure 1. Causal loop diagram to show relationship between higher costs and herd size. The S next to the arrowheads indicates a 'same' relationship; in other words, that the impacted factor moves in the same direction as the causal factor.

Diagram by the first author.

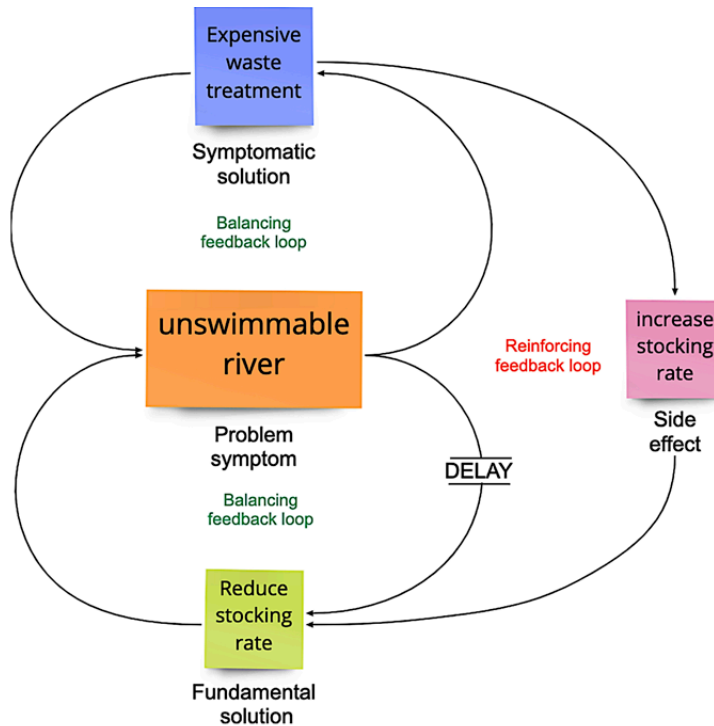


Figure 2. “Shifting the burden” story for the situation in Figure 2. Diagram adapted from the archetype of Senge (1990, p. 112).

The expensive waste capture and treatment systems are one area of the symptomatic solutions that were instigated with the aim of reducing nutrient and pathogen pollution of rivers. The diagram shows how a side effect of the solution, that of increasing the number of cows to provide more income to pay for the waste system, defeats the fundamental solution that would solve the problem.

Another feature which Senge (1990) explains about this archetype, which is at play in the situation of unswimmable rivers caused by nutrient pollution, is that of “eroding goals” (p. 108), which happens when solutions do not work. This is illustrated through the 2017 National government’s attempt to change the water quality standard of “swimmability” for bodies of freshwater from 260 E. coli to 540 E. coli per 100 mls water (Ministry for the Environment, 2017). In 2017, this became an election issue with significant push back (Baisden, 2019). The “Shifting the burden” system archetype can also result in “unintended shifts in strategic direction.” An example of this, which came up later in my conversation with the farmer, was the observation that the gradual push in New Zealand dairy farming from pasture-based dairy farming to a more industrial, off-pasture system, with more time spent on feed pads or in herd homes as a way of reducing the nutrient load on paddocks, was contrary to the key marketing message about New Zealand dairy products being pasture-based and natural. From my youth in the United Kingdom, I remember the 1989 Anchor butter advert jingle, “We are lucky cows, we chew the cud and browse. / 'Cause we’re eating up our greens, it makes our butter taste supreme” (Animal Ad Stars, 2013). If we keep heading towards a more intensive dairy farming model, our point of difference could be lost.



The implication of this system analysis for a possible solution is that cost is likely a leverage point. Through either reducing the cost of the waste system, or gaining an income from it, farmers might be able to reduce stocking rates, thereby reducing the nutrient surplus which can leach from the paddock. Another potential leverage point is increasing the capacity of the system to use more nutrients. This would involve increasing the complexity of the system. Natural ecosystems are generally much more complex than human-made systems which tend towards being monocultures. In a complex ecosystem such as a rainforest, excess nutrients provide niches for other living things. Regenerative farming techniques may also be part of this more fundamental solution to the problem, as they tend to increase the capacity of the farm to use excess nutrients by increasing soil life and varying pasture species or introducing more trees. Increased natural processes, for example processing of manures by insects, also help make natural nutrients more available to plants thereby reducing the need for synthetic fertilisers. A BSFL-based waste system would work on both leverage points.

Thematic analysis gave me insights into farmers' feelings about their lifestyle and the threats they perceive to it. Some of the themes were interesting, although less relevant to my particular purpose with my ongoing project, or provided insights about areas that I have little control over, such as legislation and government. Nevertheless, when synthesised with other information, or considering parallel situations, they have offered some insights.

The thematic analysis showed that farmers are open to a circular economy and have been open to new ideas, yet they are overwhelmed with the perceived constant changes to legislation, which they feel is unfair. They have spent a lot of time and effort on their waste systems and feel that their efforts to reduce nutrient pollution are not recognised and that the government wants to get rid of all dairy farms. They pay for their waste systems using income from milk solids. They do not like being told what to do by people who they consider do not understand their context. The implication of these insights are: the proposed BSFL system needs to reduce costs and/or generate income, which needs to be used to reduce the number of cows whilst retaining the lifestyle farmers love; the importance of establishing a trusting relationship with the farmers and including them in designing the enterprise and the biodigester; the need to work with the government to get appropriate legislation in place for insect farming; and the need to create a positive narrative about BSFL farming.

The computer simulation model of a BSFL-based bioreactor on a dairy farm suggests that it could provide income for the dairy farmer from the sale of BSFL and frass (insect manure and cast-off exoskeletons), while reducing the mass and volume of the dairy manure, preserving many of the nutrients that would otherwise be lost as GHGs, or potentially leached onto land or water (see Figures 3 to 5 below). I will continue to update the model; initially by adding a chart of nutrient capture and GHG reduction based on data from new research. The model provided part of the evidence for the potential of scenario 1 (see conclusion).

Although my efforts to grow a colony were only partially successful, the process illuminated some of the barriers to establishing BSFL farming in a field-based setting in New Zealand. These include the need for a controlled environment for black soldier flies and larvae to breed and grow in colder locations and seasons; protection from pests such as rats and ants and the need to pre-process the feed substrate. All these have implications for the next steps.

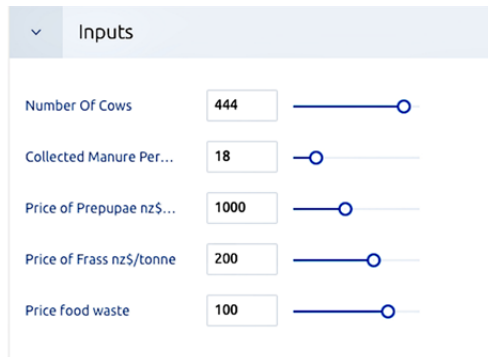


Figure 3. Inputs into the AnyLogic model yearlong simulation of the BSFL based waste system. The inputs were set on the experiment to reflect realistic figures. The number of cows and the collected manure percentage are the average for dairy farms in 2021. The price of pre-pupae reflects the price for fishmeal and the price of food waste is an estimate of what people pay to dispose of food waste. Extract from my model BSFL Unit 2, Version 13, Experiment 2.

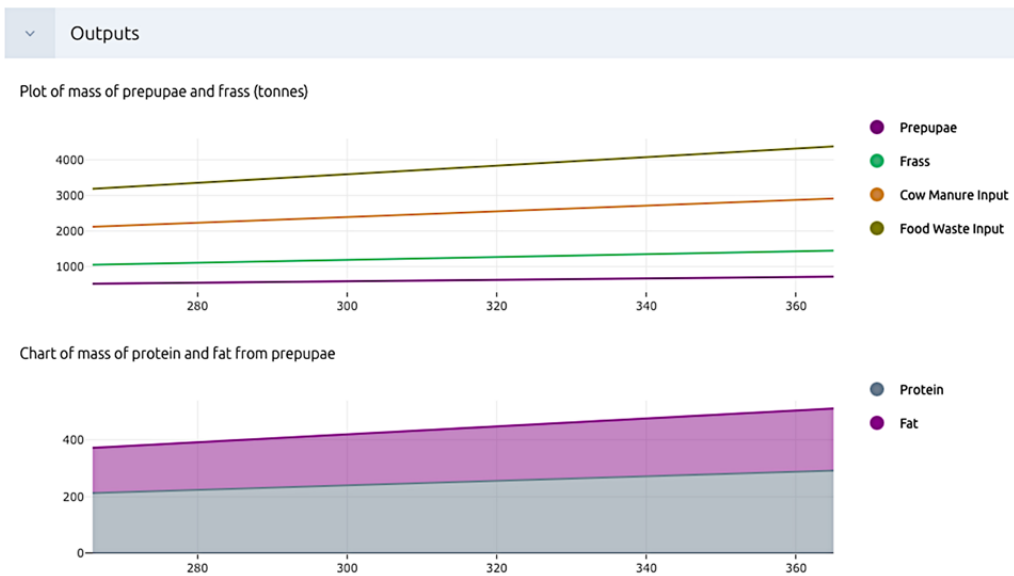


Figure 4. Mass of inputs and outputs from the BSFL waste system in the above simulation. The unit on the y axis is tonnes.

Cow manure and food waste input masses are shown to illustrate how much the volume of these waste streams can be reduced by BSFL processing. Protein and fat are shown as BSF pre-pupae are often processed into these components for sale as ingredients. Extract from my model BSFL Unit 2, Version 13, Experiment 2.

Chart of money from sale of prepupae, Frass and for taking food waste (NZ\$)

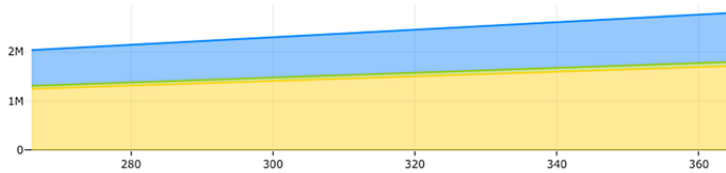


Figure 5. Projected income from taking food waste, and sale of prepupae and frass in the above simulation. Yellow = income from sale of prepupae, green = income from sale of frass and blue = income from taking food waste as a service to councils or other food waste generating industries. Extract from my model BSFL Unit 2, Version 13, Experiment 2.

## CONCLUSION AND WAY FORWARD

The issue of surplus nutrients from dairy farming is a significant and highly complex problem with many contradictory viewpoints. BSFL based dairy farm waste systems could be one of several ways of making dairy farming more environmentally regenerative and economically viable. They would diversify farm income streams, use more of the nutrients in dairy manure, and replace chemical fertilisers with frass, which soaks up surplus nutrients and improves the soil in the long term. Significantly, the main environmental benefits would only eventuate if the number of dairy cows were reduced. There could be environmental benefits in other industries by making more of the surplus nutrients from food waste, while getting it out of the waste stream. Benefits potentially include providing an alternative protein and fat source for animal-feed to replace environmentally damaging fishmeal and soy, providing a source of biodiesel, and making frass available as a soil conditioner.

The regulatory environment is not yet in place for BSFL farming on manures and post-consumer food waste, and the technology is not yet consistent enough to reliably grow BSFL in New Zealand, although it is getting very close. At this stage, it may be more effective to bring in the technology from companies that are further ahead in trialling, and to start BSFL farming on easier waste streams such as pre-consumer food waste.

Since the completion of the thesis, I have been working to develop a collaborative group to further BSFL/ invertebrate farming in New Zealand. We now have scientists, entrepreneurs and potential customers on board and are looking at regulation. I am also working with a local resource recovery social enterprise to get a BSFL-based food waste biogas trial started, using imported technology. My BSFL-based dairy farm waste system may happen in the future when the regulations and technology are in place.

Although not directly relevant to my proposed solution, I also aim to communicate my analysis to appropriate people, particularly government and dairy farming organisations, about how current expensive waste systems and regulations are having the unintended consequences of increasing the number of dairy cows and that they are also affecting the relationship between farmers and the government.

## LOUISE'S REFLECTION ON THE LEARNING JOURNEY

Through my research, I explored diverse methods, gaining skills from various academic disciplines and learning from both academic and non-academic participants. Embracing a transdisciplinary approach which emphasised the importance of respecting and listening to all participants, exposed me to valuable knowledge beyond my limited perspective.

This approach aligned well with my dyslexic, big-picture thinking style. I tend to absorb knowledge through insights rather than relying solely on explicit sources, and this approach catered to my intuitive way of learning. While intuition and insights may not conform to the traditional academic norm of falsifiability rooted in classical science, my personal experience suggests they still contribute legitimate knowledge. They may not adhere to universal laws or be easily replicated, but their non-provability and the complex amalgamation of multiple sources in the subconscious mind should not discount their legitimacy. In my experience, insights often provide crucial missing pieces that explain why things do not work as expected. This resonates with Nicolescu's concept of the Hidden Third, where insights offer glimpses into knowledge that remains inaccessible from our own perspective. I have gained confidence in the validity of my insights, which have guided me towards solutions in Nicolescu's (2010) "included middle," a place where different and contradictory realities can exist at the same time. I think I would have had a lesser understanding of the problem had I stayed with one or two methods and would argue that transdisciplinarity has a place in bridging the gap between science/academia and lived world practice.

### **CELINE'S REFLECTION ON THE LEARNING JOURNEY**

Working in a transdisciplinary team with scientists it was my role, as an applied linguist, to assist Louise to tell the narrative of the research in all its twists and turns, and also, to encourage her to write herself into the narrative, with a critical and analytical lens. For inquiry-based research addressing complex issues, which in this case entailed high financial stakes for individual farming businesses, a transdisciplinary research framework offers researchers and mentors the opportunity to engage multiple methods to explore the issues and work towards a proposed solution. It invites the humane values of searching out and listening to people across a wide spectrum of experiences and beliefs, disciplines, and worldviews, encompassing a range of perspectives, including that of the natural world, to inform a response. The requirement to seek out respectfully, to try to take account of differing views and lived experiences, and to be aware that there is still more to understand, as acknowledged in Nicolescu's Hidden Third or included middle, requires the researcher to be open to stepping beyond the initial framing and parameters of the inquiry. This response requires an understanding of the connectedness of multiple factors and allows the potential for creative and often unexpected solutions.

In responding to the challenges and unexpected outcomes researchers and mentors can encounter in the process of inquiry, transdisciplinary research can accommodate the personal strengths of the researchers, such as a dyslexic thinking-style, as in this research project. Bringing together mentors from across disciplines can provide its own challenges given that disciplinary understandings and mindsets are extended in the process of the inquiry.

### **HENK'S REFLECTION ON THE LEARNING JOURNEY**

As the journey unfolded and the global COVID-19 pandemic disrupted our lives, the research project was threatened significantly. Limited or no access to laboratories, and no physical access to fellow research participants and collaborators, forced Louise and the facilitators as a team to consider innovative ways to continue the work. Modern computing technology, mixed with ingenuity driven by 'making do with what we have where we are,' opened other opportunities: the BSF plant, built on Louise's own property, the use and adaptation of simulation models to progress concepts, and long sessions in video calls discussing options became the new normal.

We embraced modelling to explore ideas to make best use of time talking to other actors and stakeholders. As Celine points out, we were forced to dig deep to understand people's motivations. It meant that we were ready to review and validate concepts when limited regional travel became possible. Perhaps because of the significant social distancing during lockdowns, people were keen to have discussions in person. It allowed for longer and more engaging meetings that highlighted deeper emotional drivers of the dilemma that this research addressed.

Above all, the entrepreneurial spirit and willingness to be agile in adversity delivered an ongoing enterprise that operates quite comfortably in an increasingly brittle and uncertain world. When we started to focus on the dilemma we faced, we realised that our different world views could be used quite productively to synthesise a new reality. Similarly, in this new reality farmers, environmental activists, researchers and the community are all heard and can see a way to achieve outcomes for the common good.

Environmental educator, eco-builder and social entrepreneur, **Louise Deane** has been a long time community and environmental volunteer in practical projects and on various boards of trustees. Her current work is in establishing a collaborative group for scientists, entrepreneurs and potential customers, to progress insect farming in Aotearoa, and in working with a local social enterprise to trial using black soldier fly larvae to process food waste.

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## THIS LEARNER’S IDENTITY – LOST, FOUND, OR SIMPLY CONFUSED? IN SEARCH OF A DEFINITIVE IDENTITY

Rob Nelson

### TEAM OF ONE

I can change, pivot, spin, realign, adjust, re-focus—do them all;  
the words matter less than the thinking and actions connecting them.  
My theoretical learning has taught these lessons; real life reinforced them—  
as worker, manager, and leader, in offices and in factories,  
as facilitator of learning experiences on campus and trainer for corporates.  
Does this make me some sort of genuine hotshot Super Person?  
A knower of all that is fabulous and empowering for others?  
Or am I simply reacting to circumstances as best I can?  
I work and learn at distance, in a world of aloneness  
connected to the world by Zooms and Teams and various other media.  
Is the real me the one on somebody’s screen?  
The one who’s super nice and bites his tongue?  
Or is he the hidden one afraid to really let it out,  
my identity not the same as if I was really there?  
Am I nicer online than I would be in person?  
Because I wear multiple hats my identity fits the circumstantial needs,  
the mindset adjustments collective; the challenges at the same time individual.  
Institutions are challenged to rethink if they serve systems or people.  
Does form still guide function, or has function triumphed at last?  
When can I stop endlessly searching for a comfortable single identity  
and accept I am simply making contingency planning “book theory” real?  
Must I constantly invent the new to replace yesterday’s old ways?  
Will innovative revolution always outperform an evolution equally as brave?  
They are not some magic identities I have yet to reach,  
they are the journey I travel; indeed, have always travelled,  
the outcomes of my decisions every day, reflecting on my learnings.  
My journey will never end, my professional identity will always evolve,

my thoughts and actions adjusted to my circumstances now and ahead,  
being adaptable, encouraging, empowering,  
challenging, creative, resilient – my normal daily behaviour  
marrying past knowledge and lived experience with care for my learners  
with care for myself and desire to truly give my best.  
Another day and challenges have been met – bring on the next.  
Maybe tomorrow will be the day that I accept  
having multiple identities is not a bad thing  
that there is more to be learned from them in collaboration  
than in thinking I must be one identity or the other—  
Together Each (of me) Achieves More.

## INTRODUCTION

To address the question of what my identity means in a work-based learning context for me both as a learner and a learning practitioner, I have chosen a figurative autoethnographic camera and a series of lenses to document my experiences as I search for meaning and relevance as a Vocational Education and Training (VET) practitioner and learner. The first is a poetic inquiry lens (Hoben, 2021), chosen in an attempt to capture my inner thoughts about who and what I am, coupled with a heart-full filter (Ellis, 1999) to capture my evocative experience. The second is a subjective academic narrative lens (Arnold, 2015), selected for its ability to reveal fictional truth (Arnold, 2010) in the overall picture that might otherwise not come as sharply into focus.

Poetic inquiry—specifically, autoethnographic poetry—allows me to construct meaning (Lahman et al., 2010) from my lived experiences, teasing out key thoughts worthy of further reflection, to which I can add more detailed reflection on lived experiences as data (Wiebe, 2015). What is important is that the voice is mine and the content relevant to me (Newman, 2019), because that is where the value lies when I plan for future growth.

I will examine this process through two different lenses, each of which is a part of my search for meaning. The first is through my current role as a facilitator of diploma and degree-level management and leadership learning in an online environment. The second is through my current role as a doctoral-level learner, where I am re-creating myself as a critical learning outcome.

## AS A LEARNING FACILITATOR

For most of my career as a facilitator, I have worked in a face-to-face (F2F) environment. The time and place for formal learning sessions are fixed, as are some of the synchronous learning activities (Iowa State University, n.d.). I have never been a fan of rote learning, preferring instead to take more of a co-creational approach in which learners become partners in a shared learning enterprise. While much of my practice has been with cohorts working as smaller teams on discrete projects, the context for these tasks has been established via whole-class co-creation of an appropriate knowledge base (Cook-Sather et al., 2014), where the process can be tailored around an appropriate combination of theoretical approaches (Wilson, 2018). I can adjust my theoretical emphasis based on my 'read of the room' because all of the participants are sharing the same physical space and time with me—I can observe and respond appropriately based on the range of cues I am being presented with (Knight, 2018; Lemonis, n.d.).



Now I am working in a computer-mediated learning environment where content is delivered via the internet, and interactions between myself and my learners are largely via email (IGI Global, n.d.), and occasionally through the likes of Microsoft Teams. This means the learning is asynchronous—different learners engaging with the course content at times which fit the unique combination of their learning needs and lifestyle constraints (Scheiderer, 2021). While there are facilities for learners to engage with me using a range of different channels, there is no requirement for them to do so at all if they choose not to.

What I feel I have had to accept as a constraint in my current circumstances is that relationships with learners whom I never meet are going to be different to what I have been used to forming in the F2F environment. To me, this is not something that needs to be worked around, because online/distance delivery is the organisation's business—there is not going to be a return to a different model at a later point in time. What I need to make is a straight-out adjustment to my thinking about my role. I am no longer simply a provider of marks and feedback on assessments after the fact, I am a guide on the journey through assessments and into the world beyond. Because the likes of Zoom and Teams are not being used for student interactions with my courses, it is only through my written interactions and the very occasional phone call that I am able to project critical persona elements by coming across as approachable and interested in them (Barile, n.d.) that resembles what they would experience F2F.

To achieve what needs to be achieved—in line with the organisation's stated and real objectives—there are several additional adjustments this reflective lens reveals to me that will contribute to my greater satisfaction with how I am performing the role, positively impacting the relationships I have with my learners:

- Sharing relevant personal experiences. My pre-facilitating career has spanned a diverse range of industries and organisations, giving me an equally diverse collection of experiences from which to draw when it comes to demonstrating how learners can translate the theories they are learning to situations they may be more familiar with (Martin, 2019). Stories can excite interest in a topic that might otherwise not have existed (Baines & Healy, 2021), acting to provide structure for remembering course material (Green, 2004) in ways where the narrative connects with some aspect of the learner's lived experience, as well as a connection with me as the story sharer.
- Focusing on providing encouragement in every interaction. Recognising that direct, spontaneous interaction opportunities will be fewer than in a F2F environment, I believe it is important to review how I am communicating my course expectations for us as a cohort, especially when we are working with content that has been created by third parties (Martin, 2019). From my own experience as a distance learner, I have felt a much stronger connection with facilitators who have created a personal video introducing themselves rather than a page of text, or those who have held live sessions to deal with burning questions. Helping my learners to develop a more comprehensive understanding of who I am as a facilitator (Draus et al., 2014) can also go some way towards understanding who I am as a person outside of that specific context, helping learners to create a connection with me that is both broader and deeper than would be otherwise be possible.

The importance of creating a human relationship with my learners as a facilitator is an important part of the collaborative learning journey we are all taking. The adjustments I have outlined in this section, however, only go part way towards enabling me to become the most effective version of myself. Adding to these, I must also reflect on myself as a learner, because those experiences remind me what it is like to be taking the journey from the other side.

As I look back at the story I have shared here about how I operate, I am drawn to the work of Smit et al. (2010), and their thoughts on the struggles teachers face both in and around teaching, and how I construct my professional identity based on feedback from diverse sources. Tensions constantly exist between the various views informing my identity (Pillen et al., 2013). Moderating the tensions is my need to be authentic to myself in how I apply my mix of lived experiences and formal learning to both manage and lead learning experiences for my learners (McKenzie, 2012).

## AS A DOCTORAL LEARNER

Having to work almost entirely online is simply the reality of being a distance learner.

If I expected my doctoral journey to stretch me beyond limits I had not previously pushed, I have not been disappointed. It has taken me into mental spaces that I knew existed in theory; but had not experienced in practice. There are so many rabbit-holes I could disappear down in this section, each of them important in its own context, but the one I will discuss is loneliness. As I reflect back on four and a half years (at the time of writing) on the Doctor of Professional Practice journey, I would characterise it as one of the loneliest experiences of my life.

I work at home. I learn at home. The 'commute' between my place of sleep and my place of work and learning is six steps door-to-door—I know, because I counted every one of them. Sometimes it might be eight or nine steps if I have to sidestep around our cat. My work world is about 15 square metres of physical space, two computer screens and an internet connection. I rarely meet any of my fellow learners in person and, being half-way up-country from where my academic mentors are based in Dunedin, I rarely meet anybody to whom I 'report' in person. Inglorious isolation is where I exist, and yet it is not where I want to be.

It still surprises me that I write about not wanting to be isolated because, for a long time, I considered myself to have strong introversion tendencies, someone who was happier reflecting in the background and working independently (Petric, 2019). Such a view, however, is not consistent with my role as a learner-facing educator and trainer of over 20 years' experience. Grant (cited in Bradberry, 2016) identifies a number of critical questions that may give some indication of an individual's ambiversion potential. Options to choose from cover each end of the introversion-extroversion spectrum, such as preferences for working independently versus collaboratively, and the degree to which an individual enjoys being the centre of attention, to the balance of time spent alone versus in company.

In a face-to-face, classroom-based situation, I can be strongly extroverted, drawing energy from the audience I am interacting with, working in ways that are consistent with Blanchard's situational leadership model (Daft & Pirola-Merlo, 2009, p. 63) as a way of achieving outcomes collaboratively. On reflection, I find I also use elements of Fiedler's Contingency Model, matching my leadership style to the situation (McShane et al., 2013, p. 390). In other words, my doing and my learning occur in real time, face-to-face interactions, because I am an inherently social animal.

The communication that happens in face-to-face interactions tends to be both more interactive and filled with a richness of cues to meanings that either are not there or are easily missed in online meetings (Honeycutt, 2017; Krause, 2022). Balanced against this, however, I find myself experiencing a diminished sense of shared purpose and disenchantment (Breslau & Ramseur, 2021). I have more regular interactions with our cat than anybody connected with my project and, while there are times that talking issues through with Snowy The Cat has helped me to find answers (or, at least, possibilities) I was looking for, those interactions are not the same as interactions with project-connected humans.

With very few deep and meaningful connections to project-connected humans, it is perhaps inevitable that I have questioned who the authentic me really is. I have to be more than somebody who sits in front of two screens all day, reads a lot, thinks a lot, and sometimes writes stuff. I have objectified myself (Rashid & Brooks, 2021) as this person called 'Doctoral Learner (Remote)' and found pain in that process because somehow, I am not enough. The lack of recognition of, and engagement with who I am and what I am achieving is connected in my own mind to the lack of regular interaction with project-connected people.

How to assuage this pain? Through something entirely disconnected from my doctoral project—See (Camera) Time/Me Time. This self-care concept, borrowed from a friend's Doctor of Professional Practice project, allows

me to take advantage of the flexibility I have in my schedule by blocking out regular time each week (Hannigan, 2021) to focus on photography. Prioritising these moments of pleasure (Finch, 2020) I have taken this from a pastime to a serious hobby. When I am in that photography space, this is what I also refer to as my “photographic mindfulness time,” where I am intentionally living in that moment without judgement, in order to manage my emotions and bring about a state of calmness, and general sense of well-being (Birtwell et al., 2019; Pepping et al., 2016). Nothing else exists in that time except the challenge of capturing the images I have in my mind’s eye.

On a semi-regular basis, I chat on social media with other friends (Vermees, 2020) in the doctoral journey space “beyond business” (Finch, 2020), both in this country and overseas. We look out for each other (Hannigan, 2021) simply because that is what friends do, even though I have physically met only those in this country. Sometimes it is nice to know that there is somebody I can talk to outside of my immediate household who has either lived, or is currently living, the same sorts of issues I am. I do not expect them to solve my problems, because that is something I need to do. Sometimes the process of having the conversations does not create the solutions; it merely exposes them.

## CONCLUSION

As a practitioner and facilitator of collaborative learning for more than two decades, an important part of my work has been to train learners in how to think (rather than what to think). To think of possibilities. To not allow the past, or even the present, to define what the future could look like. To construct their identities from the experiences they live, and to be authentic to themselves.

The reflection I have engaged in to tell my story here has reminded me of the importance of living the advice I have shared with so many others. It has also reminded me that my two identities as facilitator and learner may never fully become one. I have come to accept that there will always be tension between elements of the two different identities. While education is the domain which unites them, it is the roles which separate them. At best, each will inform the growth of the other, and perhaps I simply need to accept that I have two related but not mirror image identities.

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# BUILDING A SOUNDTRACK FOR A DOCTORATE JOURNEY: SONGS SUNG WHILE LEARNING REFLEXIVITY AND CRITICALITY

Leigh Quadling-Miernik

## CONTEXT OF THE DOCTORATE

The Doctor of Professional Practice (D. ProfPrac) is a programme that develops a candidate's knowledge not only in their area of practice but within themselves (Otago Polytechnic, n.d.). Set within the candidate's professional practice, the ultimate goal is to contribute new knowledge that will inform the participant, the field of practice and the profession. Putting simply, it consists of different tasks or projects to achieve throughout the time. Course 1 has the Review of Learning and the Learning Agreement components, where both require a written document, and the Learning Agreement also includes a presentation. Like every qualification in New Zealand, there are Graduate Profile Outcomes and Learning Outcomes which when achieved, indicate the candidate has demonstrated the understanding that is required.

## THE ARTICLE'S CONTRIBUTION

This article outlines one phase in the journey of one doctoral candidate (me). It is centred within the Learning Agreement project as part two within Course 1. Its goal is to document the author's journey, as part of the Me Project within my doctorate as well as to inform other doctoral candidates of the adventures that await. This article is a subjective academic narrative (Arnold, 2012), where the article becomes a scholarly story using a selection of my journal entries as data. I acknowledge as I own the stories, that the presence of me within the narrative is subjective and there is an attempt to add deeper understanding.

What is a learning journal and what is my learning journal? In essence, a learning journal is a place of accumulated reflective moments over time and deeply personal (Moon, 2006). Highlighting the different nuances in the concepts of learning diary, learning log and learning journal, Moon then divides content matter into three areas of focus: personal development, non-vocational education and professional education/development. My D. ProfPrac journal started as a record of my journey documenting my actions and emotions, a diary as such. It developed into a reflective learning journey in response to a previous *Scope* article and the understanding of how I would design the Me Project further. To demonstrate the D. ProfPrac's Graduate Profile Outcome "Systematically and critically reflect on experience, theory and practice as a means of creating new knowledge" (Otago Polytechnic, n.d.), I adjusted my D. ProfPrac journal from a diary into a tool for my professional development.

It now records not only my actions and emotions but also what my actions mean and how I know what I know. It is handwritten, filled with typos and grammatical errors caused from quick or rambled thinking and digressions into rabbit holes as well as being in notebooks that bring joy when opening. This article is a reflection of my authentic written voice, centred around three key learning moments. These lightbulb moments are considered as critical incidents when viewed in hindsight. A critical incident is an experience, in other words, the moment

that has caused change due to the importance or critical thinking placed on the event (Tripp, 2012). Critical incidents are a useful tool in research and have been utilised in education and health research either as forward focused learning opportunities (Attrill et al., 2019; Hrovat & Luke, 2016) or reflective focused moments of learning (Bolton, 2016; Nejadghanbar, 2021; Wijaya & Kuswandono, 2019). In this article the critical incidents are defined as critical when I was reflecting on what I have learnt in the Learning Agreement, making them significant in hindsight rather than at that time. It is through my reflection on my actions that I have learnt.

## MY D. PROFPRAC JOURNEY AND BUILDING ITS SOUNDTRACK

Studying is often linked to the concept of a journey. During Course 1a: Review of Learning, I viewed the doctorate ahead as a journey where I struggled to see the road and grasped for a map to guide me. The trials and tribulations of Course 1a: The Review of Learning (ROL) journey were outlined with the realisation that my mentors were beside me, I did not need a map and my feet would find their way (Quadling-Miernik, 2022). I completed Course 1a in January 2022 with "I'm Not Afraid" (Eminem, 2010) as my theme song. This one lyric, "I'm not afraid," brought a slight bravado so that within my head and my heart was calmness for the year ahead. While I acknowledged it would still be challenging, exhausting, confusing and perhaps frustrating, I started the Learning Agreement (LA) section of my D. ProfPrac journey with confidence and peace that I could do it; slowly and surely, stepping forward, guided by my mentors to the side of me. Now at the end of the Learning Agreement, I have a new song for the journey ahead. This article outlines the changes across the last year, the deeper understanding of my journey, specifically in regard to learning reflexivity and criticality, as well as building the soundtrack to my D. ProfPrac. I position myself as a student within the D. ProfPrac, but also as a participant in an autoethnographic view of development, filled with reflection on actions across the year.

According to Adams et al. (2017) there are two purposes of autoethnography. The first is "to offer accounts of personal experiences to complement, or fill gaps in, existing research" and second to "articulate insider knowledge of cultural experience" (2017, p. 3). While there is plenty of research on doctorate students and their journeys (Al-Kassar & Chaer, 2013; Goodall et al., 2017; Turner, 2016; Webber, 2017), even with their supervisors or mentor (Goode & Andrew, 2021) it is my personal knowledge of my learning within the experience of being a D. ProfPrac student that I focus on within this article. Furthermore, it is useful to consider that central to autoethnography is the critical view on the personal experiences; there needs to be accountability and truthfulness within the context discussed. Adams et al. also further add that the stories of a person's experiences, the feelings, and the thinking, allow the information to become part of the "field" (2017, p. 4). Self-narrative shifts from reflection and stories to the development of new knowledge or new understandings of old (Andrew & Rossignol, 2017). In other words, my contribution becomes data for whoever studies doctoral students' journeys. It is important to note that this article and the reflective journal entries which could form usable data are not part of any study.

Reflection on action as opposed to reflection in action, is a form of retrospective reflection occurring after an event (Schön, 1983). The question posed by my mentor was: "What are the landmarks in learning reflexivity and criticality in your D. ProfPrac journey so far?" The landmarks were moments within reviewing and developing the three draft versions of my Learning Agreement. They come as critical moments, moments of clarity; when I develop a deeper understanding and change as a result. Through reviewing my reflective journal entries and by writing this journal article I am able to discuss the critical moments as well as the changes, which become either permanent or temporary.

## VI, V2, V3 REVELATIONS

A brief summary of the different versions (V) of the LA as time markers:

- End of January 2022 feedback from my RoL arrives
- February 16<sup>th</sup> first meeting starting the LA
- August 26<sup>th</sup> V1 uploaded
- November 10<sup>th</sup> V2 uploaded
- January 22<sup>nd</sup> 2023 V3 uploaded
- February 15<sup>th</sup> LA Presentation.

Knowing that my first LA document would be reviewed and not be at submission level, I duly used the provided template as a guide. I dithered about filling in sections, leaving them, reading more, updating sections, abandoning them, revising, and rewriting written parts. In reality, the V1 document I submitted was V4 as I started the document again and again when I was confused.

*Reflective journal – June 6<sup>th</sup> I've just structured the LA. I realised that I had been throwing things into sections and things were becoming unclear. A bit like how I cook Chinese – cut up the bits, throw them in a pan and add this and that, add more seasoning, discover something in the pantry/fridge to quickly chop up and throw in then stick it all on rice and eat.... So I structured my sections – broke them down to ingredients and components and now can see the whole as well as the parts.*

The journal entry above highlights a critical moment where I reflected on my approach. The final V1 started as my own adaption of the template with each section holding the subheading to guide me on each paragraph. A few days later a future critical moment starts to appear.

*Reflective journal – July 12<sup>th</sup> Another uneasy feeling is one of the writing being not so academic and more I, me, and random statements based on my gut. I'm tired of finding more sources or needing to find more sources. I am not synthesising my readings. Hummmm – I need to know how to synthesise my writing questions. How?*

## VI TO V2 LIGHTBULB MOMENT: DESIGNING RESEARCH MEANS RESEARCH DESIGN

One crucial span of time was between receiving written feedback on V1, the meeting with mentors to discuss V1 and the actions taken to get V1 to V2. With “I’m not afraid,” my theme song, continuously playing in my head, I processed the feedback, connected this to what I had written and connected it to further readings. It was these actions that helped me realise how important research design was. Creswell and Creswell (2018) state that central to the intersection of three components: philosophical worldviews, research design and specific methods, are the research approaches of qualitative, quantitative, and mixed methods. When I submitted V1, I wrote in my reflective journal what feedback I would receive as a form of competition between my mentors and myself.

*Reflective journal – Sept 7<sup>th</sup> Today was my meeting with mentors re draft 1 of the LA. It's a wonderful ride of emotions, plenty of 'yes but...' or 'great but...' which leads to a 'grrrrr why didn't you tell me before so I could do that' or 'I knew you were going to say that.' I am frustrated because the weak ones (ok – not weak but not of quality) are vaguely what I knew.*

This journal entry highlights the grasping of understanding which areas of V1 needed improvement, perhaps even before reading the feedback. It allowed me to see that not only was the LA document about the ‘why,’ the ‘who,’ and the ‘what’ of the future project, but it was really important to outline the ‘how.’ The questions I had to ask myself were “What are the processes to gather the data? Why am I choosing that process? How would I manage the data, the process, the analysis?” Adding to this was the struggle with, and linkage to, discovering my



epistemology and ontological stance. I realised it was important to outline where I sit and at whose table I sit. Once I did that within the LA document, the reader would understand my choices in the process. Creswell and Creswell (2018) suggest researchers “make explicit the larger philosophical ideas they espouse” (p. 44), as well as explain the choices made in the approach to the research.

While doing V1:

*Reflective journal – March 19<sup>th</sup> – Today I started reading the SAGE handbook but the big words just made me tired. So I realised I need to work on my questions and then the method....In the first bit I focussed on ethnography and phenomenology. After reading and YouTube clips, I've narrowed it down – Hermeneutics phenomenology – as opposed to Transcendental. I've got to feel comfortable I am in Heidegger's camp not Husserl's camp....So I'll just check out some differences btw phenomenology, ethnology, and grounded theory, and narrative inquiry. Now I'm confused again...I feel as though before I take a step forward I have to take a step back (or more) to get an understanding of the foundations.*

*I also got asked to discover my epistemic position – another situation of stepping back to step forward.*

*Reflective journal – July 30<sup>th</sup> – I also think I'm vaguely avoiding the harder parts of the writing, facing addressing my methodology and the lit review. Those parts are big – not just in writing but in comprehending the entirety. Justifying my methodology when I still don't quite get it, knowing I need to get it and being confident in it. It's all vaguely there, I can see things in a hazy fog but it's not quite clearing up nor do I spend time putting the heat on to clear the fog. But I will have to do it next week.*

These journal entries outline the start of learning aspects of research design. They touch on the confusion and the attempt to grasp what I knew I needed to grasp. It was at this point I remembered the next line in my D. ProfPrac theme song: “I'm not afraid – to take a stand.” I realised it was not just about the literature review or the completion of the template sections, but it was about taking a stand on how I would achieve this. Drawing a line in whether it was qualitative or quantitative, or even mixed methods. Looking about and choosing where to sit; at the table of narrative inquiry or ethnography, or even a phenomenological approach. It was also about considering how I would do the research and would those methods be achievable. Ultimately, it was outlining what I would do and why I chose to do it this way.

In V1 LA, I felt I had outlined this stand but it seemed not. In my profession when taking leave, I write a lesson plan for the person teaching my class. The plan details what the relief teacher could do just as if I was there. I needed to approach the LA document as a plan that anyone could pick up and do themselves. In order to get to V2, the research design section needed to be clearer, more prominent and logical. It was like my lesson plan for my research, stating the procedure I would be using.

Post V1 into V2:

*Meeting Notes – Sept 27<sup>th</sup>*

*Pre-meeting questions Justification of method/methodology – needs more right?*

*Meeting notes: Walk the reader through my decisions. There is a landscape to describe – what is the research, paradigms (broadly). Then my decisions are to clarify my position in the landscape and the reasons related to my epsito/onto. I make those decisions.*

*Reflective journal – September 29<sup>th</sup> –So I'm reading the Research Design books (AGAIN!). It's amazing how much easier these books, words have become. Two phrases come to mind: The awakening of... The deepening of...which is happening I don't know – maybe both. Maybe I am awakening to a deeper understanding. Whatever it is I will say it again, it's comfortable but still a challenge to get it finalised. People have talked about the wrestle with this part of the journey. I don't feel I am wrestling with the choices, I am wrestling with the writing of why these choices.*

Reflective journal – October 5<sup>th</sup> – *I truly understand what I have to do and why. I know I have to show the reader where I am going, what I am doing and also why – I'm just stuck on the writing structure.*

It is only now by reflecting on my actions when receiving feedback on V1, working on that feedback to write V2, and utilising other doctorate and PhD dissertations that I can see that researchers take a stand and they are not afraid of where they stand, but in doing so they fully outline their research design.

Email to mentor – December 6<sup>th</sup> – *The next line of I'm not afraid by Eminem is "to take a stand" That is what I feel I'm doing with the LA – taking a stand in where I sit in the plethora of paradigms. Drawing a faint line in what I will and won't do in research design. This whole year has been about finding my feet, getting solid and confident in my ability to 'represent' myself in research and having concrete feet so I won't be knocked over.*

## V2 TO V3 LIGHTBULB MOMENT: TIMES OF LEARNING REFLEXIVITY

### **Event: Meeting a D. ProfPrac colleague who said “How do you know what you know?”**

Reflexivity as headlined by Braun and Clarke (2022) is “the most important companion for your adventure” (p. 13). So who is my journey buddy? Who would be a good critical friend who I trust to ask the hard questions and provide a different view on significant issues? (Costa et al., 1993). I have my mentors, as well as colleagues and friends who are interested in my research. For reflexivity to happen, I am my buddy; well, my previous self is. By examining my own beliefs, judgements and practices throughout the research process, I can see my influences on the research. Braun and Clarke (2022) speak about the proactive and routine reflection on the choices and how these choices have produced knowledge. Considering this while writing the LA is important to set up before commencing research.

My colleague's question asks for me to provide evidence for what I say rather than trusting in my ability to understand what I do. If I extend this to my career in education, I know how to teach, it is in me and it has taken many years of experience to get to this point. I instinctually feel my way through lessons, responding to students developing their understanding, approaching the actions of teaching and learning in different ways, in any way to spark that lightbulb a teacher craves to see go off in the eyes of students. Within my teaching, I just know what to do next, or when to do things differently. This is what Schön (1983) would call knowing in action, where our knowledge is demonstrated through the skilful actions we have, and it is difficult to explain what we are doing. It's like driving – 90 percent of the time you just do it with little consciousness other than being aware of potential hazards. It is the other 10 percent of the time when you are very aware of your actions and the processes – like doing parallel parking. I do not feel the need to examine my practices, or my beliefs regularly within my profession. I may do some reflection on what I did within the classroom or how to approach the classroom the next day, but deeper questioning of my actions or beliefs rarely occurs.

Research however is not instinctual to me. I am constantly having to look, think, consider, revise, reword, justify, explain, frame, analyse, read and digest, read and disregard, ultimately leading to reflection on how this applies to my context, my research, and my understanding. This is preparing me to answer the reflexivity question – how WILL I know what I know?

Meeting Notes – June 15<sup>th</sup> *See how you see the world. Reflection writing – helps work through the fog. Start with the I statement and then unpack it.*

I took the time between V1 and V2 to examine my beliefs to get my stance. It was also at this stage, I twice took time to understand the words 'synthesis' and 'read critically.' I realised that although I knew the words, I did not understand the actions behind the words.

Meeting Notes – June 13<sup>th</sup> Scholar's voices are stepping stones to my research. Consider: How do you use the scholar's voices?

- Writing beyond descriptions. Consider defensibility.
- Analysis/Synthesis helps to move beyond description.

First attempt at understanding synthesis, during writing V1:

Reflective Journal – July 16<sup>th</sup> Today I started with looking at what is synthesis and the structure of a paragraph. I feel silly looking at this but who cares. Actually I think I've realised that I have been summarising instead of synthesising. So that is a change. I've just got to work through my thoughts to develop the skill of synthesising. I then started – restarted? my lit rev.

Reflective Journal – July 17<sup>th</sup> Today I continued my lit rev. I'm reflecting now, cos I've come to a standstill in the writing, that synthesis is hard!

Second attempt at understanding synthesis during writing V2:

Reflective Journal – Sept 24<sup>th</sup> I started with my feedback of my writing was more descriptive and I supposed that meant for me, not doctorate enough. So I reviewed how to critically read at this level. I suppose my big learning curve here is to not accept the statements as is and to question them – I've been collecting statements rather than synthesising them. New thought here, cos I thought I vaguely got synthesis but I don't to be honest. Synthesising and critical reading go hand in hand, taking knowledge deeper. In order to synthesise you need to read and question and link to other questions and thoughts you have. ....to work out how I can make notes on all my readings so I can critically think and synthesise.

These two journal entries show not only the actions behind my conscious learning of the words and the actions but the change in my processes to link references into my LA. It was a careful examination of my practices in my academic writing. The second attempt also highlights that the first attempt was not successful.

Reflective Journal – Nov 1<sup>st</sup> Today I've finished the lit review... I'm at the stage I have read it several times, I have thought 'have I used the references well, have I synthesised the references, have I linked things to PI or am I just telling you what the strand is, have I summarised it, have I got clear paragraphs with one topic and finally, is it enough, have I responded to feedback and do I need to respond to feedback?'

This journal entry shows my learnings and the depth of my reviewing stage, important in the process of this journey. Being critical of what I do and why is linked to achieving the D. ProfPrac and was the thought when writing V3. I needed to go back to the D. ProfPrac GPOs as well as the Learning Agreement's assessment rubric to ensure that I achieved these. Asking myself "What will I do to demonstrate I have achieved these?" helped me write down the processes and the evidence. Considering how I was being assessed and linking my actions to the criteria would enable me to feel I have achieved the goal. If actions could not be linked, then the question to myself was "Why was I doing that action?" This questioning, reflecting and reviewing is developing and embedding the skill of reflexivity.

Around this time my theme song changed based on my journal entry:

Reflective Journal – Sept 15<sup>th</sup> – I realised that the journey through the LA phase is one of everything being foggy and unclear. A person fights with understanding the -ologies, fights with having clarity, fights with being autonomous and not being led by the mentors, fights with finding their feet to stand up and be a doctorate level student, fights with the direction, the method, the methodology, the goal, the vagueness, the unfamiliarity of where you stand. It's a fog as thick as pea soup, and you slowly see through the soup and can make out vague objects. It's like the sun has come up and the fog is slowly being burnt away. And it's the same for everyone. I will stick with Natasha Bedingfield's lyrics from Unwritten.

I sang this for the rest of the LA journey; before each of the submissions of V2 and V3, I felt things were nearly there. I just had to let go and learn that I was undefined and just beginning. Additionally the future research; that is, the next phase, my book, was unwritten but I could taste it.

### V3 TO PRESENTATION LIGHTBULB MOMENT: GROUNDED, GROUNDING, THE GRIND OF CONNECTING

It was with my presentation preparation that another critical moment occurred leading to me understanding more of grounding my statements. If I used the word "connecting" instead of "grounding," it was easier to understand. It was the act of connecting and therefore supporting what I am saying. I am providing evidence that I have a reason for my decisions and actions within the research design. Additionally, and more importantly, I have to be explicit in my statements through grounding them in previous research. This is opposite to a grounded theory approach where theory arises from the participants, but grounded, that is connected, to their views (Creswell & Creswell, 2018). I wondered how people come up with new theories, and new directions if all the time they are grounded back to existing theories. Perhaps these researchers show why the grounding to the existing theory is disconnected through questioning and debunking with evidence. This leads to criticality.

According to the *Oxford English Dictionary* (2023) "criticality" is defined as being critical or judgemental in nature. It involves a careful approach that examines and judges the topic systematically, such as critical reflection (Morley, 2008) as a process to develop. Critical incidents are moments that are unplanned yet spark thought (Richards & Farrell, 2005), or even a critical friend questioning with objectivity (Shivers et al., 2020). The word critical takes on the notion of being something that is very serious (a critical situation) something that is extremely important (a critical factor), but also of being judged very good (critical acclaim). In order to be critical, I had to question what I read, and then judge it as suitable or not. Furthermore, in order to ground my statements I had to ensure the theory was present and connected.

No journal entry highlights this learning, although the mentor meetings' notes highlight the need for the actions.

In preparation for writing V2 and V3:

Meeting Notes – Sept 27<sup>th</sup> *Next draft is more critical. Use rhetorical questions – to strengthen my stance.*

Meeting Notes – Nov 23<sup>rd</sup> *Lift the criticality – in preparation for level 10.*

Presentation preparation meetings:

Meeting Notes – Feb 1<sup>st</sup> – *Come up with a short presentation to cover my bases. Cover methodological bases/choices with rationales. Prepare to answer questions regarding choices I have made in the methods.*

Meeting Notes – Feb 15<sup>th</sup> – *Deep dive – strong rationale for my choices. How the research question articulates with the method. As it is me telling the stories – ground them in the lit. The final statement, starred and in large writing: Keep it grounded/strong rationales.*

### POST PRESENTATION

I have a new theme song, "Unstoppable" (Sia, 2016). The song continues to empower and carry me into Course 2. Strangely, it plays on the radio on the days when I am slightly unmotivated to focus on the D. ProfPrac. I have my research design sorted and ethics is approved. Most importantly I know the questions to ask myself regarding my actions as I slowly deepen my knowledge of reflexivity and criticality.

## CLOSING

This article was to outline the learnings I have taken from the Review of Learning stage to the Learning Agreement stage, with a specific focus on reflexivity and criticality. With this, I hope to add to the voices of D. ProfPrac students and their journey of self-discovery and growth.

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